Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles

EPA Response to Comments Document for Joint Rulemaking

United States
Environmental Protection
Agency

Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles

EPA Response to Comments Document for Joint Rulemaking

Assessment and Standards Division
Office of Transportation and Air Quality
U.S. Environmental Protection Agency

United States
Environmental Protection
Agency

EPA-420-R-11-004
August 2011

Introduction

On October 25, 2010, the Administrator of the U.S. Environmental Protection Agency (EPA) and the Secretary of the Department of Transportation (DOT) jointly signed a Notice of Proposed Rulemaking (NPRM) for proposed greenhouse gas emissions standards and fuel efficiency standards for heavy duty vehicles and engines, under section 213 of the Clean Air Act (CAA or "the Act"). On November 30, 2010, the NPRM was published in the *Federal Register*. The EPA, in conjunction with the DOT's National Highway Traffic Safety Administration (NHTSA) held two public hearings on the NPRM; one in Chicago, IL on November 15, 2010 and one in Cambridge, MA on November 18, 2010. At those hearings, oral comments on the NPRM were received and recorded. Additionally, a written comment period remained open until January 31, 2011. A complete list of organizations, their abbreviations, and individuals that provided comments on the NPRM is contained in this document.

This *Response to Comments* contains a detailed summary of all comments we received on the NPRM as well as EPA's, and where marked, NHTSA's analysis of each comment and response. Citizen comments that raised unique substantive issues are included. In addition, several thousand citizens commented through mass e-mail campaigns; these comments are not included individually, but rather examples are provided. The comments and responses are organized by topic (see Table of Contents) to help the reader find comments and responses of interest. An index of commenters and their associated docket numbers is also provided.

Table of Contents

i. List of Commenters

Commenter	Docket ID*
American Council for an Energy Efficient Economy (ACEEE), Eaton Corporation, CALSTART, Natural Resources Defense Council (NRDC), and Union of Concerned Scientists (UCS)	1941,1941.1
Aeroserve Technologies Ltd.	2118.1,2118.2,2118.3,2118.4,2118
Alliance of Automobile Manufacturers (ALLIANCE)	1621,1621.1
Allison Transmission	2735,2735.1,2736,2736.1,2737,2737.1,2738,2738.1
American Automotive Policy Council (AAPC)	1762,1762.1
American Chemistry Council (ACC)	1631,1631.1
American Council for an Energy Efficient Economy (ACEEE)	1894,1894.1
American Council for an Energy Efficient Economy (ACEEE), Daimler Trucks North America, Natural Resources Defense Council (NRDC), Union of Concerned Scientists (UCS), Volvo Group North America	1892,1892.1
American Gas Association (AGA) and America's Natural Gas Alliance (ANGA)	1896,1896.1
American Lung Association (ALA) & Environmental Defense Fund (EDF)	3129.1,3129
American Petroleum Institute (API), National Petrochemical and Refiners Association (NPRA), and Western States Petroleum Association (WSPA)	1820,1820.1,1893,1893.1
American Road and Transportation Builders Association (ARTBA)	1777,1777.1
American Trucking Associations, Inc. (ATA)	2263.1,2263
Anonymous Public Comment	0376,1330,1330.1
ArvinMeritor, Inc.	1605,1605.1
Auto Research Center LLC (ARC)	1766,1766.1
Autocar, LLC	1617,1617.1
BAE Systems	1948.1,1948
Bendix Commercial Vehicle Systems LLC	1888,1888.1
BlueGreen Alliance	2117.1,2117
Bridgestone	2120.1,2120
Business for Innovative Climate & Energy Policy (BICEP)	2165.1,2165
California Air Resources Board (ARB)	2354.1,2354
CALSTART	2121.1,2121

Center for Biological Diversity	2506,2506.1,2506.2,2506.3,2507,2507.1,2507.2,2507.3,2507.4,2507.5,2508,2508.1,2508.2,2508.3,2508.4,2509,2509.1,2509.2,2509.3,2509.4,2509.5,2509.6,2510,2510.1,2510.2,2510.3,2510.4,2511,2511.1,2511.2,2511.3,2511.4,2511.5,2512,2512.1,2512.2,2512.3,2512.4,2512.5,2513,2513.1,2513.2,2514,2514.1,2514.2,2514.3,2514.4
Center for Neighborhood Technology (CNT)	2261.1,2261
Chamber of Commerce of the United States	2152,2152.1
Chew, Yuli	0558,558.1
Clean Air Task Force (CATF)	2734,2734.1
Coalition for Responsible Regulation, Inc. (CRR)	2262,2352.1,2352
Competitive Enterprise Institute (CEI)	2418.1,2418
Conservation Law Foundation (CLF)	3128
Cummins Inc.	1765,1765.1
Daimler Trucks North America	1818,1818.1,1819,1819.1
Desjardin, Randy	1329
Eaton Corporation	1649,1649.1
ecoFridge	2351,2351.1
Edison Electric Institute (EEI)	2114.1,2114
Encana Natural Gas Inc.	1758,1758.1
Energy Future Coalition (EFC)	2116.1,2116
Engine Manufacturers Association (EMA) and Truck Manufacturers Association (TMA)	1940,1940.1
Environmental Defense Fund (EDF)	1965
Exa Corporation	1759,1759.1
Fire Apparatus Manufacturers' Association (FAMA)	1328,1328.1
Florida Power & Light Co. (FPL)	2115.1,2115
Ford Motor Company	1761,1761.1
Green Truck Association (GTA)	1596,1596.1
Hasenour, Stephen R.	1515
Heavy-Duty Fuel Efficiency Leadership Group	1620,1620.1
Hino Motors, Ltd.	1609,1609.1
Honeywell	1891,1891.1
Horiba Instruments Inc.	353,0353
Hybrid Truck Action Group (HTAG)	1817,1817.1

Hydro Aluminum (Hydro)	1869,1869.1
Institute for Policy Integrity (IPI)	1895,1895.1
Interfaith Care for Creation (IFCC)	1587
International Association of Fire Chiefs (IAFC)	1760,1760.1
International Council on Clean Transportation (ICCT)	1945.1,1945
Investor Network on Climate Risk (INCR)	3142.1,3142,1946.1,1946
Lim, Daniel	3297
Ludlow, J.	1432
Manufacturers of Emission Controls Association (MECA)	1530.1,1530.2,1530
Mass Comment Campaign (40,911) (Sierra Club)	1947.1,1947
Missourians for Safe Energy (MSE)	1597
Motor & Equipment Manufacturers Association (MEMA)	1752,1752.1
National Association of Clean Air Agencies (NACAA)	1607,1607.1
National Automobile Dealers Association (NADA)	2705
National Federation of Independent Business (NFIB)	1527,1527.1
National Ready Mixed Concrete Association (NRMCA)	1326,1326.1
National RV Dealers Association (RVDA)	1775,1775.1
National School Transportation Association (NSTA)	1751,1751.1
National Solid Wastes Management Association (NSWMA)	1870,1870.1,2046.1,2046
National Truck Equipment Association (NTEA)	1608,1608.1
Natural Gas Vehicle Interests	2119.1,2119.2,2119.3,2119.4,2119
Natural Resources Defense Council (NRDC)	1776,1776.1
Navistar, Inc.	1871,1871.1,1871.2,1871.3
New York State Department of Transportation (NYSDOT) and Environmental Conservation (NYSDEC) and the New York State Energy Research and Development Authority (NYSERDA)	2047.1,2047
Northeast States for Coordinated Air Use Management (NESCAUM)	1757,1757.1,1757.2
Nose Cone Manufacturing Company	1943,1943.1
Odyne Systems, LLC	1853.1,1853
Oshkosh Corporation	1588,1588.1,1589,1589.1,1590,1590.1,1591,1591.1,1592,1592.1,1593,1593.1,1594,1594.1
Pacific Legal Foundation (PLF)	1604,1604.1
Parker Hannifin Corporation	1628,1855,2405,2406,3276,3277,3278,3279,1615
Pew Environment Group	1610,1610.1
Plass, B.	1324
POP Diesel	1897.1,1897
Recreation Vehicle Industry Association (RVIA)	3300

Robert Bosch LLC	1630,1630.1
Rubber Manufacturers Association (RMA)	1963,1963.1
Ryder System, Inc.	1674,1674.1
Savicorp	356.1,356,356
Sierra Club	1889,1889.1
Sinhatech	1606,1606.1,1606.2
Southern Utah Wilderness Alliance (SUWA)	1586
Southwest Research Institute (SwRI)	1778,1778.1
Spartan Motors, Inc.	1612.1,1612
Texas Department of Agriculture (TDA)	1898.1,1898
Truck Renting and Leasing Association (TRALA)	1816,1816.1,2048.1,2048
Union of Concerned Scientists (UCS)	0372_Mass ,1764,1764.1
University of Michigan Transportation Research Institute (UMTRI)	1852,1852.1
UPS	1763,1763.1
Utility Air Regulatory Group (UARG)	1964.1,1964
Virginia Department of Transportation (VDOT)	1611,1611.1
Volvo Group	1812,1812.1,1812.2
Washington State Department of Transportation (WSDOT)	1584,1584.1
Waste Management	1854.1,1854

* Docket ID Numbers in this table are each preceded by either EPA-HQ-OAR-2010-0162- or NHTSA-2010-0079

ii. List of Acronyms

μg	Microgram
μm	Micrometers
2002$	U.S. Dollars in calendar year 2002
2008$	U.S. Dollars in calendar year 2008
2009$	U.S. Dollars in calendar year 2009
A/C	Air Conditioning
ABS	Antilock Brake Systems
AC	Alternating Current
ACES	Advanced Collaborative Emission Study
AEO	Annual Energy Outlook
ANL	Argonne National Laboratory
APU	Auxiliary Power Unit
AQ	Air Quality
AQCD	Air Quality Criteria Document
AR4	Fourth Assessment Report
ARB	California Air Resources Board
ASL	Aggressive Shift Logic
ASPEN	Assessment System for Population Exposure Nationwide
ATA	American Trucking Association
ATRI	Alliance for Transportation Research Institute
avg	Average
BAC	Battery Air Conditioning
BenMAP	Benefits Mapping and Analysis Program
bhp	Brake Horsepower
bhp-hrs	Brake Horsepower Hours
BSFC	Brake Specific Fuel Consumption
BTS	Bureau of Transportation
BTU	British Thermal Unit
CAA	Clean Air Act
CAE	Computer Aided Engineering
CAE	Computer Aided Engineering
CAFE	Corporate Average Fuel Economy
CARB	California Air Resources Board
CCP	Coupled Cam Phasing
Cd	Coefficient of Drag
CDC	Centers for Disease Control
CFD	Computational Fluid Dynamics
CFR	Code of Federal Regulations
CH4	Methane

CILCC	Combined International Local and Commuter Cycle
CITT	Chemical Industry Institute of Toxicology
CMAQ	Community Multiscale Air Quality
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO2eq	CO2 Equivalent
COFC	Container-on-Flatcar
COI	Cost of Illness
COPD	Chronic Obstructive Pulmonary Disease
CoV	Coefficient of Variation
CRC	Coordinating Research Council
CRGNSA	Columbia River Gorge National Scenic Area
CRR	Rolling Resistance Coefficient
CSI	Cambridge Systematics Inc.
CSV	Comma-separated Values
CVD	Cardiovascular Disease
CVT	Continuously-Variable Transmission
D/UAF	Downward and Upward Adjustment Factor
DCP	Dual Cam Phasing
DE	Diesel Exhaust
DEAC	Cylinder Deactivation
DEER	Diesel Engine-Efficiency and Emissions Research
DEF	Diesel Exhaust Fluid
DHHS	U.S. Department of Health and Human Services
DOC	Diesel Oxidation Catalyst
DOD	Department of Defense
DOE	Department of Energy
DOHC	Dual Overhead Camshaft Engines
DOT	Department of Transportation
DPF	Diesel Particulate Filter
DPM	Diesel Particulate Matter
DR	Discount Rate
DRIA	Draft Regulatory Impact Analysis
EC	European Commission
EC	Elemental Carbon
ED	Emergency Department
EGR	Exhaust Gas Recirculation
EHPS	Electrohydraulic Power Steering
EIA	Energy Information Administration (part of the U.S. Department of Energy)
EISA	Energy Independence and Security Act
EMS-HAP	Emissions Modeling System for Hazardous Air Pollution
EO	Executive Order

EPA	Environmental Protection Agency
EPS	Electrified Parking Spaces
EPS	Electric Power Steering
ERG	Eastern Research Group
ESC	Electronic Stability Control
EV	Electric Vehicle
F	Frequency
FEL	Family Emission Limit
FET	Federal Excise Tax
FHWA	Federal Highway Administration
FIA	Forest Inventory and Analysis
FMCSA	Federal Motor Carrier Safety Administration
FOH	Fuel Operated Heater
FR	Federal Register
FTP	Federal Test Procedure
g	Gram
g/s	Gram-per-second
g/ton-mile	Grams emitted to move one ton (2000 pounds) of freight over one mile
gal	Gallon
gal/1000 ton-mile	Gallons of fuel used to move one ton of payload (2,000 pounds) over 1000 miles
GDP	Gross Domestic Product
GEM	Greenhouse gas Emissions Model
GEOS	Goddard Earth Observing System
GHG	Greenhouse Gases
GIFT	Geospatial Intermodal Freight Transportation
GREET	Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation
GUI	Graphical User Interface
GVWR	Gross Vehicle Weight Rating
GWP	Global Warming Potential
HAD	Diesel Health Assessment Document
HC	Hydrocarbon
HD	Heavy-Duty
HDUDDS	Heavy Duty Urban Dynamometer Driving Cycle
HEI	Health Effects Institute
HES	Health Effects Subcommittee
HEV	Hybrid Electric Vehicle
HFC	Hydrofluorocarbon
HFET	Highway Fuel Economy Dynamometer Procedure
HHD	Heavy Heavy-Duty
hp	Horsepower
hrs	Hours

HSC	High Speed Cruise Duty Cycle
HTUF	Hybrid Truck User Forum
hz	Hertz
IARC	International Agency for Research on Cancer
IATC	Improved Automatic Transmission Control
ICCT	International Council on Clean Transport
ICD	International Classification of Diseases
ICF	ICF International
ICM	Indirect Cost Multiplier
ICP	Intake Cam Phasing
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPCC	Intergovernmental Panel on Climate Change
IRIS	Integrated Risk Information System
ISA	Integrated Science Assessment
JAMA	Journal of the American Medical Association
k	Thousand
kg	Kilogram
km	Kilometer
km/h	Kilometers per Hour
kW	Kilowatt
L	Liter
lb	Pound
LD	Light-Duty
LHD	Light Heavy-Duty
LSC	Low Speed Cruise Duty Cycle
LT	Light Trucks
LTCCS	Large Truck Crash Causation Study
m2	Square Meters
m3	Cubic Meters
MD	Medium-Duty
MDPV	Medium-Duty Passenger Vehicles
mg	Milligram
MHD	Medium Heavy-Duty
mi	mile
min	Minute
MM	Million
MMBD	Million Barrels per Day
MMT	Million Metric Tons
MOVES	Motor Vehicle Emissions Simulator
mpg	Miles per Gallon
mph	Miles per Hour
MSAT	Mobile Source Air Toxic

MY	Model Year
N2O	Nitrous Oxide
NA	Not Applicable
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
NAS	National Academy of Sciences
NATA	National Air Toxic Assessment
NCAR	National Center for Atmospheric Research
NCI	National Cancer Institute
NCLAN	National Crop Loss Assessment Network
NEC	Net Energy Change Tolerance
NEI	National Emissions Inventory
NEMS	National Energy Modeling System
NEPA	National Environmental Policy Act
NESCCAF	Northeast States Center for a Clean Air Future
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHS	National Highway System
NHTSA	National Highway Traffic Safety Administration
NiMH	Nickel Metal-Hydride
NIOSH	National Institute of Occupational Safety and Health
Nm	Newton-meters
NMHC	Nonmethane Hydrocarbons
NMMAPS	National Morbidity, Mortality, and Air Pollution Study
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOx	Oxides of Nitrogen
NPRM	Notice of Proposed Rulemaking
NPV	Net Present Value
NRC	National Research Council
NREL	National Renewable Energy Laboratory
NVH	Noise Vibration and Harshness
O&M	Operating and maintenance
O_3	Ozone
OAQPS	Office of Air Quality Planning and Standards
OC	Organic Carbon
OE	Original Equipment
OEHHA	Office of Environmental Health Hazard Assessment
OEM	Original Equipment Manufacturer
OHV	Overhead Valve
OMB	Office of Management and Budget
OPEC	Organization of Petroleum Exporting Countries

ORD	EPA's Office of Research and Development
ORNL	Oak Ridge National Laboratory
OTAQ	Office of Transportation and Air Quality
Pa	Pascal
PAH	Polycyclic Aromatic Hydrocarbons
PEMS	Portable Emissions Monitoring System
PGM	Platinum Group Metal
PHEV	Plug-in Hybrid Electric Vehicles
PM	Particulate Matter
PM10	Coarse Particulate Matter (diameter of 10 µm or less)
PM2.5	Fine Particulate Matter (diameter of 2.5 µm or less)
POM	Polycyclic Organic Matter
ppb	Parts per Billion
ppm	Parts per Million
psi	Pounds per Square Inch
PTO	Power Take Off
R&D	Research and Development
RBM	Resisting Bending Moment
RESS	Rechargeable Energy Storage System
RfC	Reference Concentration
RFS2	Renewable Fuel Standard 2
RIA	Regulatory Impact Analysis
RPE	Retail Price Equivalent
rpm	Revolutions per Minute
s	Second
SAB	Science Advisory Board
SAB-HES	Science Advisory Board - Health Effects Subcommittee
SAE	Society of Automotive Engineers
SAR	Second Assessment Report
SBA	Small Business Administration
SBAR	Small Business Advocacy Review
SBREFA	Small Business Regulatory Enforcement Fairness Act
SCC	Social Cost of Carbon
SCR	Selective Catalyst Reduction
SER	Small Entity Representation
SGDI	Stoichiometric Gasoline Direct Injection
SI	Spark-Ignition
SIDI	Spark Ignition Direct Injection
SO_2	Sulfur Dioxide
SOA	Secondary Organic Aerosol
SOC	State of Charge
SOHC	Single Overhead Cam

SOx	Oxides of Sulfur
SPR	Strategic Petroleum Reserve
STB	Surface Transportation Board
Std.	Standard
SUV	Sport Utility Vehicle
SVOC	Semi-Volatile Organic Compound
SwRI	Southwest Research Institute
TAR	Technical Assessment Report
THC	Total Hydrocarbon
TIAX	TIAX LLC
TOFC	Trailer-on-Flatcar
Ton-mile	One ton (2000 pounds) of payload over one mile
TRU	Trailer Refrigeration Unit
TSD	Technical Support Document
TSS	Thermal Storage
U/DAF	Upward and Downward Adjustment Factor
UCT	Urban Creep and Transient Duty Cycle
UFP	Ultra Fine Particles
USDA	United States Department of Agriculture
UV	Ultraviolet
UV-b	Ultraviolet-b
VHHD	Vocational Heavy Heavy-Duty
VIUS	Vehicle Inventory Use Survey
VLHD	Vocational Light Heavy-Duty
VMHD	Vocational Medium Heavy-Duty
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compound
VSL	Vehicle Speed Limiter
VVT	Variable Valve Timing
WTP	Willingness-to-Pay
WTVC	World Wide Transient Vehicle Cycle
WVU	West Virginia University

1. Support for Final Rule

1.1. General Support for Rule

Organizations Included in this Section:

Eaton Corporation
American Automotive Policy Council
American Council for an Energy-Efficient Economy
American Lung Association
American Trucking Associations, Inc.
Anonymous Public Comment
ArvinMeritor, Inc.
BAE Systems
Bendix Commercial Vehicle Systems, LLC
BlueGreen Alliance
Bridgestone
Business for Innovative Climate & Energy Policy
California Air Resources Board
CALSTART
Center for Biological Diversity
Center for Neighborhood Technology
Chamber of Commerce of the United States
Clean Air Task Force
Conservation Law Foundation
Cummins Inc.
Daimler Trucks North America
Desjardin, Randy
Eaton Corporation
ecoFridge
Engine Manufacturers and Truck Manufacturers Associations
Environmental Defense Fund
Exa Corporation
Fire Apparatus Manufacturers' Association
Florida Power & Light Co.
Ford Motor Company
Green Truck Association
Heavy-Duty Fuel Efficiency Leadership Group
Honeywell
Hybrid Truck Action Group
Hydro Aluminum
Interfaith Care for Creation

International Council on Clean Transportation
Investor Network on Climate Risk
Lim, Daniel
Manufacturers of Emission Controls Association
Mass Comment Campaign
Missourians for Safe Energy
Motor & Equipment Manufacturers Association
National Association of Clean Air Agencies
National Automobile Dealers Association
National Truck Equipment Association
Natural Resources Defense Council
Navistar, Inc.
New York State Department of Transportation and Environmental Conservation
New York State Energy Research and Development Authority
Northeast States for Coordinated Air Use Management (NESCAUM)
Nose Cone Manufacturing Company
Pew Environment Group
Plass, B.
Robert Bosch LLC
Ryder System, Inc.
Sierra Club
Sinhatech
Southern Utah Wilderness Alliance
Truck Renting and Leasing Association
Union of Concerned Scientists
Virginia Department of Transportation
Volvo Group North America
Washington State Department of Transportation

Organization: ACEEE, Eaton Corporation, CALSTART, NRDC, and UCS

On behalf of the companies and organizations represented on this letter, we applaud your agencies' efforts to develop the first-ever greenhouse gas and fuel efficiency standards for medium- and heavy-duty trucks. We have previously stated our support for this program and see it as a key opportunity to reduce U.S. oil consumption, prevent greenhouse gas emissions, and create new markets for fuel-saving technology in the transportation sector. [EPA-HQ-OAR-2010-0162-1941.1, p.1]

Last October, your agencies issued a Notice of Proposed Rulemaking to establish standards between model years 2014 and 2018. We believe the proposed standards are fundamentally achievable and will deliver important benefits. However, this joint submission underscores our common concern that the proposed standards fail to properly incentivize the development and introduction of critical fuel-saving technology, such as hybrid power systems and advanced transmissions. [EPA-HQ-OAR-2010-0162-1941.1, p.1]

Organization: American Automotive Policy Council

AAPC supports the efforts of the United States Environmental Protection Agency ('EPA') and the Department of Transportation's National Highway Traffic Safety Administration ('NHTSA') to adopt a 2014-2018 model year medium- and heavy-duty vehicle greenhouse gas and fuel consumption program modeled after the 2012-2016 model year Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule. AAPC believes that the program should: [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

• Establish a coordinated national program to reduce the fuel consumption and reduce greenhouse gas emissions from medium- and heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

• Acknowledge that the data on greenhouse gases and fuel consumption is limited and still developing for this all new program. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

• Promote the introduction of a new generation of clean vehicles with innovative technologies. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

• Promote U.S. leadership in manufacturing clean medium- and heavy-duty trucks and vans. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

• Create high-quality domestic jobs. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

• Enhance energy security. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

• Be technically feasible and cost effective for both consumers and manufacturers. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The adoption of fuel efficiency and greenhouse gas standards for medium- and heavy-duty vehicles is a major step toward managing the nation’s oil consumption, emissions, and fuel expenditures, and by extension the cost of consumer goods. It also offers the potential of new jobs in the design and production of new vehicle technologies. U.S. manufacturers and suppliers are leaders in certain advanced truck technologies, and this program has the potential to help them consolidate their leadership and thrive in a global market. At the same time, other nations are developing their own programs to improve the efficiency and reduce the emissions of heavy-duty vehicles, and this rule can help set the stage globally. [EPA-HQ-OAR-2010-0162-1894.1, p. 1]

While it is clear that truck users are sensitive to fuel prices, there are currently major obstacles to bringing efficiency technologies into the market: there is no standardized way of documenting the benefits of these technologies; volatile fuel prices undermine the confidence of manufacturers and buyers to invest in them; and trucks are often sold after just a few years on the road. Given this situation, a fuel efficiency standard is an important tool for promoting the development of new technologies and ensuring their rapid deployment. [EPA-HQ-OAR-2010-0162-1894.1, p. 1]

EPA's and NHTSA's proposed rule represents a good first step in the difficult job of setting fuel efficiency and greenhouse gas emissions standards for medium- and heavy-duty vehicles. ACEEE supports the adoption of the program starting in 2014, as proposed. We also believe however that the proposal can and should be strengthened to capture more of the available fuel savings, to ensure support for the program among regulated entities and the public, and to establish precedents that will facilitate future improvements in the program. [EPA-HQ-OAR-2010-0162-1894.1, p. 1]

We also note that complementary strategies, while not part of the rule itself, could enhance the program's success. Financing mechanisms such as those promoted through EPA's SmartWay Partnership could help owner-operators and smaller fleets with limited resources to realize net savings from more efficient trucks beginning as soon as the trucks are put into operation and continuing throughout the vehicles' lifetimes. [EPA-HQ-OAR-2010-0162-1894.1, p.3]

In conclusion, ACEEE strongly supports EPA and NHTSA's development and adoption of greenhouse gas and fuel efficiency standards for all medium- and heavy-duty vehicles starting in model year 2014. We recommend that the agencies strengthen the proposed rule in several areas as discussed above to ensure that the program achieves maximum economic and environmental benefits and sets a strong precedent for future phases of the program. [EPA-HQ-OAR-2010-0162-1894.1, p.28]

Organization: American Council for an Energy-Efficient Economy (ACEEE), Daimler Trucks North America, Natural Resources Defense Council, Union of Concerned Scientists, Volvo Group North America

We believe the proposed standards are fundamentally achievable, and we urge that any flexibility provisions in the final rule be designed to preserve the savings and integrity of the program. [EPA-HQ-OAR-2010-0162-1892.1, p.1]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

EDF and ALA strongly support the comprehensive Heavy-Duty National Program to reduce greenhouse gas emissions and improve fuel efficiency for medium- and heavy-duty vehicles. The nation's fleet of trucks and buses consumes nearly 2.5 million barrels of oil per day and emits about 20 percent of U.S. transportation greenhouse gas emissions. Reducing fuel consumption and GHG emissions from these vehicles will lessen our dependence on oil, improve our energy security and help mitigate climate change. The proposed standards will also drive innovative technologies that will stimulate economic growth and create high-quality domestic jobs. [EPA-HQ-OAR-2010-0162-3129.1, p.2]

The SmartWay Transport program currently focuses primarily on Class 7/8 fleets and technologies. We encourage to the Agency to expand the program to more fully include vocational fleets by, for example, including technologies for vocational engines and vehicles in the calculators. In addition, the Green Vehicle Guide could be expanded to include information about vocational vehicles, tractors, and trailers. [EPA-HQ-OAR-2010-0162-3129.1, p.15]

Organization: American Trucking Associations, Inc. (ATA)

ATA supports efforts to reduce greenhouse gas (GHG) emissions and reduce the nation's fuel consumption to make this country more energy independent and ensure our industry is as green and fuel-efficient as possible. Fuel economy of line-haul trucks has not improved appreciably over the last quarter century and average fuel economy of between 6.0 and 6.5 miles per gallon is not acceptable to our industry. ATA endorsed national fuel economy standards for medium- and heavy-duty trucks that are both technologically and economically feasible. In May 2010, ATA participated in President Obama's Rose Garden event whereby he signed a Presidential Memorandum directing DOT and the U.S. Environmental Protection Agency (EPA) to develop a standard to improve fuel efficiency starting with the model year 2014 and establishing the goal of issuing a final rule by July 30, 2011. [EPA-HQ-OAR-2010-0162-2263.1, pp.2-3]

Organization: Anonymous Public Comment

According to your proposal, this regulation is nearly 30 years overdue. There is no time like the present to enact this rule; especially considering most of the people that first considered it are now retired. While the transformation of commuter cars has been drastic in recent years, moving from hybrids, natural gas cars, and even electric cars, not much progress has been seen in the design of medium and heavy vehicles. [EPA-HQ-OAR-2010-0162-0376-cp, p.1]

Organization: Anonymous Public Comment

I think that this proposed rule regulating greenhouse gas emissions and fuel efficiency standards for medium and heavy-duty vehicles is a major step forward for the United States in addressing climate change issues. This is especially true since this rule will implement the first ever program to reduce greenhouse emissions and improve fuel efficiency for heavy-duty vehicles. There is no reason not to apply these sorts of standards to medium and heavy-duty vehicles when light-duty vehicles are already being regulated in such a manner. [EPA-HQ-OAR-2010-0162-1330.1, p.1]

Organization: ArvinMeritor, Inc.

ArvinMeritor is supportive of efforts to reduce dependency on foreign oil and to limit greenhouse gas emissions. Establishing regulated limits now for commercial vehicles is the right thing to do for the U.S., and fortunately, the industry is well positioned to implement the product changes that will meet or exceed the limits. [EPA-HQ-OAR-2010-0162-1605.1, p.1]

The agencies were challenged to issue regulations in a compressed timeframe, which required a pragmatic and simplified approach to regulate fuel efficiency for the first time in this highly complex vehicle segment. The breadth and range of products in this commercial vehicle segment obviously posed a formidable challenge. Each of the major OEMs has a plethora of vehicle models, applications, and variants. Unlike passenger cars, commercial trucks allow significant variation in major drivetrain components, including engines, transmissions, axles, tires, suspensions, and ancillary equipment. The need to take this broad range of products and consolidate them into distinct regulatory categories was no small task, and in the end, required some compromises to the validation process. Despite the necessary compromises, the resulting regulations are workable, and will drive meaningful improvements in fuel efficiency and emission reduction. The effectiveness of the agencies' overall approach is demonstrated by the following elements of the regulations. [EPA-HQ-OAR-2010-0162-1605.1, pp.1-2]

The agencies did extensive research and analysis to understand what existing technologies could significantly improve fuel economy. The objective was to establish regulations that could be met without the need for extensive research and development initiatives. Indeed, the implementation timing for the regulations would not have allowed for a lengthy R&D process. Regulations were established by calculating the benefit of the current technologies and projecting an acceptance rate of implementation percentage. Again, a dose of reality was integrated into the regulations by recognizing that not all technologies could or would be utilized on all vehicles. [EPA-HQ-OAR-2010-0162-1605.1, p.2]

Once again, ArvinMeritor applauds the agencies for the development of simplified, but effective, regulations that can be met by OEMs in the compressed timeframe specified. The agencies' approach gives the industry every chance to succeed. [EPA-HQ-OAR-2010-0162-1605.1, p.3]

Organization: BAE Systems

We applaud EPA and NHTSA's initiative to improve fuel efficiency of our Nation's medium- and heavy-duty vehicle fleets. Improving transportation efficiency, reducing our Nation's dependence on foreign oil, and the resultant reduction in greenhouse gases and other criteria pollutants are strategic national imperatives which we at BAE System fully support as demonstrated by the substantial private investment we have put into the development and deployment of hybrid-electric drive systems over the past decade. [EPA-HQ-OAR-2010-0162-1948.1, p.1]

Organization: Bendix Commercial Vehicle Systems LLC (Bendix)

The state of the nation's economy in recent years has severely challenged all sectors of the motor vehicle industry and many suppliers continue to face financial hurdles. Bendix is encouraged by the carryover of the collaborative efforts from the light-vehicle National Program for fuel economy and greenhouse gas (GHG) emission standards between the federal agencies, National Highway Traffic Safety Administration (NHTSA) and Environmental Protection Agency (EPA), to approach medium- and heavy-duty vehicles standards. Bendix supports a uniform National Program based on GHG reduction and reduced fuel consumption because it allows vehicle and engine manufacturers to focus their resources on investing in the best technologies available. This, in turn, feeds the ability of the supplier base to advance development and turn research technologies into commercially viable products. This creates a lasting shared value among the government agencies, the for-profit businesses such as Bendix and most importantly the communities that we all reside and work within. Once the agencies are finished with the current proposed rulemaking for MY2014-2018 medium- and heavy-duty vehicle standards, Bendix encourages the agencies to continue this path of work as they consider the next phase of standards for MY2018/MY2019 and beyond. [EPA-HQ-OAR-2010-0162-1888.1, p.1]

Bendix supports the approach taken by the Administration to bring together the medium- and heavy-duty vehicle fuel efficiency standards and GHG emissions standards into a joint Heavy-Duty National Program. A uniform program not only allows vehicle manufacturers to invest in the appropriate technologies their vehicles need to reach and exceed the targets, but also helps the supplier base convert research technologies into commercially viable products.

Suppliers are a key part to producing the results outlined by the Administration. [EPA-HQ-OAR-2010-0162-1888.1, p.7]

Bendix urges the EPA and NHTSA to adopt the recommendations provided herein to expand the advanced technologies eligible for regulatory flexibility credits. Also, we urge the agencies to prescribe a clear process by which stakeholders can submit innovative technologies for regulatory flexibility credits. Bendix made several recommendations to revise and/or reconsider some of the assumptions relative to the various compliance provisions made in the NPRM for not only this final rule, but for the next phase of rulemaking for these vehicles. [EPA-HQ-OAR-2010-0162-1888.1, p.7]

Organization: BlueGreen Alliance

The light-duty vehicle sector is poised to provide significant oil savings and pollution reductions as a result of the historic model year 2012–2016 fuel efficiency and greenhouse gas standards finalized in April 2010. Expanding this approach to medium- and heavy-duty vehicles is critical to building a comprehensive national framework for vehicle standards. These vehicles – which include delivery trucks, buses, and long-haul freight trucks – consume as much as 37 billion gallons of fuel every year and account for 20 percent of the GHG emissions from the transportation sector, although they comprise just 4 percent of all vehicles on the road. As a result, these standards represent a tremendous opportunity to lower fuel costs for truckers, cut pollution, save oil, and create jobs. [EPA-HQ-OAR-2010-0162-2117.1, p.1]

Setting the first-ever national GHG and fuel efficiency standards for medium and heavy-duty vehicles will help America lead the world in the development and deployment of a new generation of cleaner trucks. Doing so will reduce our dependence on oil, strengthen the American auto and truck manufacturing sectors, create quality jobs and significantly reduce GHG pollution. [EPA-HQ-OAR-2010-0162-2117.1, p.1]

As proposed, the standards will improve fuel efficiency between 7 and 20 percent among truck classes, resulting in 250 million fewer tons of GHG pollution and saving 500 million barrels of oil over the life of vehicles sold from 2014 to 2018. This estimated cumulative oil savings is almost as much as what America imported last year from Venezuela and Iraq. [EPA-HQ-OAR-2010-0162-2117.1, p.2]

The BlueGreen Alliance, working among a unique partnership of labor and environmental movement perspectives – including the Teamsters, United Auto Workers, Sierra Club, Natural Resources Defense Council, Union of Concerned Scientists, and National Wildlife Federation - support this initial approach to setting medium- and heavy-duty vehicle standards. [EPA-HQ-OAR-2010-0162-2117.1, p.2]

We applaud the agencies' efforts to develop the first-ever fuel efficiency and greenhouse gas standards for medium- and heavy-duty vehicles. Working together, we can ensure the best possible outcomes for American workers, our communities, the economy and the environment. [EPA-HQ-OAR-2010-0162-2117.1, p.3]

Organization: Bridgestone

As an environmental advocate, Bridgestone Americas supports the NHTSA and EPA efforts to establish proposed vehicle standards to improve the environment. We understand that the referenced proposed rule is a vehicle rule, but a technology emphasized in formulating the proposed Greenhouse Gas Emissions and Fuel Consumption vehicle standards is low rolling resistance and wide base tire technology. Therefore, tires are indirectly impacted by this proposed rule and we are committed to assisting in promulgating a rule that is effective, efficient and has considered all un-intended consequences. [EPA-HQ-OAR-2010-0162-2120.1, p.2]

Organization: Business for Innovative Climate & Energy Policy (BICEP)

As leaders of large U.S. businesses, we are writing to voice our strong support of EPA and NHTSA's efforts to regulate the medium- and heavy-duty truck sector. Strict standards will save companies money, create jobs, promote energy security and reduce climate risk. [EPA-HQ-OAR-2010-0162-2165.1, p.1]

EPA and NHTSA are to be commended for the proposals under consideration, but by using existing and emerging technologies, we could realize even greater benefits in terms of economic growth and oil savings. We thus urge EPA and NHTSA to take into account all available technologies across the vehicle in setting standards, and to require a 35% reduction in fuel use by long-haul trucks pulling van trailers by 2017. We also urge the agencies to move aggressively to set standards for trailers for model year 2014, which will result in significant overall fuel savings for combination tractors. [EPA-HQ-OAR-2010-0162-2165.1, p.1]

Organization: California Air Resources Board (ARB)

ARB strongly supports the development of a federal program by U.S. EPA and NHTSA ('the agencies') to reduce the greenhouse gas (GHG) emissions and improve the fuel economy of heavy-duty vehicles. Continued, unwavering progress along this regulatory path is vital for California and the nation as we continue to strive to stabilize the climate and address the threat of global climate change. [EPA-HQ-OAR-2010-0162-2354.1, p. 1]

ARB understands that the proposal would result in the introduction of the most GHG-efficient heavy-duty trucks on the roads, encouraging technology innovation and early introduction. California fully supports the development of such national regulations, as it will help us meet the goals established by the California Global Warming Solutions Act of 2006 (AB 32). Specifically, AB 32 mandates a reduction of California's GHG emissions to 1990 levels by 2020. Further, Governor Arnold Schwarzenegger also issued Executive Order S-3-05, which prescribes an additional 80 percent reduction from 1990 levels by 2050. [EPA-HQ-OAR-2010-0162-2354.1, p. 1]

Organization: CALSTART

We support the rule and commend EPA and NHTSA for collaboratively working with industry to develop the proposal. This rule is a critical step in US efforts to combat climate change and address energy security. [EPA-HQ-OAR-2010-0162-2121, p.1]

We believe that smart, aggressive regulations can be positive for US industry and business and help drive innovation in new technologies, fuels and approaches. American companies are already leaders in many of the technologies that can achieve much greater fuel savings and carbon reductions. CALSTART would like to take this opportunity to provide comments on the proposed rule in an effort to ensure that it is effective in accelerating the transition to cleaner and more efficient medium and heavy duty vehicles. [EPA-HQ-OAR-2010-0162-2121, p.2]

Organization: Center for Biological Diversity

We fully support NHTSA’s and EPA’s (the “Agencies”) efforts to curb greenhouse gas emissions from and improve the fuel efficiency of new medium- and heavy-duty on-highway vehicles and work trucks and their engines (“HD Vehicles”), and appreciate the opportunity to submit comments on the Proposed Rule. We thank the Agencies for taking our comments, including those to the recent light-duty vehicle rules, into account. The Proposed Rule, however, contains significant flaws and fails to set the HD Vehicle standards at the maximum feasible level. We have discussed many of these issues in detail in our prior comment letters, and here will raise only additional concerns while seeking to avoid repetition. [EPA-HQ-OAR-2010-0162-2506.1, p.2]

Organization: Center for Neighborhood Technology

The Center for Neighborhood Technology (CNT) is writing to support the adoption of the joint National Highway Traffic Safety Administration (NTHSA) and Environmental Protection Agency (EPA) rulemaking setting fuel economy and greenhouse gas emissions standards for medium- and heavy-duty engines and vehicles (Docket Numbers NHTSA-2010-0079 and EPA-HQ-OAR-2010-0162). [EPA-HQ-OAR-2010-0162-2261.1, p.1]

Transit buses that operate in the urban environment at low speeds with many stops can benefit greatly from new technologies such as regenerative braking and hybridization to increase fuel economies. In this time of economic constraints, technologies that reduce the operational costs, including fuel purchases, for these agencies will help ensure that they can continue to provide transit service to communities that rely on them for mobility and accessibility. [EPA-HQ-OAR-2010-0162-2261.1, p.1]

Communities across the country are seeking to do their part to address global climate change by setting emissions targets and working to implement greenhouse gas mitigation strategies. This rulemaking will help every single one of these communities in meeting their goals by reducing the emissions from on-road vehicles with a comprehensive nation-wide mandate, the impact of which goes beyond what any one community could do on their own. [EPA-HQ-OAR-2010-0162-2261.1, p.1]

Organization: Chamber of Commerce of the United States

The Chamber strongly supports the goal of greater fuel economy for the medium- and heavy-duty trucking sector. The Chamber also recognizes that EPA, NHTSA and the stakeholder industries have agreed on a framework for a national program to address GHG emissions and increase fuel economy for years 2014-2018 (hereinafter referred to as the “National Program”). The Chamber provides the following comments and critiques on the joint proposed rule in an effort to assist EPA and NHTSA in accomplishing the goals of the National Program. [EPA-HQ-OAR-2010-0162-2152.1, p.1]

Organization: Clean Air Task Force (CATF)

The HD GHG Rule proposal would establish for the first time fuel efficiency and greenhouse gas standards for new medium- and heavy-duty trucks sold in model years (MY) 2014 to 2018. We commend EPA and NHTSA for moving forward with this joint proposal, which we believe is an important part of the President’s commitment to reduce our nation’s oil dependence and to reduce greenhouse gas emissions from the transportation sector. We also believe that the proposed Rule is absolutely necessary, and should be strengthened and finalized promptly. [EPA-HQ-OAR-2010-0162-2734.1, p.2]

We support the basic direction and structure of the rule presently proposed, including application of the standards to all medium-and heavy-duty truck classes, from Class 2b heavy pick-ups through Class 8 tractor trailers, beginning with model year 2014. We also support separate standards for combination truck engines, although we think the standards proposed need to be strengthened. And, we strongly support in principle the use of incentives and flexibility provisions to encourage the introduction and commercialization of advanced technologies, but are concerned that as presently proposed in the Rule they may serve as a weak substitute for tighter standards that will hasten the introduction of those technologies, and as such will compromise the overall level of greenhouse gas reductions produced by the rule. [EPA-HQ-OAR-2010-0162-2734.1, p.3]

Organization: Conservation Law Foundation

I strongly support the EPA and DOT proposed rules to adopt America's first-ever climate pollution and fuel economy standards for freight trucks and buses. [EPA-HQ-OAR-2010-0162-3128, p.1]

Organization: Cummins Inc.

Cummins Inc. supports the government's efforts to set greenhouse gas and fuel consumption standards for medium- and heavy-duty engines and vehicles in a comprehensive Heavy-Duty National Program. As noted in our oral testimony [1] during public hearings on November 15, 2010 and November 18, 2010, Cummins is an advocate for consistent and responsible regulations that recognize the needs of business, offer clear direction and provide incentives to companies that create innovative technologies as well as jobs in this country. Important national energy, environment and economic goals can and should be achieved through this rulemaking by requiring greenhouse gas (GHG) and fuel consumption (GHG/FC) improvements for commercial vehicles. [EPA-HQ-OAR-2010-0162-1765.1, p.7]

Cummins supports the efforts of EPA and NHTSA to develop this first ever "Proposed Rule on Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles". Cummins appreciates the Agencies' leadership in proposing this historic regulation. This regulatory action has broad support because of the open process used to create it and its potential for economic, energy and environmental benefits. As highlighted in these comments, there are still issues requiring further consideration and some remaining details to finalize. We look forward to continuing to work with the Agencies over the coming months to develop the final rule. By building on our long history of working together and by utilizing existing programs where possible, we can together deliver the greenhouse gas and fuel consumption benefits envisioned in this rulemaking while continuing to deliver outstanding products to our customers. [EPA-HQ-OAR-2010-0162-1765.1, p.50]

1 See Appendix A for the full text of the testimony. [See pages 52-56 of Docket 1765.1]

Organization: Daimler Trucks North America

Daimler fully supports the Agencies' desire to establish a rule that has the effect of reducing the GHG emissions from commercial vehicles and improving their fuel efficiency. Daimler applauds the Agencies' significant efforts that have resulted in the proposed rule. Daimler appreciates the opportunity over the past many months to have worked with the Agencies in the development of the proposed rule.[EPA-HQ-OAR-2010-0162-1818.1, p.2]

Nevertheless, given the Agencies' desired time frame for implementation of a rule (2014), the Agencies have been forced to find a simpler and more easily achievable solution in a first phase effort to begin regulating commercial vehicle GHG and fuel efficiency. In connection with that solution, the Agencies have agreed with the industry, including Daimler, on some core principles that form the basis of Daimler's willingness to accept a rule that may not meet Daimler's objectives as described above and does not provide the required lead time and stability. While we would have preferred that the rule went a different direction, Daimler acknowledges the excellent work the Agencies have done to develop a proposal that can form the basis of a workable rule. [EPA-HQ-OAR-2010-0162-1818.1, p.2]

In addition, as explained below, it is vitally important, that there be one, and only one, national program. The market for medium and heavy-duty vehicles and engines, and the manner in which they are built, sold and operated, cannot accommodate differing or disparate GHG/FE standards. Consequently, the Agencies must continue their outreach efforts with the State of California to ensure that California remains fully committed to the single national program at issue. Similarly, the Agencies should work with their counterparts in Canada and Mexico to ensure that any GHG/FE standards that those nations may consider and adopt are fully aligned and harmonized with the standards promulgated under this rule making. [EPA-HQ-OAR-2010-0162-1818.1, p.2]

Organization: Desjardin, Randy

I applaud both the National Highway Transportation Safety Administration and the Environmental Protection Agency (EPA) on their proposal to reduce the greenhouse gas (GHG) emissions of medium and heavy duty vehicles. By reducing the emissions from these classes of vehicles it is suggested that the United States would reduce 250 million metric tons of GHG and 500 million barrels of oil for the life span of 2014-2018 vehicles. While this is a step in the right direction, we have to maintain this direction to help preserve both our economy (the reliance on fossil fuels) and help preserve our environment for future generations. [EPA-HQ-OAR-2010-0162-1329-cp, p.1]

Organization: Eaton Corporation

We believe that the proposed rule is a good foundation for new regulations that will reduce GHG emissions and improve the fuel efficiency of heavy-duty vehicles. The new standard takes an important step toward addressing many challenges that face our nation: energy security, emissions reduction and additionally, provide a nexus for another societal goal: job creation. [EPA-HQ-OAR-2010-0162-1649.1, p.2]

The rule must have clear, achievable objectives that spur innovation and deployment, avoiding negative impacts on the economy while promoting our Nations' leadership in commercial vehicle fuel efficiency. We believe that many of the technologies needed to achieve the proposed standards are available. Many are already in use; others need a path into the market. The rule has the potential to accelerate adoption of game changing technologies that lead the world in fuel economy and GHG reduction in the medium and heavy duty transportation sector. We are putting forth these comments after carful consideration of the impacts and opportunities these new regulations present.[EPA-HQ-OAR-2010-0162-1649.1, p.2]

We hope that our comments contribute to the current framework outlined in the NPRM and lead to a final regulation that will drive innovation, foster both technology and competition, while maintaining fleet diversity and incentivizing over-achievement of emissions and fuel economy targets. [EPA-HQ-OAR-2010-0162-1649.1, p.2]

Organization: ecoFridge

We commend the actions taken by the EPA and NHTSA to regulate the fuel economy and greenhouse gas emissions from medium- and heavy-duty vehicles. We recommend that EPA and NHTSA should extend the proposed rules to cover TRU diesel units, and phase in a requirement that new units adopt alternative non-diesel refrigeration solutions. [EPA-HQ-OAR-2010-0162-2351.1, p.1]

The proposed rules specify that the regulations cover the complete vehicle and not simply the vehicle's engine. This approach correctly recognizes the achievements that can be gained through improvements in a vehicle's overall performance. In the TRU industry, those gains are particularly feasible through improvements in the refrigeration system utilized by shipping vehicles. [EPA-HQ-OAR-2010-0162-2351.1, p.2]

Organization: Engine Manufacturers and Truck Manufacturers Associations

EMA and TMA continue to support the common core principles that shape the framework for the Proposed GHG/FE Standards. Accordingly, while these comments necessarily will focus on the Associations' as-yet unresolved issues and concerns regarding the pending rulemaking, the significant common ground on which this rulemaking is based is fundamental to the anticipated successful implementation of the Proposed GHG/FE Standards, and should not be overlooked. [EPA-HQ-OAR-2010-0162-1940.1, p.3]

In assessing the efficacy of the Proposed GHG/FE Standards, one key foundational premise is that the HD vehicle sector is extremely diverse, both in terms of the many types and sizes of vehicles that the sector encompasses, and the many different functions that those myriad vehicles serve. The current heavy-duty vehicle fleet ranges from '18-wheeler' tractor-trailer combination vehicles, to school buses, to delivery vans, to garbage trucks, to utility service trucks, to pickups, to transit buses, and more. All of those HD vehicle applications have their own inherent and unique limitations on potential fuel-efficiency gains (and GHG emission reductions) as a result of the way in which they need to be operated and designed. For example, the potential aerodynamic efficiency gains for a heavy-duty Class 8 tractor-trailer that regularly operates at highway speeds for long distances are fundamentally different from the potential efficiency gains that might be achieved for a city-based delivery van that typically operates in urban stop-and-go traffic. In fact, many of the potential aerodynamic design improvements for highway operations are impractical and counter-productive for urban driving applications. [EPA-HQ-OAR-2010-0162-1940.1, p.3]

The core principles that serve as the foundation for the Proposed GHG/FE Standards are sound and reflect solid consensus-driven conclusions. As a result, and notwithstanding the ensuing comments that highlight certain details of the pending rulemaking that require further amendment or development, EMA and TMA can and do support the foundational principles on which the Proposed GHG/FE Standards are based, subject to the Agencies addressing the issues discussed below. [EPA-HQ-OAR-2010-0162-1940.1, p.4]

Organization: Environmental Defense Fund (EDF)

I strongly support the EPA and DOT proposed rules to adopt America's first-ever climate pollution and fuel economy standards for freight trucks and buses. [EPA-HQ-OAR-2010-0162-1965_Mass, p.1]

Organization: Exa Corporation

Exa supports the EPA and NHTSA in this historic effort to reduce fuel consumption and greenhouse gas emissions (GHG) from heavy vehicles. As a key supplier to the global ground transportation industry we appreciate the impact and benefit this has on the environment and society as whole. We applaud the EPA and NHTSA for undertaking this complex and important issue in such a thoughtful and transparent manner. After careful review of the proposed ruling with our customers and the EPA, we would like to submit these comments and suggestions for the EPA and NHTSA to consider before releasing the final ruling in July, 2011. [EPA-HQ-OAR-2010-0162-1759.1, p.3]

Organization: Fire Apparatus Manufacturers' Association

The Fire Apparatus Manufacturers' Association supports the intent of this proposed rule in its endeavor to serve the interests of the environment and energy conservation. We do, however, wish to point out one issue where we believe the proposed rule will be either impossible to comply with, or counterproductive as it relates to emergency vehicles. [EPA-HQ-OAR-2010-0162-1328.1, p.1]

Organization: Florida Power & Light Co.

We commend NHTSA and EPA on the joint development of this rulemaking and what appears to be a sincere effort to involve the regulated community in producing a realistic and workable approach for achieving our national goals of reducing dependence on foreign oil, and reducing emissions. FPL actively supports these efforts. [EPA-HQ-OAR-2010-0162-2115.1, p.6]

Organization: Ford Motor Company (Ford)

We commend the efforts of both agencies to develop new greenhouse gas emissions and fuel efficiency standards for medium and heavy duty engines and we are committed to working with you to finalize these regulations. [EPA-HQ-OAR-2010-0162-1761.1, p.1]

Ford supported the President's initiative to bring together key stakeholders and work out a solution to enable a uniform national program to address greenhouse gases and efficiency from medium and heavy-duty vehicles. Ford Motor Company is a major manufacturer of heavy-duty pickup trucks and vans, an important segment of the broader medium and heavy-duty vehicle industry. [EPA-HQ-OAR-2010-0162-1761.1, p.3]

We support EPA and NHTSA's initiative to establish uniform GHG and fuel consumption standards for medium- and heavy-duty engines and vehicles and encourage the agencies to carefully consider our comments as you finalize this rulemaking. [EPA-HQ-OAR-2010-0162-1761.1, p.6]

Organization: Green Truck Association (GTA)

GTA Supports Regulatory Approach The GTA supports the Agencies' regulatory approach to this complex issue. Recognizing the diversity of the medium and heavy truck market and applying different regulatory approaches to differing segments of the industry is appropriate and reasonable. [EPA-HQ-OAR-2010-0162-1596.1, p.1]

As Congress during its deliberations on the EISA legislation and the agencies' throughout this rulemaking have recognized, commercial trucks and passenger cars are dramatically different, not simply in size but in use and manufacture as well. Creating a regulatory approach that differs from the traditional corporate average fuel economy system for passenger cars was necessary and would be accomplished through these regulations. [EPA-HQ-OAR-2010-0162-1596.1, p.1]

We recognize that this rulemaking requires a fairly compressed time frame which may not allow for the flexibility that might be available during future rulemakings on this issue. Nonetheless, we believe there exist opportunities within the advanced and innovative technology sections that should be explored to promote their use and development. We feel also that alternative fuels play an important role in greenhouse gas reduction and energy independence and that they could be further incentivized through this or future fuel efficiency rulemakings. [EPA-HQ-OAR-2010-0162-1596.1, p.2]

We support the goals and general approach of this rulemaking. As recognized in this rulemaking commercial trucks have far less homogeneity than passenger cars. Trucks can be built in an almost infinite number of configurations and for widely divergent tasks. Dividing the truck universe into three categories will allow for better and more appropriate regulations. [EPA-HQ-OAR-2010-0162-1596.1, p.4]

Organization: Heavy-Duty Fuel Efficiency Leadership Group

In April of 2010, each Leadership Group company's Chief Executive Officer signed a joint letter to EPA Administrator Lisa Jackson and Secretary of Transportation Ray LaHood commending this joint EPA/NHTSA initiative and setting forth a Statement of Principles which we felt should be embodied in the proposed rules. The Leadership Group feels that – to a substantial extent – the proposed rules are consistent with these principles and provide the foundation for a balanced and achievable set of first-ever GHG/fuel efficiency regulations for the medium and heavy duty sector. [EPA-HQ-OAR-2010-0162-1620.1, p.2]

6) Harmonized Program: Inconsistencies between regulatory agencies must be avoided. A single MDV/HDV fuel efficiency/GHG program is essential to provide vehicle manufacturers, suppliers and the user community with the certainty necessary for capital investment. A patchwork of different state requirements or conflicting standards for GHG and fuel efficiency will compromise the achievement of improvement goals as well as program compliance. [EPA-HQ-OAR-2010-0162-1620.1, pp.5-6]

EPA and NHTSA appear to have achieved a harmonized set of GHG and fuel efficiency standards, consistent with the Leadership Group's goals. The Agencies efforts to consult and reach agreement with CARB on a national program also should be applauded. [EPA-HQ-OAR-2010-0162-1620.1, p.6]

The Group urges EPA and NHTSA to be more explicit in the final rule regarding a single harmonized certification pathway and a single national enforcement and compliance regime. This harmonized certification and compliance program should provide for a single national submission of certification and compliance data. [EPA-HQ-OAR-2010-0162-1620.1, p.6]

We commend EPA and NHTSA for the work they have done thus far. We believe the foundation has been laid for a national set of achievable standards which will yield important environmental and energy security benefits for this country, and we look forward to the issuance of final rules in July, 2011. [EPA-HQ-OAR-2010-0162-1620.1, pp.6-7]

Organization: Honeywell

Honeywell International and its subsidiaries, Honeywell Transportation Systems and Honeywell Turbo Technologies (collectively 'Honeywell'), submits these comments in support of the agencies' efforts to reduce carbon dioxide and other greenhouse gas emissions from medium and heavy duty vehicles. Honeywell is a world leader in advanced motor vehicle technologies, and specifically in the development of turbo-technologies. [EPA-HQ-OAR-2010-0162-1891.1, p. 1]

Organization: Hybrid Truck Action Group (HTAG)

We as individual companies and as a group support the joint fuel economy and carbon emission rule EPA and NHTSA are proposing, and also support the agencies' joint collaborative process with industry to develop, implement and phase in the rule. It has been long in coming and is a critical step for U.S. efforts to combat climate change and address energy security. [EPA-HQ-OAR-2010-0162-1817.1, pp.1-2]

Organization: Hydro Aluminum (Hydro)

We want to congratulate EPA and NHTSA on their first-ever attempt to regulate the fuel economy of heavy duty vehicles. We believe that you have done a good job of categorizing these vehicles and developing an appropriate regulatory approach for each category. We also are pleased to see that weight reduction has been taken into account as a means for reducing fuel consumption and greenhouse gas emissions. However, we believe that the NPRM seriously limits the opportunities for mass reduction and therefore limits the fuel savings and emissions reductions that are possible. [EPA-HQ-OAR-2010-0162-1869.1, p.1]

Organization: Interfaith Care for Creation

I strongly support the EPA and DOT proposed rules to adopt America's first-ever climate pollution and fuel economy standards for freight trucks and buses. [EPA-HQ-OAR-2010-0162-1587-cp, p.1]

Organization: International Council on Clean Transportation (ICCT)

The International Council on Clean Transportation (ICCT) welcomes the opportunity to provide comments on the EPA and NHTSA’s proposed rulemaking for medium- and heavy-duty vehicle fuel consumption and greenhouse gas (GHG) emission standards. We commend the agencies for this historic rule proposal, which represents the first time that medium- and heavy-duty vehicles will be fully regulated. Japan bears the important distinction of establishing the first fuel economy standards for heavy-duty vehicles, but those standards were primarily focused on the engine rather than the full vehicle. [EPA-HQ-OAR-2010-0162-1945.1, p.1]

This rule proposal could very well set a new international best practice for medium- and heavy-duty vehicle regulatory programs. It’s important to point out that emissions from commercial trucks are typically a far greater percentage of fuel consumption and greenhouse gas emissions in emerging economies than in developed nations like the US, Europe and Japan. Also, sales volumes in emerging economies of China, India and Brazil are on par with those in “mature” markets of the US and Europe. [EPA-HQ-OAR-2010-0162-1945, p.1]

In almost all cases, the rule proposal is consistent with the recommendations and findings of the National Academy of Sciences (NAS) panel. In our opinion, the principle findings of the NAS panel were that there is a substantial opportunity for improvement in the fuel efficiency of medium- and heavy-duty vehicles ranging from 35 to 50% within the 2015 and 2020 time frame, and that in order to capture the full extent of this opportunity, the agencies should regulate the whole sector and the full vehicle. [EPA-HQ-OAR-2010-0162-1945.1, pp.1-2]

Finally, this rule proposal should also be used to lay the technical basis for harmonization and alignment of national regulatory programs – as is already underway with Canada. This is a global industry that has routinely called upon governments in Japan, Europe and the United States to harmonize regulations. The National Academy panel heard testimony from heavy-duty engine manufacturers that certain efficiency technologies would not have made economic sense to include on newly designed engines unless the engines were sold in Europe and the United States. Thus there are private and public justifications for harmonizing and aligning national regulatory programs. [EPA-HQ-OAR-2010-0162-1945.1, p.2]

Push for global harmonization. Continue to pursue global harmonization through collaborations with other government agencies, such as EPA and NHTSA are already doing with Canada, China, Japan, Mexico and Europe. The agencies should also consider shifting to the use of the World Harmonized Test Procedure should data collected from manufacturers and in-use testing support such a decision. [EPA-HQ-OAR-2010-0162-1945.1, p.3]

Organization: Investor Network on Climate Risk

As long-term investors, and as members of the Investor Network on Climate Risk (INCR), which represents over $9 trillion in assets, we are writing to voice our strong support for EPA and NHTSA's efforts to regulate the medium- and heavy-duty truck sector. Strict standards will catalyze investment in high efficiency truck technologies (thereby serving to retain the U.S. leadership position in this sector), save businesses money, promote energy security and reduce climate risk. [EPA-HQ-OAR-2010-0162-3142.1, p.1]

We commend EPA and NHTSA for the proposals under consideration, but by using existing and emerging technologies, we could realize even greater benefits in terms of economic growth and oil savings. [EPA-HQ-OAR-2010-0162-3142.1, p.1]

Organization: Lim, Daniel

I applaud you for setting the first-ever efficiency and emissions standards for delivery trucks and tractor trailers (Docket No. EPA-HQ-OAR-2010-0162).[EPA-HQ-OAR-2010-0162-3297_Mass, p.1]

Once again, I applaud this effort to regulate the biggest, most polluting vehicles on the road. Please set the strongest standards possible. Let's put technology to work to cut our addiction to oil and curb global warming. [EPA-HQ-OAR-2010-0162-3297_Mass, p.1]

Organization: Manufacturers of Emission Controls Association (MECA)

The Manufacturers of Emission Controls Association (MECA) is pleased to provide comments in support of the U.S. EPA's proposed rulemaking to establish medium- and heavy-duty greenhouse gas emission standards and corporate average fuel economy standards. We believe an important opportunity exists to significantly reduce greenhouse gas emissions and improve fuel economy from medium- and heavy-duty engines and vehicles. [EPA-HQ-OAR-2010-0162-1530.2, p.1]

In conclusion, MECA commends EPA for taking important steps to reduce greenhouse gas emissions and improve fuel economy from medium- and heavy-duty vehicles. MECA believes that a variety of advanced powertrain options are available for reducing carbon dioxide emissions from these vehicles and engines. Our industry is prepared to do its part and deliver these cost-effective advanced emission control technologies to the market. [EPA-HQ-OAR-2010-0162-1530.2, p.9]

Organization: Mass Comment Campaign (40,911) (Sierra Club)

I applaud you for setting the first-ever efficiency and emissions standards for delivery trucks and tractor trailers. Setting strong global warming and fuel efficiency standards for medium- and heavy-duty trucks will help break our addiction to oil, increase our national security, curb global warming, and save truckers and businesses money at the pump and consumers at the store. Technology is available to reduce pollution and fuel consumption for long haul freight trucks by as much as 35%. It is important that the new standards ensure the continued development and deployment of advanced technologies including engines, transmissions and hybrid systems. When setting these standards, it is critical EPA and DOT chart a long-term course, beginning in 2014, to generate sustained investment in advanced technologies. Further, it is critical that standards for all vehicles, from large pickups to delivery vans to tractor trailers, be set at the strongest level possible. Once again, I applaud this effort to regulate the biggest, most polluting vehicles on the road. Please set the strongest standards possible. Let's put technology to work to cut our addiction to oil and curb global warming. [EPA-HQ-OAR-2010-0162-1947.1_Mass, p.1]

Organization: Missourians for Safe Energy (MSE)

Our organization strongly supports the EPA and DOT proposed rules to adopt America's first-ever climate pollution and fuel economy standards for freight trucks and buses, medium and heavy-duty engines. This action is necessary and long overdue. [EPA-HQ-OAR-2010-0162-1597-cp, p.1]

I would like to thank everyone at the EPA, especially Administrator, Lisa Jackson, for your courageous leadership on this important issue and encourage you to please press ahead quickly with enforcing all our other vital and important environmental laws that reduce other forms of pollution, while also addressing greenhouse gases---particularly in the utility sector. [EPA-HQ-OAR-2010-0162-1597-cp, p.1]

Organization: Motor & Equipment Manufacturers Association (MEMA)

The state of the nation’s economy in recent years has severely challenged all sectors of the motor vehicle industry and many suppliers continue to face financial shortfalls. As with the light-vehicle National Program for fuel economy and greenhouse gas (GHG) emission standards, MEMA is encouraged by the carryover of the collaborative efforts between the federal agencies – the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA) – to approach medium- and heavy-duty vehicles standards similarly. MEMA supports a uniform National Program based on GHG reduction and increased fuel economy because it allows vehicle and engine manufacturers to focus their resources on investing in the best technologies available. This, in turn, feeds the ability of the supplier base to advance development and convert research technologies into commercially viable products. Once the agencies are finished with this rulemaking for Model Year (MY) 2014-2018 medium- and heavy-duty vehicle standards, MEMA encourages the agencies to continue this path of work as they consider the next phase of standards for MY2019 and beyond. [EPA-HQ-OAR-2010-0162-1752.1, p.2]

Organization: National Association of Clean Air Agencies (NACAA)

NACAA, therefore, applauds EPA’s and NHTSA’s action to propose the first-ever federal program to reduce GHGs from, and improve the fuel economy of, heavy-duty vehicles. This proposal, when added to the federal GHG emissions standards already in place for light-duty vehicles in MYs 2012 to 2016, marks another very commendable step forward in what must be an ongoing effort to make our nation’s entire mobile source fleet and fuels as clean and “green” as possible. Moreover, we cannot overstate the critical importance of EPA’s role in ensuring the success of the development and adoption of fuel efficiency technologies. The ability of the heavy-duty sector to achieve its full potential in terms of fuel efficiency is directly proportional to progress in meeting rigorous emissions standards. Thus, it is very appropriate that EPA and NHTSA have carefully coordinated this rulemaking to ensure that consumers are able to choose from among the most fuel-efficient and low-polluting heavy-duty vehicles and engines. [EPA-HQ-OAR-2010-0162-1607.1, p.2]

The agencies estimate the benefits of this rule over the lifetime of the affected vehicles to include a reduction in oil consumption of more than 500 million barrels or 20 billion gallons, a reduction in carbon dioxide (CO2) equivalent emissions of 250 million metric tons and total net cost savings for industry as high as $41 billion. But these are not the only benefits to result from this action. The co-benefits to be derived from such a program extend far beyond climate change and fuel savings, and include the following: reduced hydrocarbon emissions due to lower fuel throughput at retail distribution outlets; reduced PM2.5 and NOx emissions due to reduced gasoline distribution emissions associated with tanker trucks; reduced toxic emissions due to proportional reduction in petroleum refining; reduced risk of accidental spills of volatile crude oil due to proportional reduction in oil imports via marine tankers; and increased incentives to utilize electric drive train components that provide on-road criteria emissions benefits associated with engine downsizing, combined with zero emission performance for portions of the heavy-duty vehicle duty cycle. [EPA-HQ-OAR-2010-0162-1607.1, p.2]

First and foremost, NACAA strongly supports EPA's proposal to establish GHG emissions standards for three categories of vehicles: 1) Class 2b and 3 vehicles (pick-ups and vans), 2) tractor trailers and 3) vocational vehicles. [EPA-HQ-OAR-2010-0162-1607.1, p.2]

We recognize that several states are currently involved in litigation concerning the federal regulation of GHG emissions. NACAA is pleased to provide these technical comments on EPA's proposed Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles to ensure that the final rule is appropriately rigorous and will best achieve our nation's long-term mobile source goals. [EPA-HQ-OAR-2010-0162-1607.1, p.6]

Organization: National Automobile Dealers Association (NADA)

NADA/ATD generally support a national program designed to roll out appropriate, cost-effective, and technologically feasible commercial vehicle fuel efficiency strategies. The proposal clearly reflects an effort to account for the wide variety of vehicle and engine OEM products and capabilities, to recognize the broad range of potentially regulated vehicle classes, and to provide for considerable compliance flexibility. [EPA-HQ-OAR-2010-0162-2705, p.5]

Organization: National Truck Equipment Association (NTEA)

The NTEA generally supports the overall goals and regulatory approach of this proposed rule. [EPA-HQ-OAR-2010-0162-1608.1, p.1]

Organization: Natural Resources Defense Council (NRDC)

Setting strong national limits on motor vehicle global warming pollution and fuel economy standards is a necessary and important action for the U.S. to meet the President's stated goals of reducing greenhouse gas (GHG) emissions and reducing our dependency on oil. The NPRM introduces the so-called Heavy-Duty National Program, which is the first-ever national action to curb greenhouse gas emissions and fuel consumption from medium- and heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1776.1, p.2]

NRDC strongly supports the administration's decision to create the Heavy-Duty National Program and to propose vehicle standards. The NPRM is an important step forward for helping to fulfill the national GHG emission and oil demand reduction goals. Strong vehicle standards are good for the environment but also enhance national security and the economy. Trucks that consume less fuel will save truckers money at the pump, reduce vulnerability to oil price spikes and help reduce the cost of all shipped goods. [EPA-HQ-OAR-2010-0162-1776.1, p.2]

The standards are also important to maintaining and creating U.S. manufacturing jobs. Japan has enacted and the European Union is developing truck efficiency programs that will require clean vehicle technology adoption. U.S.-based standards will ensure that domestic manufacturers at least keep pace with international competitors and can help make the U.S. global leaders in clean truck technologies. [EPA-HQ-OAR-2010-0162-1776.1, p.2]

NRDC urges the agencies to move forward to finalize this rule for model years 2014 to 2018 medium- and heavy-duty vehicles. To make a strong program even stronger, we urge the agencies to incorporate our recommendations into the final rule. [EPA-HQ-OAR-2010-0162-1776.1, p.2]

Setting strong, long-term national limits on motor vehicle global warming pollution and fuel efficiency standards is a necessary and important action for the U.S. to meet the President's stated goals of reducing greenhouse gas (GHG) emissions and reducing our dependency on oil. NRDC strongly supports the administration's decision to take this necessary and important step. [EPA-HQ-OAR-2010-0162-1776.1, p.4]

Importantly, President Obama and the federal agencies have recognized the authority of the State of California (and by extension the CAA Section 177 states) to adopt their own vehicle pollution standards. In his May 2010 address, the President requested that the agencies "seek input from all stakeholders, while recognizing the continued leadership role of California and other States." We strongly support the collaborative efforts of the federal agencies to address heavy duty GHG emissions and fuel efficiency and their intention to set a rule that is appropriate for adoption by California's Air Resources Board. [EPA-HQ-OAR-2010-0162-1776.1, p.5]

The requirement to address global warming pollution under the Clean Air Act increases the benefits of the Heavy-Duty National Program. The CAA allows the program to start in 2014, sending an urgent signal to the truck manufacturing industry that technologies to cut global warming pollution and improve efficiency will soon be necessary in the marketplace. Following the EISA mandate alone, the program would start later, in 2016, which would mean less pollution reductions and greater fuel consumption. The CAA also allows standards for a broader scope of vehicles, specifically recreational vehicles which NHTSA determined as excluded under EISA. The CAA also addresses non-carbon dioxide global warming pollution such as hydrofluorocarbon emissions from air conditioning systems and tailpipe nitrous oxide and methane emissions that are not directly related to vehicle efficiency. In sum, the Heavy-Duty National Program is stronger than a single standard based solely EISA direction to regulate vehicle efficiency. By having a joint agency proposal instead of just regulating vehicle efficiency, the Administration is doing more to cut U.S. oil dependence, curb global warming pollution and save truckers money at the pump. [EPA-HQ-OAR-2010-0162-1776.1, p.5]

The proposed rule is a very important step forward but it should be strengthened to maximize the environmental, security and economic benefits. Below, we recommend improvements to the proposal to better meet the Administration's overall energy and climate security goals. We also recommend action by the agencies to establish efficiency and GHG emission standards for trailers that will take affect starting in 2014. As previously stated, medium- and heavy-duty vehicles are a very significant contributor to U.S. oil dependence and global warming pollution. We urge that the agencies to strengthen the rule to maximize savings in model years 2014 to 2018 and lay a strong foundation for a robust and mature Heavy-Duty National Program that captures all cost-effective technology improvements beyond 2018. [EPA-HQ-OAR-2010-0162-1776.1, p.5]

NRDC strongly supports moving ahead with the Heavy-Duty National Program. To make a strong program even stronger, we urge the agencies to incorporate the recommendations in these comments into the final rule. [EPA-HQ-OAR-2010-0162-1776.1, p.14]

Organization: Navistar, Inc.

Moreover, Navistar recognizes the benefits of a single national program to address GHG emissions and fuel efficiency of medium- and heavy-duty trucks and buses. We also recognize the benefits of a joint rulemaking, including the proposed coordinated framework. We commend EPA and NHTSA for their efforts in putting this rulemaking together and harmonizing many of the program requirements. [EPA-HQ-OAR-2010-0162-1871.1, p.1]

Navistar emphasizes again that it continues to support the common core principles that shape the framework of the Agencies' proposed GHG emission and fuel efficiency rule. Subject to the Agencies modifying the matters highlighted herein, Navistar agrees that the joint rulemaking is a sound framework for addressing reduction of GHG emissions, energy independence and improvement of fuel efficiency in heavy-duty engine and vehicle applications. [EPA-HQ-OAR-2010-0162-1871.1, p.2]

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

New York State commends the National Highway Traffic Safety Administration (NHTSA) and the United States Environmental Protection Agency (EPA) for the groundbreaking efforts to improve the fuel economy and to reduce greenhouse gas emissions from the heavy and medium duty vehicle fleet. EPA and NHTSA also should be applauded for the proposal and analyses performed in support of the proposed rule-making. [EPA-HQ-OAR-2010-0162-2047.1, p.1]

While New York State fully supports the goal of the proposed rules, the new standards must not cause safety concerns and must not affect adversely the built infrastructure, in particular roadway pavement as described below. [EPA-HQ-OAR-2010-0162-2047.1, p.2]

Organization: Northeast States for Coordinated Air Use Management (NESCAUM)

Our organization strongly supports efforts to reduce motor vehicle GHG emissions and fuel consumption, and we commend the agencies on this important step toward establishing standards for medium- and heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1757.1, p.1]

We strongly support this federal effort to develop fuel economy and GHG standards for medium- and heavy-duty engines and vehicles. Improving the fuel economy of our nation's trucks will provide long-lasting benefits to consumers, businesses, and the economy as a whole, by reducing the costs for transporting goods and for the many other services that utility and vocational vehicles provide. By eliminating 250 million tons of greenhouse gas emissions, the rules will play an important role in minimizing the detrimental economic and environmental impacts of global warming. In addition, the rules will substantially reduce our nation's dependence on foreign oil, cutting petroleum use by 500 million barrels over the life of the affected vehicles. [EPA-HQ-OAR-2010-0162-1757.1, p.1]

On behalf of the millions of citizens in our states, we thank you for your leadership in proposing to reduce our dependence on foreign oil by increasing fuel efficiency for new cars and trucks. We are pleased that the Department of Transportation (through the National Highway Traffic Safety Administration, NHTSA) and the Environmental Protection Agency (EPA) are releasing a proposal that meets your call from last May for improved fuel efficiency and stronger greenhouse gas pollution standards for new cars and trucks. [EPA-HQ-OAR-2010-0162-1757.1, p.5]

We write to let you know that we support this action for many reasons, but perhaps most importantly, by employing American ingenuity we will have more efficient vehicles that will reduce unnecessary and wasteful spending at the pump, keeping money in our state and local economies. The US currently sends nearly $1 billion overseas for oil every day; money we could use more productively at home. [EPA-HQ-OAR-2010-0162-1757.1, p.5]

Our states are among the 14 states that have adopted cleaner car standards based on the pioneering California rules -- and consumers are embracing the vehicles. Building on California's independent authority and technical expertise, our alliance of states remains committed to support cars that are technologically advanced, use less oil and run cleaner. We believe that reducing our demand for oil will also be good for the environment. as it will reduce the risk of damage to our, oceans, our coasts and sensitive land. [EPA-HQ-OAR-2010-0162-1757.1, p.5]

Today, the technology exists to reduce fuel use and pollution from all types of vehicles. As your administration develops these proposals, we urge you to set ambitious new standards for passenger vehicles. Some hybrids today already get over 50 miles per gallon and are being labeled 'conventional.' We have seen the automakers meet goals time and again and we are confident that technological improvements, including the plug-in hybrids and pure electric vehicles that they are rolling out, will increase efficiency and affordability further and will make 60 miles per gallon commonplace. We urge you to help realize this by setting a joint EPA/NHTSA standard of 60 mpg by 2025. [EPA-HQ-OAR-2010-0162-1757.1, p.5]

We also look forward to EPA and NHTSA's proposed fuel economy and greenhouse gas standards for medium- and heavy-duty trucks. These next clean vehicle standards must also put money back in consumers' pockets by increasing fuel efficiency of long-haul trucks by at least 35 percent by 2017. As the cost of shipping decreases, necessities will become more affordable for struggling families around the US. Taken together these standards would reduce the country's oil consumption by more than 45 billion gallons per year by 2030--more than one and a halftimes the amount we currently import from the Persian Gulf. [EPA-HQ-OAR-2010-0162-1757.1, p.6]

In the past, government and industry were at odds. But we are glad to say that the carmakers are supporting clean car standards because they know that Americans will increasingly demand these cleaner cars. Today, there are fewer and fewer parties on the 'other side' of this issue. [EPA-HQ-OAR-2010-0162-1757.1, p.6]

On behalf of our citizens, we thank you and are pleased that you share our vision of pioneering technology that makes travel more affordable, creates new jobs, protects the environment, and enhances our national security. We thank you and your agencies for leadership on this important issue and look forward to partnering to improve our economy, environment, and leadership in the world. [EPA-HQ-OAR-2010-0162-1757.1, p.6]

Organization: Nose Cone Manufacturing Company

EPA and NHTSA are to be commended for the proposals to establish a comprehensive program that will increase fuel efficiency for onroad heavy duty vehicles; all of the proposals are well thought out and appropriately consider the diversity of the industry. We humbly submit the following comments in response to the request for comments regarding including commercial trailers and testing procedures. [EPA-HQ-OAR-2010-0162-1943.1, p.1]

Organization: Pew Environment Group

On behalf of the Pew Charitable Trusts, I am writing to commend the Environmental Protection Agency (EPA) and National Highway Traffic Safety Administration (NHTSA) for issuing the first-ever standards for greenhouse gas emissions and fuel economy improvements for medium- and heavy-duty vehicles produced in the 2014-2018 period. These standards will produce tangible benefits for America’s economy, our environment and our security. [EPA-HQ-OAR-2010-0162-1610.1, p.1]

The proposed rulemaking will help stem growing consumption and emissions in the sector by requiring different classes of medium- and heavy-duty vehicles to achieve a 10-15 percent reduction in fuel consumption by 2018. The potential of these improvements is confirmed by EISA-required research undertaken by the National Academy of Sciences (NSA) and NHTSA. The NAS and NHTSA studies identified numerous existing technologies that can be harnessed to improve efficiency in medium- and heavy-duty vehicles, including: automated manual transmissions, fuel injection and turbocharging technologies, improved aerodynamics, and reduced rolling resistance from enhanced tire designs. [EPA-HQ-OAR-2010-0162-1610.1, p.1]

Again, we commend the EPA and NHTSA for its efforts to comply with EISA and establish the first-ever standards for medium- and heavy-duty vehicles in the U.S.

transportation fleet. This effort will help spur American innovation, competitiveness and prosperity. It will make us more energy independent and contribute to ongoing efforts to reduce reliance on oil imports. It will result in significant net economic benefits. And, finally, it will reduce emissions of the greenhouse gases driving costly and potentially catastrophic climate changes. [EPA-HQ-OAR-2010-0162-1610.1, p.2]

The Pew Charitable Trusts supports the proposed rulemaking because it constitutes good economic policy, good energy policy and good environmental policy. We are confident that this rule will spur America's private sector to innovate and adapt in ways that produce far-reaching benefits for the nation and position our country for a cleaner, more prosperous and secure energy future. [EPA-HQ-OAR-2010-0162-1610.1, p.2]

Organization: Plass, B.

I support this regulatory scheme as a whole. The only way to implement a comprehensive scheme for the reduction of greenhouse gas emissions and to increase the fuel efficiency of our nation's vehicles is the promulgate standards that apply to all vehicles that emit greenhouse gases and consume fuel. [EPA-HQ-OAR-2010-0162-1324-cp, p.1]

Organization: Robert Bosch LLC

Bosch supports the establishment of a harmonized HD National Program to reduce GHG emissions and improve fuel efficiency in the HD sector, which EPA and NHTSA propose to divide into three segments – combination tractors, HD pickup trucks and vans (PUVs), and vocational vehicles. [EPA-HQ-OAR-2010-0162-1630.1, p.2]

Overall, Bosch supports the creation of a "strong and comprehensive Heavy-Duty National Program," and it commends EPA and NHTSA for their extensive and continuing efforts to establish one. Bosch agrees that the HD sector can and should reduce its GHG emissions and simultaneously improve its fuel efficiency, in an effort to minimize the nation's dependence on oil, enhance national energy security, and benefit the environment. As with the light-duty vehicle (LDV) sector, a uniform and harmonized National Program for HD engines and vehicles is both achievable and desirable, and Bosch applauds the agencies for collaborating with the California Air Resources Board (CARB), as well as industry, and for striving to "avoid unnecessarily duplicative testing and compliance burdens." [EPA-HQ-OAR-2010-0162-1630.1, p.4]

Organization: Ryder System, Inc.

Ryder is generally supportive of the Proposed Rule; however, we do have a number of concerns with certain aspects of the proposal and point you to comments filed by both the Truck Renting and Leasing Association and the American Trucking Associations, Inc. whose comments we support to address those concerns. [EPA-HQ-OAR-2010-0162-1674.1, p.1]

Organization: Sierra Club

The Sierra Club applauds the Environmental Protection Agency and the National Highway Transportation Safety Administration for proposing the first-ever efficiency and greenhouse gas emissions standards for medium and heavy duty vehicles. We must break our addiction to oil and slash the pollution that causes global warming while revitalizing our economy and creating jobs. These initial standards for trucks are a starting point for reducing oil consumption and greenhouse gas emissions from these vehicles. In addition, they will save drivers money at the pump and help create jobs. To fully address fuel consumption and emissions from the range of vehicles these standards cover, the Administration must develop a comprehensive transportation strategy that puts us on a path to reducing oil consumption in this sector. This strategy must include a comprehensive freight plan. [EPA-HQ-OAR-2010-0162-1889.1, p. 1]

We applaud EPA and NHTSA for proposing the first-ever fuel efficiency and greenhouse gas emissions standards for medium and heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1889.1, p. 5]

These standards serve as a starting point for future rounds of standards to drive even more reductions in oil consumption and greenhouse gas emissions. [EPA-HQ-OAR-2010-0162-1889.1, p. 5]

Organization: Sinhatech

I strongly support President Obama’s vision for improving truck fuel economy. However effective implementation of the proposed standards will require complete knowledge of all available technologies and inclusion of operational considerations which impact total cost. If the regulations end up substantially increasing the cost of transporting essential goods, it will hit the hardest. This is clearly not the intent of the regulators. [EPA-HQ-OAR-2010-0162-1606.1, p.2]

Organization: Southern Utah Wilderness Alliance

We urge the EPA to adopt stirngent [sic] pollution reductions for medium- and heavy-duty engines and vehicles. In Utah's Uinta Basin air monitoring has recently detected extremely high levels of wintertime ozone pollution (see EPA's AirExplorer website for data). These pollution levels are likely the result of significant oil and gas development taking place in the Uinta Basin. This oil and gas development involves large numbers of medium- and heavy-duty engines. Because this engines typically escape state regulation efforts under state implementation plans and because the Uinta Basin is considered Indian Country--an area of EPA primacy--diminishing emissions from medium- and heavy-duty vehicles is a critical step in addressing ozone pollution here. In the winter of 2010, the fourth highest level of the daily eight-hour maximum ozone pollution reached 117 parts per billion. Such high pollution levels will require reductions of pollution across the board, not just from stationary sources. For that reason this proposed rule is critical and we urge the EPA to adopt the most stringent pollution controls possible for medium- and heavy-duty engines.[EPA-HQ-OAR-2010-0162-1586-cp, p.1]

Organization: Truck Renting and Leasing Association (TRALA)

General support

TRALA generally supports the Proposed Standards - although, as explained further below, we are concerned about how they may impact fleets through imposition of regulatory burdens and uncertainties, while potentially increasing the costs of trucks and vocational vehicles. The Proposed Standards are broad-based and intended to tackle two issues - truck efficiency and fuel consumption - that are a concern of TRALA's membership. The Proposed Standards also generally apply upstream at the manufacturer level, thereby appropriately acknowledging that issues related to vehicle emissions, efficiency and fuel consumption are largely out of the hands of individual fleet owners and operators - this is particularly the case when it comes to the use of vehicle-based technologies. [EPA-HQ-OAR-2010-0162-1816.1, pp.1-2]

This said, TRALA has several concerns about the Proposed Standards, which we have set forth below. Our concerns generally fall into two categories: (1) the potential imposition of regulatory burdens and liabilities on truck rental and leasing companies; and (2) increased vehicle costs due to undue or excessive regulation of manufacturers. The context for these comments is President Obama's January 18, 2011 executive order on regulatory review, which states that '[w]here relevant, feasible, and consistent with regulatory objectives, and to the extent permitted by law, each agency ... shall consider regulatory approaches that reduce burdens and maintain flexibility and freedom of choice for the public' (Executive Order, 'Improving Regulation and Regulatory Review, JJ § 4 (White House, Jan. 18, 2011)). [EPA-HQ-OAR-2010-0162-1816.1, p.2]

Organization: Union of Concerned Scientists (UCS)

We applaud the agencies for moving forward with standards that will make our goods movement system more efficient, save vehicle owners money at the pump, and improve our nation's energy security, economy, and environment. We strongly support both agencies moving forward with the joint rulemaking to fulfill NHTSA's requirements under the Energy Security and Independence Act of 2007 and EPA's longstanding responsibilities to protect public health under the Clean Air Act. [EPA-HQ-OAR-2010-0162-1764.1, p.1]

The proposed rule structure is sound and represents a significant achievement considering the complexity of the medium and heavy-duty vehicle sector. As the agencies move to finalize the standards, we urge you to consider modifications that would maximize the overall environmental, economic, and energy security benefits of the standards. Strong standards will drive innovation, create jobs, and help the American truck manufacturing industry maintain its leadership in an ever increasing global marketplace. [EPA-HQ-OAR-2010-0162-1764.1, p.1]

We urge the agencies to move quickly to finalize the rulemaking and to promptly begin developing standards for trailers, a vital strategy for achieving the greatest fuel savings and emissions reductions from the largest heavy-duty vehicle fuel consumers. [EPA-HQ-OAR-2010-0162-1764.1, p.1]

Setting strong standards for these vehicles will keep America's truck manufacturing sector competitive in an increasingly global marketplace, spur economic growth and create American jobs, while improving the nation's energy security and our environment. [EPA-HQ-OAR-2010-0162-1764.1, p.3]

The proposed standards for Greenhouse Gas Standards and Fuel Efficiency Standards of Medium- and Heavy-Duty Engine and Vehicles are a significant step forward, offering cost savings, petroleum reductions and climate change benefits. However, the standards could be improved in several areas to provide greater benefits in the short-term while setting the stage for deep reductions over the long term. During the May announcement, President Obama called for reducing oil consumption from the nation's cars and trucks by 50 percent over the next 20 years. To do so, it is imperative that we put fuel efficiency technology to work in all of our vehicles. A recent National Academy of Sciences' (NAS) assessment showed that technologies available by 2015 could reduce fuel consumption by as much as 30% and reach 50% for many vehicle types by 2020. To reach these levels of reductions, it is critical that these near-term standards provide a strong framework for future improvements in truck fuel economy and greenhouse gas emissions. [EPA-HQ-OAR-2010-0162-1764.1, pp.3-4]

The medium- and heavy-duty fuel economy and greenhouse gas program must establish a robust data collection component to provide the information needed to effectively evaluate and improve the program over time. The program must also ensure new technologies are encouraged and properly credited, but not at the expense of moving readily available cost-effective improvements into the vehicle fleet. The stringency of the standards should reflect improvements available across the entire vehicle and be designed to achieve the greatest cost-effective fuel savings and emissions reductions. In addition, the standards should provide consumers with information about the fuel consumption and emissions performance of the vehicles they are buying. [EPA-HQ-OAR-2010-0162-1764.1, p.4]

Organization: Virginia Department of Transportation (VDOT)

VDOT supports continued vehicular fuel efficiencies and efforts toward the goal of corresponding reductions in greenhouse gas emissions. The proposed rule could potentially achieve both objectives with a comprehensive plan affecting on-road, heavy-duty equipment beginning in model years 2014 through 2018. Depending on the class of vehicle, fuel consumption and carbon dioxide emission reductions are anticipated to be seven percent to ten percent per ton-mile each. These are commendable targets, but while the agency is generally supportive, VDOT does have several concerns. [EPA-HQ-OAR-2010-0162-1611.1, p.1]

Organization: Volvo Group

We support the effort by EPA and NHTSA to move the industry toward lower GHG emissions and more sustainable commercial transportation.

Volvo Group is strongly committed to support a GHG regulation that delivers real value to our customers and to society through reduced fuel consumption and GHG mitigation. We agreed to this support via a letter to Administrator Jackson and Secretary LaHood on May 20, 2010, which also noted key principles underlying the agreement (i.e. Letter of Principles). Volvo Group wants to abide by the spirit and intent of the regulation but is concerned that we can only do so, while remaining competitive, if the rule ensures unambiguous requirements, appropriate measurement processes, and an industry-wide level playing field. [EPA-HQ-OAR-2010-0162-1812.2, p.2]

Volvo Group has been actively working with EPA to help develop this rule to meet these objectives. We recognize the immense difficulty to accomplish this in view of the complexity of the heavy-duty vehicle market and the lack of available data for many segments of the market. We applaud the EPA staff for the work they have done with limited resources and a very compressed timeframe. [EPA-HQ-OAR-2010-0162-1812.2, p.2]

Organization: Washington State Department of Transportation

The Washington State Department of Transportation (WSDOT) thanks EPA and NHTSA for the opportunity to provide comment on the proposed federal rule on Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles. [EPA-HQ-OAR-2010-0162-1584.1, p.1]

WSDOT supports establishing the first-ever fuel efficiency and greenhouse gas emission standards for medium- and heavy-duty vehicles as an important step in reducing transportation greenhouse gas emissions in Washington State. [EPA-HQ-OAR-2010-0162-1584.1, p.1]

In our state, mid- and heavy-duty vehicles are currently responsible for about 11 percent of the vehicle miles traveled, but about 30 percent of the on-road greenhouse gas emissions. Our analysis indicates that over the coming years the portion of the greenhouse gas emissions from these vehicles will increase. [EPA-HQ-OAR-2010-0162-1584.1, p.1]

We have been actively evaluating strategies to reduce transportation greenhouse gas emissions so that we can make effective changes to our transportation system to reduce greenhouse gas emissions. One well-suited strategy to reducing emissions from medium- and heavy-duty vehicles is improved vehicle efficiency. However, because we are not able to set vehicle standards, we must rely on the federal government to take this type of action to move us towards a lower-carbon economy. [EPA-HQ-OAR-2010-0162-1584.1, p.1]

Response:

Many commenters expressed support for the proposed HD National Program in general, as well as for various specific provisions of the rules. Many of these commenters also had concerns about some relatively technical provisions of the rules, which are addressed elsewhere in this document and in the preamble of the final rulemaking.

Several commenters supported a program with a common set of principles, including:

- Increased use of existing technologies to achieve significant GHG emissions and fuel consumption reductions;
- A program that starts in MY 2014 and is fully phased in by MY 2018;
- A program that works towards harmonization of methods for determining a vehicle's GHG and fuel efficiency, recognizing the global nature of the issues and the industry;
- Standards that recognize the commercial needs of the trucking industry; and
- Incentives leading to the early introduction of advanced technologies.

The final rules adopted today reflect these principles.

1.2. Support for SmartWay Transport Partnership

Organization: American Trucking Associations, Inc. (ATA)

H. EPA's SmartWay Program Must Remain Intact

The SmartWay program, unveiled in 2004, is a ground-breaking voluntary GHG reduction program developed by EPA, ATA, shippers, and other stakeholders The partnership creates strong market-based incentives that challenge companies shipping products and the trucks delivering these products to improve the environmental performance of their freight operations. Under the program, SmartWay partners increase their fuel efficiency, reduce GHG emissions, improve overall air quality, and are given preference by SmartWay shipper partners. [EPA-HQ-OAR-2010-0162-2263.1, p.9]

The proposed rule is carefully intertwined with the SmartWay program in that many of the technologies, metrics, and verifications are a result of this important program. The tremendous success of SmartWay is reflected in its doubling in size almost each year. ATA members and shippers alike have come to depend upon SmartWay for providing a universal measuring stick for freight efficiency. Shippers increasingly require fleets delivering their goods to be SmartWay partners as a contractual condition to assist them in reducing their carbon footprint and help them maintain their partnership status in the program. Shippers have come to rely on SmartWay as the common metric of choice to compare the efficiency and carbon footprints of freight movements. For these reasons, ATA included the continuation and growth of the program as another critical pillar in our Sustainability Plan previously referenced. [EPA-HQ-OAR-2010-0162-2263.1, p.9]

President Obama's Executive Order 13514, Federal Leadership in Environmental, Energy, and Economic Performance, was signed in October 2009. The Executive Order requires each federal agency to produce a plan and declare a percentage reduction in GHG emissions over the next 10 years. A major component in these plans is the reduction of GHG's from the transportation sector. ATA has been working closely with federal agencies advocating for them to use SmartWay as their metric for trucking fleets since our industry is familiar with the program and doing so would promote consistency across the federal government. [EPA-HQ-OAR-2010-0162-2263.1, p.9]

Going forward, the SmartWay program should be fully recognized for any related GHG reductions from fuel-efficient technologies purchased by SmartWay partners. ATA understands the agencies' wish to promote such advances under the rule. Keep in mind that SmartWay partners are purchasing fuel-efficient equipment not as a result of the rule, but rather to maintain their standing in the SmartWay program, receive higher SmartWay scores, increase profit margins, and maintain their public image. [EPA-HQ-OAR-2010-0162-2263.1, p.9]

Due to the benefits provided by the SmartWay program, coupled with the extent to which shippers, carriers, and the public have come to rely upon it, it is imperative that the program continues to exist and gets proper recognition for GHG improvements by partners after the regulation is finalized. [EPA-HQ-OAR-2010-0162-2263.1, p.9]

Organization: National Automobile Dealers Association (NADA)

While the proposal borrows extensively from the Smartway program, it should not supplant it. For one thing, Smartway can serve to successfully encourage vehicle owners and operators to retrofit vehicles with systems and componenets [sic] designed to improve fuel efficiency. Bottom line: the Administration should avoid eliminating a successful “voluntary” public/private program by replacing it with a yet-to-be-tested set of command and control regulations. [EPA-HQ-OAR-2010-0162-2705, p.10]

Organization: Truck Renting and Leasing Association (TRALA)

Growing numbers of shippers and carriers, as well as the public, have come to rely upon EPA's SmartWaySM Transport program. That program provides methodologies and metrics by which shippers may 'green' the fleets that they use, thereby using market forces to achieve desirable environmental goals. [EPA-HQ-OAR-2010-0162-1816.1 p.6]

TRALA understands that the Proposed Standards are based in part upon the SmartWaySM Transport program, but the status of that program after the regulations are finalized remains unclear. Due to the benefits provided by the SmartWaySM Transport program, coupled with the extent to which shippers, carriers and the public have come to rely upon it, we believe that it is imperative that the SmartWaySM Transport program continue even after the Proposed Standards are finalized. [EPA-HQ-OAR-2010-0162-1816.1 p.6]

Response:

The agency appreciates the support for the SmartWay Transport Partnership. The SmartWay program includes operational approaches (such as improved logistics) that truck fleet owners as well as individual drivers and their freight customers can incorporate for improving GHG and fuel consumption performance.The agencies believe the benefits of the SmartWay program will complement the final standards, furthering the public policy objectives of addressing energy security and reducing climate change.

1.3. National Harmonization of the Program

Organization: American Trucking Associations, Inc. (ATA)

The Preamble to the rule notes that the agencies' on-going work with the State of California and CARB will result in California and CARB adopting regulations equivalent in practice to this rulemaking. ATA was also informed that efforts were being pursued to align California's truck and trailer GHG requirements with the federal rule. Harmonization of this rule with California's (or any other states for that matter) is an extremely high priority for ATA. Given the interstate nature of trucking, national consistency in regulatory approaches is critical. [EPA-HQ-OAR-2010-0162-2263.1, p.7]

The State of California currently requires 2011 and newer sleeper cab tractors, when pulling a 53-foot trailer, to be SmartWay certified. The proposed rule, on the other hand, does not address trailer GHG and fuel efficiency improvements. Whether 2014–2018 model year sleeper cab tractors sold under the proposed rule will meet the SmartWay certification requirements in the state is not addressed. With anticipated fuel economy improvements of up to 20%, it would appear many tractors under the federal rule will be aligned with the intent of California's SmartWay certification process. However, due to the California requirements, SmartWay certification is required. ATA requests clarification on how the proposed rule will align with SmartWay certification and the sleeper cab tractor requirements under California's Heavy-Duty Vehicle Greenhouse Gas Regulation. [EPA-HQ-OAR-2010-0162-2263.1, p.8]

It is both unwise and unhealthy for the nation's economy and the movement of the nation's freight to allow a patchwork of state and federal GHG and fuel consumption standards for trucks to go unchecked. It is critical for EPA, DOT, CARB, and the other 49 states to coordinate their efforts not only in this first round of regulation, but also in developing the next round of standards for trucks. EPA, DOT, and CARB have been working closely together on the light-duty rule and announced on January 24 that they intend to coordinate their efforts in pursuing a national approach for fuel economy and GHG standards for model year 2017-2025 cars and light-duty trucks. Resolution of how the proposed rule will align with California's efforts is needed in advance of issuing the final rule. [EPA-HQ-OAR-2010-0162-2263.1, p.8]

Organization: Daimler Trucks North America

This Rulemaking Must Result In A Unified Program Nationwide, With Nationwide Unified Requirements, Unified Certification Procedures, And Unified Penalty Programs. [EPA-HQ-OAR-2010-0162-1818.1, p.14]

The President's May 21, 2010 memorandum on fuel efficiency standards and greenhouse gas emissions reductions directed the agencies to develop a joint "harmonized framework" for addressing fuel economy and greenhouse gas emissions from medium and heavy-duty trucks which builds on the successful National Program. One the most important attributes of the harmonized National Program for light-duty vehicles (LDVs) is the fact that it established coordinated and unified Federal and California/state requirements, and generally delivered "environmental and energy benefits, cost savings, and administrative efficiencies on a nationwide basis that would likely not be available under a less coordinated approach." As the agencies further explained, the "National Program will allow automakers to produce and sell a single fleet nationally, mitigating the additional costs that manufacturers would otherwise face in having to comply with multiple sets of federal and state standards." [EPA-HQ-OAR-2010-0162-1818.1, p.14]

Complete harmonization between federal requirements and any similar California/state requirements is a critically important aspect to include in the proposed National Program for Heavy-duty vehicles, just as it was for LDVs. The input from a large and diverse group of stakeholders representing both truck and engine manufactures, trucking fleets, environmental organizations and States, including the state of California, demonstrated a clear consensus around the need for "a common Federal program with consistent standards." The need for "consistent standards" requires not only unity between EPA and NHTSA standards, but also encompasses the need for unity between Federal and California standards. The need for "national" uniformity was recognized at least in part in the agencies' NPRM. Unfortunately, the commitment to uniformity between federal and California standards, as expressed in the NPRM, did not go far enough, and the agencies should clarify their full commitment to true national uniformity in the final rule. [EPA-HQ-OAR-2010-0162-1818.1, p.14]

Organization: National Automobile Dealers Association (NADA)

When Congress vested NHTSA with the exclusive authority to regulate commercial vehicle and engine fuel efficiency, it did so recognizing that it was amending the Energy Policy and Conservation Act (EPCA), which contains a clear-cut prohibition against the adoption or enforcement of state laws related to fuel economy. 49 USC ' 32919. Avoiding a patchwork of state laws related to fuel economy is critical to the dealerships that sell new vehicles and engines to the for-hire carriers, private companies, public fleets, and individuals who operate trucks and tractors in every state in the nation. NADA/ATD urges NHTSA and EPA to clearly acknowledge in the final rule the need to avoid duplicative and non-identical state rules that would impose untenable burdens on dealerships, on new truck and engine manufacturers, and on prospective purchasers. Above all else, the rule must result in only one national fuel economy-related program applicable to new commercial vehicles. [EPA-HQ-OAR-2010-0162-2705, p.3]

Of course, NADA/ATD supports and commends the efforts of states like California and others aimed at improving the efficient movement of trucks over our nation's roads. In fact, such efforts will prove ever more important over time as the number of trucks and truck-miles inevitably increase. In addition, to the extent states like California and others have expertise and insights to offer on federal regulatory programs governing fuel economy or efficiency, they are free to offer such through comments, testimony and otherwise. Federal law only prohibits state regulations related to fuel economy standards such as the instant proposal. [EPA-HQ-OAR-2010-0162-2705, p.3]

Organization: Ryder System, Inc.

Ryder and its customers operate over 100,000 trucks throughout the U.S. It is vital that we are not faced with a patchwork of fuel efficiency and/or GHG emission standard requirements. Such a situation would lead to an inefficient use of vehicles, and more vehicles on the road, both of which are counter-productive to the purpose of the Proposal. Also, fleet flexibility, both in the ability to scale up or down to meet seasonal demands and geographic differences is at the very heart of what makes the vehicle rental and leasing industry attractive to its customers. Any change that would diminish our ability to efficiently move vehicles around to meet varying customer demands, including growth, diminishes our ability to compete. [EPA-HQ-OAR-2010-0162-1674.1, p.2]

Second, subjecting manufacturers to duplicative and/or conflicting federal and state regulatory regimes runs the risks of increasing our and our customers' costs because the manufacturers almost certainly will pass such costs on to their customers. [EPA-HQ-OAR-2010-0162-1674.1, p.2]

Organization: Truck Renting and Leasing Association (TRALA)

If GHG standards are to be adopted, TRALA believes that they should be nationally applied and preempt applicable State standards - including, but not limited to, those issued by the California Air Resources Board (CARB) (42 U.S.C. § 209(a)). [EPA-HQ-OAR-2010-0162-1816.1, p.2]

Ensuring that the Proposed Standards have preemptive effect is important for TRALA members for at least two reasons.

First, truck rental and leasing companies, and their customers, have operations throughout the United States. Regulatory uncertainty - and chaos, in some instances-would befall those companies if they took delivery of trucks that met the requirements of the new national program but for whatever reason failed to meet one or more applicable state (or even local) requirement(s). Under unrelated mobile source programs, for example, TRALA members may incur regulatory liability under California law if they, unbeknownst to them, took delivery of vehicles that had mismatched model years for engine and vehicle - an issue for which federal law imposed liability on the manufacturer. A similar situation could occur with respect to the Proposed Standards, given that it is clear that CARB's heavy-duty program is not and will not be identical to the forthcoming national one (for example, CARB's program includes requirements that apply to in-service trucks). [EPA-HQ-OAR-2010-0162-1816.1, p.2]

Second, subjecting manufacturers to duplicative and/or conflicting federal and state regulatory regimes runs the risk of increasing costs to TRALA members because the manufacturers almost certainly will pass such costs on to their customers. [EPA-HQ-OAR-2010-0162-1816.1 p.2]

Response:

The agencies agree that it is ultimately desirable to have a harmonized national regulation to set performance based standards for new trucks to reduce fuel consumption and GHG emissions. That goal remains one of the primary motivations for the agencies' joint action and our outreach with the State of California. We believe the program we are finalizing today will eventually be adopted by the State of California and will provide a consistent set of national standards for heavy-duty truck and engine fuel efficiency and GHGs. We should be clear, however, that these regulations are focused on performance standards for new trucks and engines and do not address the ongoing in-use performance of the existing vehicle fleet that California is controlling through its various fleet rules.

1.4. Timeline to Finalize Rule

Organization: Heavy-Duty Fuel Efficiency Leadership Group

Each Leadership Group member company intends to file its own set of comments on the proposed rule. While each may identify opportunities for further clarification and improvement, the Leadership Group and its members support finalization of the rule by July 30, 2011 – consistent with the schedule announced by President Obama in May, 2010 – in order to achieve important environmental, economic and energy security benefits during the 2014-2018 timeframe. [EPA-HQ-OAR-2010-0162-1620.1, p.1]

Organization: Northeast States for Coordinated Air Use Management (NESCAUM)

All eight NESCAUM states and numerous others throughout the US have established aggressive GHG reduction targets in climate action plans or legislation; many call for reductions of at least 75 percent by 2050 with intermediate goals for 2020. In order to meet these goals, states have established or adopted a number of programs, including programs to reduce power plant emissions, adoption of the California light duty vehicle GHG standards, and the Zero Emission Vehicle program. In addition, states are undertaking measures to reduce truck, locomotive, and passenger car idling; to reduce vehicle miles traveled; to establish infrastructure and incentives for zero emission vehicles; and to evaluate other strategies for reducing GHG emissions from mobile and stationary sources. [EPA-HQ-OAR-2010-0162-1757.1, p.4]

The timely finalization of the proposed medium- and heavy-duty standards is extremely important since states are reliant on the federal government for GHG reductions from new medium- and heavy- duty trucks. To underscore this point, nine governors wrote a letter to President Obama in October 2010 urging him to establish stringent fuel consumption and GHG emissions standards for medium- and heavy-duty vehicles in addition to light duty vehicles. [EPA-HQ-OAR-2010-0162-1757.1, p.4]

In summary, we urge the agencies to finalize the proposed rules by July 2011, incorporating the changes we propose in these comments. NESCAUM looks forward to working with EPA and NHTSA in the refinement and finalization of the proposed rules. [EPA-HQ-OAR-2010-0162-1757.1, p.4]

Organization: Ford Motor Company (Ford)

Ford looks forward to working with EPA and NHTSA to provide additional support as required finalizing this rule by the end of July 2011. [EPA-HQ-OAR-2010-0162-1761.1, p.6]

Organization: International Council on Clean Transportation (ICCT)

Finish the rule on time. The agencies have committed to finalizing this historic rulemaking by July 30, 2011. The ICCT strongly supports the agencies' adherence to this important deadline. [EPA-HQ-OAR-2010-0162-1945.1, p.3]

Organization: National Association of Clean Air Agencies (NACAA)

NACAA urges that EPA and NHTSA ensure that this final rule is promulgated by July 2011, as planned. Numerous states across the nation have developed climate action plans with

GHG reduction targets of 80 percent by 2050 and interim goals for 2020, and have adopted an array of measures to achieve these goals, including programs to reduce power plant emissions, California's light-duty vehicle GHG standards and the Zero Emissions Vehicle (ZEV) program. States are also working to reduce truck, locomotive and passenger car idling and vehicle miles traveled and to establish an infrastructure and incentives for ZEVs, as they continue to evaluate further strategies to reduce GHG emissions from mobile and stationary sources. The benefits that will result from final adoption of effective federal standards for heavy- and medium-duty GHG emissions are critically important to states and localities. [EPA-HQ-OAR-2010-0162-1607.1, p.5]

In November 26, 2009, comments to EPA and NHTSA on the agencies' joint proposal to establish light-duty vehicle GHG emissions standards and corporate average fuel economy standards for light-duty vehicles, NACAA encouraged EPA to develop and enforce GHG standards for all key vehicle, engine and equipment subsectors within the overall transportation sector. We placed special emphasis on onroad heavy-duty engines, and advocated for the development of federal regulations, in close cooperation with the states, without delay. As noted above, states are keenly aware of the pressing environmental need to garner GHG emissions reductions from onroad heavy-duty engines. In the absence of federal action, states will be pressed to move ahead using other authorities under the Clean Air Act so that emissions reductions from this sector can be achieved as soon as possible. [EPA-HQ-OAR-2010-0162-1607.1, p.5]

Response:

The agencies agree that this rulemaking should be completed as recommended in the President's memorandum by July 30, 2011 and we have worked to meet that goal as closely as possible while appropriately dealing with the complex issues raised in comments.

2. Opposition to Final Rule

Organizations Included in this Section:

Aeroserve Technologies Ltd.
Allison Transmission
American Petroleum Institute
National Petrochemical and Refiners Association
Western States Petroleum Association
Coalition for Responsible Regulation, Inc.
Competitive Enterprise Institute
Daimler Trucks North America
National Automobile Dealers Association
National RV Dealers Association
Utility Air Regulatory Group

Organization: Aeroserve Technologies Ltd.

The term "Unintended Consequences" is mentioned several times. We have no doubt that there will be negative unintended consequences for doing what is proposed. This includes the burdening of a struggling industry and adding more tax payer funded bureaucracy to an already seriously indebted government. History contains ample evidence of the consequences of government interference in private business. We believe these proposed regulations represent a perfect example of governments ignoring history. [EPA-HQ-OAR-2010-0162-2118.1, p.5]

Aeroserve Technologies cannot support the notion of cap and trade. The myriad of target trucking configurations under such regulation will only sow confusion, industry indecision and needless regulatory expense. The government staff required to administer such a system would have to be paid for by the tax payer. It is almost a certainty that the immediate loser will be the truck owners followed by stakeholders these proposals are supposed to "help." The end result will be a loss for the general public. We believe that when government attempts to guide industry behavior, it should do so through industry loan programs, the promotion of devices that have a reasonable return on investment, and that said loans are paid back through fuel savings. The decision to purchase these devices should be based on return on investment, including life cycle costs, and should not be subsidized through government programs that delay action while waiting for decisions and legislative paperwork. The incentive is to burn less fuel and in that way, save money. The by-product of this activity is lower emissions and for those interested, lower carbon use. [EPA-HQ-OAR-2010-0162-2118.1, p.5]

The only reason we can see for vehicle categorization, or for the assignment of bin numbers, or for creating the GEM is to interface with a Cap and Trade regime. Without Cap and Trade these activities would not be required. [EPA-HQ-OAR-2010-0162-2118.1, p.5]

Organization: Allison Transmission

While the Proposed Rules attempt to address such issues, they fall short in many important respects. Therefore, Allison believes that it would be prudent for EPA and NHTSA to take additional time with respect to the finalization of the Proposed Rules in order to obtain additional information and to further review available technologies. [EPA-HQ-OAR-2010-0162-2735.1, Cover Page 2]

In general, EPA should more closely examine how MD/HD vehicles are used in the marketplace and conduct further assessments of the cost and market impacts of providing incentives and disincentives to the use of various technologies. In this regard, both agencies have sufficient statutory flexibility to pursue such a course. EPA and NHTSA are not constrained by law or judicial deadline to adhere to the announced - and overly ambitious - deadline for this rulemaking. [EPA-HQ-OAR-2010-0162-2735.1, Cover Page 2]

To be clear, that the purpose of any delay in this rulemaking would not be to simply delay for delay's sake, but rather, to 'get it right the first time.' With additional time, EPA and NHTSA could correct certain aspects of the Proposed Rules as well as refine its computer modeling of vehicle performance. EPA and NHTSA must recognize that this rulemaking will inevitably establish precedent and shape market expectations for follow-on rules affecting MD/HD vehicles into the next decade. Additional time can help to ensure that this unprecedented regulatory effort to establish the first ever GHG and FE regulation of Class 2b to Class 8 vehicles - is accomplished correctly and with full consideration of available alternatives. [EPA-HQ-OAR-2010-0162-2735.1, Cover Page 2]

While Allison recognizes that the timing of the Proposed Rules is part of a broader policy decision within the Administration, many separate areas of this rulemaking need to be revised or improved before final rules would be appropriate. As detailed below, EPA and NHTSA need to adopt a metric which more completely characterizes FE and GHG performance, substantially improve and finalize the computer modeling utilized for compliance, incorporate different drive cycles and drive cycle weighting, revise regulations related to the testing of vehicles and ensure that the Propose Rules do not act to inhibit advanced transmission technology, including that utilized in hybrid systems. [EPA-HQ-OAR-2010-0162-2735.1, p.1]

Organization: American Petroleum Institute, National Petrochemical and Refiners Association, and Western States Petroleum Association

While the Associations do not take issue with the substance and stringency of the actual greenhouse gas (GHG) standards that EPA proposes to impose on heavy duty trucks, the Associations strongly oppose any approach to implementing mobile source standards in a manner that impacts a wide swath of unrelated stationary sources. As of January 2, 2011, as a result of a similar rulemaking for cars and light duty trucks, EPA has begun imposing significant and unprecedented GHG permitting requirements on stationary sources around the nation. It has accomplished this through “four related actions that, taken together, trigger [permitting requirements] for GHG sources on and after January 2, 2011.” Action to Ensure Auth. to Issue Permits under the Prevention of Significant Deterioration Program to Sources of Greenhouse Gas Emissions: Finding of Substantial Inadequacy and SIP Call (Proposed SIP Call), 75 Fed. Reg. 53,892, 53,895 (Sept. 2, 2010) (emphasis added). These four actions are: [EPA-HQ-OAR-2010-0162-1820.1, p.2]

the “Endangerment Finding,” Endangerment and Cause or Contribute Findings for GHGs under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496 (Dec. 15, 2009); [EPA-HQ-OAR-2010-0162-1820.1, p.2]

the “Car Rule,” Light-Duty Vehicle GHG Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324 (May 7, 2010); [EPA-HQ-OAR-2010-0162-1820.1, p.2]

the “PSD Interpretive Memorandum,” Reconsideration of Interpretation of Regulations that Determine Pollutants Covered by Clean Air Act Permitting Programs, 75 Fed. Reg. 17,004 (April 2, 2010); [EPA-HQ-OAR-2010-0162-1820.1, p.3]

and the “Tailoring Rule,” Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 Fed. Reg. 31,514, 31,557 (June 3, 2010). [EPA-HQ-OAR-2010-0162-1820.1, p.3]

Organization: Coalition for Responsible Regulation, Inc.

The Coalition opposes EPA's proposed Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium-and Heavy-Duty Engines and Vehicles, 75 Fed. Reg. 74152-74456 (November 30, 2010) ('Proposed Vehicle Rule'), on the grounds that it relies upon a faulty finding that GHGs, including CO2, endanger public health or welfare. EPA does so without scientific basis and while litigation of that finding is ongoing. [EPA-HQ-OAR-2010-0162-2262, p.1]

This addendum is being submitted by Vinson & Elkins LLP and Holland & Hart LLP to supplement our January 27, 2011 comments on behalf of the Coalition for Responsible Regulation, Inc. ('CRR'). As explained in our January 27 comments, CRR opposes EPA's proposed 'Greenhouse Gas Vehicle Emission Standard Rulemaking for Medium- and Heavy-duty Engines and Vehicles,' 75 Fed. Reg. 74,152 (Nov. 30, 2010) ('Truck Rule') because it is based on an unlawful determination that greenhouse gases ('GHGs'), including CO2, endanger public health and welfare. See Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66496 (Dec. 15, 2009). CRR also opposes EPA's proposed rule for the following independent reasons. [EPA-HQ-OAR-2010-0162-2352.1, p.1]

Organization: Competitive Enterprise Institute

Although the ostensible purpose of the rule is to reduce greenhouse gas emissions and oil imports, the overwhelming lion’s share of the claimed benefits – fuel savings for truckers – have nothing to do with either climate change or energy security. [EPA-HQ-OAR-2010-0162-2418.1, p.1]

EPA and NHTSA provide no solid evidence that the trucking industry’s alleged “under-investment” in fuel-saving technology is due to market failure. In fact, two of the agencies’ five “potential hypotheses” suggest that truckers are simply behaving like prudent buyers. [EPA-HQ-OAR-2010-0162-2418.1, p.1]

EPA and NHTSA ignore a more credible and obvious explanation of lagging heavy-truck fuel economy. EPA’s diesel-engine emission standards, both by directly reducing the fuel efficiency of diesel engines, and by crowding out fuel economy-related R&D investment and consumer spending, created the problem the agencies now seek more power over industry to solve. [EPA-HQ-OAR-2010-0162-2418.1, pp.1-2]

Not once in EPA and NHTSA’s 300-page proposal do the agencies acknowledge the longstanding trade-off between making diesel engines cleaner and making them more fuel efficient. They discuss five “potential hypotheses” to explain industry’s alleged “under-investment” in fuel-saving technology without ever wondering whether the regulatory environment in which truckers operate might have something to do with it. [EPA-HQ-OAR-2010-0162-2418.1, p.11]

The evidence that EPA’s diesel-truck emission standards impair fuel efficiency and impose significant opportunity costs on both manufacturers and truckers is substantial. The evidence suggests that lagging heavy-truck fuel economy is not an example of market failure but of regulation-induced government failure. [EPA-HQ-OAR-2010-0162-2418.1, p.11]

Maybe it would unreasonable to expect an agency to stand up and take the blame for the very problem it seeks more power over industry to solve. However, given the administration’s high-profile commitment to regulatory “transparency,” EPA and NHTSA should have at least addressed the issue. They have not done so. [EPA-HQ-OAR-2010-0162-2418.1, p.11]

Organization: Daimler Trucks North America

We appreciate that the Agencies have listened to Daimler's concerns and suggestions. Unfortunately, the Agencies have not proposed the type of a rule that Daimler suggests – a rule that considers the GHG reduction potential of the entire vehicle with its integrated components, including its engine, and is neutral as to the technologies that manufacturers may use to meet the specified standards. Daimler believes that such a rule is possible and would move the Agencies closer to a rule that could have the most impact on GHG reduction and fuel efficiency improvement and be harmonized with similar rules being drafted by other countries. [EPA-HQ-OAR-2010-0162-1818.1, p.2]

This program will create a significant burden for manufacturers, including (1) requiring new tracking and reporting, (2) creating new enforcement risk, (3) compelling the measurement or coefficients of drag (Cd's) of a wide range of vehicles we do not today measure, and much more. Many of the requirements remain unclear to us, even after we read the NPRM. The Agencies need to work with manufacturers as we implement this program, as we cannot be expected to leap into such a complex and burdensome program with no problems. [EPA-HQ-OAR-2010-0162-1818.1, p.12]

Organization: National Automobile Dealers Association (NADA)

The proposal attempts but does not fully recognize the complex and varied nature of commercial vehicle manufacturing, sales and ownership. For example, commercial purchasers often do not spec and purchase truck bodies and trailers from tractor and truck chassis manufacturers and their dealers, but rather from body and trailer manufacturers and dealers. Moreover, vehicle purchasers often spec engines and other major components from a variety of manufacturers with no single manufacturer having complete dominion over the finished product. Also, due to the prevalence of leasing and other commercial realities, operators often do not own and control the trucks, tractors, and trailers they operate. [EPA-HQ-OAR-2010-0162-2705, p.6]

Organization: National RV Dealers Association (RVDA)

RVDA does not believe that it is appropriate to regulate non-commercial motor vehicles (motorhomes) with the same regulations as EPA intends to apply to for-profit commercial trucking enterprises. The difference in scale between the two industries is undeniable when you look at the price sensitivity of purchasers of the vehicles, the number of units sold per year, and the number of miles driven by end-users per year. The EPA needs to perform a separate Regulatory Flexibility Act analysis specifically for non-commercial motor vehicles and should conclude that motorhomes should be exempted from this rule. [EPA-HQ-OAR-2010-0162-1775-cp, p.1]

RVDA is supportive of the efforts to make our country cleaner and our vehicles more fuel efficient. The RV lifestyle is complementary with EPA's goals of a healthy outdoors environment and appreciation for the natural beauty of the United States. A cleaner environment benefits all of us. However, RVDA believes that this regulation, as proposed, will have a material negative impact on RV industry sales, and related RV industry jobs. [EPA-HQ-OAR-2010-0162-1775.1, p.1]

Organization: Utility Air Regulatory Group

EPA appears to analyze the proposed Heavy-Duty Rule as a whole, including the GHG emission reductions that would occur from the proposed vehicle fuel efficiency standards proposed by the National Highway Traffic Safety Administration ("NHTSA"). The majority of the emission reductions projected by EPA likely would occur anyway as a result of promulgation of the NHTSA fuel efficiency standards. Accordingly, the already minuscule projected effects from EPA's proposed rule, noted above, become even smaller if one excludes (as one should) the projected effects from the NHTSA standards. [EPA-HQ-OAR-2010-0162-1964.1, p.2]

Response:

A number of commenters took the opportunity afforded by the public comment period for these rules to address issues of wider concern to one or both agencies but not actually impacted by this rulemaking proposal, including potential cap-and-trade programs for GHGs. The agencies appreciate these comments and encourage commenters to take these issues up in actions and forums that specifically involve those issues.

Addressing more specific points made by commenters:

GEM was developed specifically in relation to the proposed standards and is not in any way intended as a cap-and-trade tool.

We agree that the final rules would be directionally improved by taking additional time to complete them, but believe that the rulemaking process undertaken over the past three years, starting with the Advance Notice in July 2008 (73 FR 44354) has been a robust one, and has resulted in programs that will provide substantial benefits in the short- and long-term. Allison Transmission specifically suggested that the agencies need more time "to further review available technologies (as well as the cost and market impacts of requiring and/or providing incentives and disincentives to the use of such technology)". It is not clear what additional technologies are intended, but from the discussion provided elsewhere in Allison's comments it appears that hybrids and advanced transmissions are the focus. These technologies were considered in detail in the agencies' feasibility analysis, both in the draft (NPRM) RIA and the final RIA, and provisions have been added to the test procedures and the innovative strategies credit program to help account for their benefits.

We also agree that, because this program is new to the HD sector, there are likely to be some initial implementation issues, and we intend to work with the regulated industries to ensure that the program is implemented as smoothly as possible. As discussed in the preamble for the rules, we intend to initiate a follow-up rulemaking focused on longer-term measures to reduce fuel consumption and GHG emissions in the heavy-duty transportation sector, and expect that adjustments to improve the compliance requirements and procedures may be possible in that action.

EPA sees no compelling reason to exempt motorhomes from the GHG standards. These vehicles are successfully regulated today for criteria pollutants, and the requirements we are adopting for vocational vehicles, which include motorhomes, are as straightforward for motorhome manufacturers as they are for manufacturers of other vehicles in this category, involving as they do use of certified engines and achieving emission reductions based on use of tires meeting the new standards. As to the commenter's suggestion that EPA conduct a separate analysis under the Regulatory Flexibility Act regarding the RV sector, the commenter provides no basis to challenge EPA's finding that the rules will not have a significant impact on a substantial number of small entities; however, in response to public comments we received on the proposal, we have further analyzed costs and benefits for regulation of RVs in Section 11.2 of this document.

Regarding comments about the interaction of EPA criteria pollutant emission standards and the current rulemaking, we note that in setting standards for NOx emissions from heavy-duty vehicles under the Clean Air Act, the Agency must set standards reflecting the greatest degree of emissions reductions achievable through the application of technology which the Administrator determines will be available for the model year to which such standards apply, giving appropriate consideration to cost, energy, and safety factors (emphasis added). In each of EPA's regulations of heavy-duty diesel engines, the Agency has made estimates of any impacts on energy consumption (positive or negative) in reaching its conclusions that the standards were appropriate under the Clean Air Act. Technology improvements to meet our Clean Air Act standards, especially the introduction of turbocharger intercooling and electronic engine controls, have all contributed to substantial improvements in engine efficiency and performance. Needless to say, EPA is not reopening, reconsidering, or otherwise re-evaluating the criteria pollutant standards for heavy duty diesel engines.

As directed in the President's May 2010 memorandum, NHTSA and EPA are pursuing these rules jointly, in recognition of the fact that reducing fuel consumption and vehicle exhaust CO2 are accomplished primarily through the use of a common set of technologies. The coordinated program that has resulted will greatly reduce the cost of compliance compared to uncoordinated programs pursued as separate rulemakings. We do not agree that the benefits of EPA's action under this rulemaking will be miniscule, as can be seen from the environmental and health benefits analysis in Chapter 8 of the RIA. Moreover, as experience with the voluntary Smart Way program shows, the heavy duty vehicle sector is not adopting available and highly cost-effective technologies to any substantial degree. The agencies thus believe that these benefits would not occur in the absence of these rules. Moreover, these benefits are additional to a NHTSA-alone regulation. Due to lead time requirements in EISA, NHTSA cannot adopt mandatory standards applicable before MY 2016 and thus two model years of feasible, highly cost-effective emission reductions would be foregone without the CAA standards.

EPA has already responded at length to the collateral attacks on the Endangerment Findings and findings about the triggering effect on stationary sources of mobile source GHG rules. These responses appear in the record to the Endangerment finding and light duty vehicle GHG rule which are incorporated by reference as part of the record for this rulemaking.

3. Additional General Comments

3.1. Consumer Labels

Organizations Included in this Section:

American Council for an Energy-Efficient Economy (ACEEE)
Union of Concerned Scientists (UCS)
New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority
International Council on Clean Transportation (ICCT)
National Association of Clean Air Agencies (NACAA)
American Lung Association (ALA) & Environmental Defense Fund (EDF)
Clean Air Task Force (CATF)
Institute for Policy Integrity
Sierra Club

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Furthermore, the actual configuration results should be placed on buyer-oriented vehicle labels. The proposal includes labeling requirements that will have very limited utility to truck buyers. In the case of vocational trucks and tractor-trailers, the label will list the truck features that allowed it to be certified at certain levels for compliance purposes but apparently will not allow a buyer to draw any conclusions about what fuel efficiency he or she might expect to achieve. A label is required to address one of the main barriers that efficiency faces in the heavy-duty vehicle market, namely the lack of standardized fuel efficiency information. Buyers need to be able to compare trucks and to judge likely performance on their own duty-cycles. While duty-cycles famously are as varied as the truckers that drive them, certain key parameters analogous to the city and highway fuel economy figures for light-duty vehicles could go a long way toward providing that information to buyers in a fashion that is consistent across manufacturers, technologies, and model years. More detailed recommendations for a heavy-duty labeling program appear later in these comments. [EPA-HQ-OAR-2010-0162-1894.1, p.4]

Lack of consistent fuel efficiency information for buyers of trucks, both new and used, is a barrier to greater efficiency. All vehicles and engines should carry labels that provide the buyer with fuel consumption and GHG emissions information that will help in choosing among products with similar functionality. [EPA-HQ-OAR-2010-0162-1894.1, p.25]

The labeling provisions of the proposed rule are minimal and are clearly intended to facilitate compliance and enforcement, rather than to provide consumer information. Given that lack of standardized fuel consumption information is a barrier to faster adoption of efficiency technologies in the heavy-duty vehicle market, it is important that a consumer-oriented label be put in place to support the new standards. [EPA-HQ-OAR-2010-0162-1894.1, p.25]

Recommendation (labeling): The final rule should require that fuel consumption and GHG emissions information for all vehicles and engines covered by the rule be made available in a buyer's guide on an annual basis. [EPA-HQ-OAR-2010-0162-1894.1, p.25]

The agencies specifically decline to require fuel consumption labeling, because they believe it could mislead the purchaser (p.74352). As for other products, including light-duty vehicles, medium- and heavy-duty vehicle labels cannot be expected to provide information that predicts individual users' energy use; labels are designed to help guide comparisons made in the purchasing process. How to provide information that is helpful rather than misleading to, the consumer is a perennial challenge for labels. However, this challenge has been met in other cases through careful design of the label, and updating as needed, rather than by declining to provide the information at all. If the standards can be relied upon to reduce fuel consumption, as we believe they can, then it must be the case that vehicles' certification values relative to those standards would be meaningful information to buyers. [EPA-HQ-OAR-2010-0162-1894.1, p.25]

In the final rule, the agencies should indicate their intention to issue a rulemaking for labeling of the vehicles and engines covered by this rule. In addition, the final rule should require the issuance of an annual buyers guide similar to the Fuel Economy Guide that EPA and DOE issue for light-duty vehicles. The guide would list, for each vehicle and engine subject to this rule, fuel consumption and GHG emissions rates, along with other information helpful for comparing and understanding the performance of these vehicles and engines. [EPA-HQ-OAR-2010-0162-1894.1, p.25]

Recommendation (labeling of engines, tractors and vocational vehicles): The final rule should require that engine, tractor, and vocational truck labels include the Family Emissions Limits, regardless of whether the manufacturer is participating in ABT. [EPA-HQ-OAR-2010-0162-1894.1, p.25]

Under the proposed rule, engine and vehicle labels would provide product specifications to facilitate identification and ensure in-use compliance. However, the proposed rule appears to require that the label state the product's certified emissions, or 'Family Emissions Limit', only if the manufacturer is using ABT (p.74268). Fuel consumption information is not required on the label at all. Whether or not the manufacturer is participating in ABT, GHG emissions and fuel consumption information should be provided on the label. [EPA-HQ-OAR-2010-0162-1894.1, p.26]

Recommendation (buyer-oriented label): The final rule should include information and discussion in preparation for a subsequent labeling rule requiring that tractor and vocational truck labels list the vehicle's fuel consumption and GHG emissions on each test cycle, in addition to the weighted average used for certification. Where possible, the values should reflect the actual vehicle configuration, rather than the standard GEM model inputs specified for certification purposes. [EPA-HQ-OAR-2010-0162-1894.1, p.26]

Moreover, the label should include information designed to be most useful to the buyer. At a minimum, it should allow comparisons across similar vehicles or engines and promote the deployment of efficiency technologies. [EPA-HQ-OAR-2010-0162-1894.1, p.26]

Elsewhere, we have recommended that among the data that manufacturers should report to the agencies for each vehicle model are fuel consumption and GHG emissions as calculated by the GEM model using actual vehicle specifications, including engine, transmission, frontal area, etc., rather than the generic inputs required for certification purposes. We recommend that this information be displayed on a buyer-oriented vehicle label as well. [EPA-HQ-OAR-2010-0162-1894.1, p.26]

In addition, displaying fuel consumption and GHG emissions on each of the required test cycles (transient, 55 mph cruise, and 65 mph cruise) separately, in addition to the specific weighted sum required for certification purposes, would allow buyers to better understand the suitability of a given vehicle for their duty cycle. In fact, research conducted by West Virginia University for the International Council on Clean Transportation provides evidence that fuel consumption and GHG emissions over any heavy-duty drive cycle can be reasonably well approximated as a weighted sum of fuel consumption and GHG emissions over certain standard drive cycles. The weightings are determined by certain parameters associated with the drive cycle, such as average speed and average acceleration. Various combinations of three drive cycles, including some similar to the cycles proposed in the rule, were shown to produce good results. [EPA-HQ-OAR-2010-0162-1894.1, p.26]

Hence it is likely that a buyer in principle could use fuel consumption values over the three cycles used for compliance testing to estimate the fuel consumption of a given vehicle knowing the characteristics of his or her own duty cycle. Showing the individual test cycle results on the label would be similar to listing city and highway fuel economy on the Monroney label; the car driver can form an opinion of the value to him or her of high city or highway fuel economies, based on his or her own driving habits. In the WVU work, the parameter on which that view is based is not the split of miles driven into city and highway, but rather the split of time spent in each of three modes. That split could be measured by average speed and acceleration. [EPA-HQ-OAR-2010-0162-1894.1, p.27]

Issues arising from this proposal call for further investigation. For example, while truck fleets are likely to know the average speed over their duty cycles, they are less likely to have average acceleration data (though this can be approximated from second-by-second speed data if available). Also, the estimates of fuel consumption and GHG emissions produced by this method may differ from real-world values by a greater percentage than the required percentage improvement under the standard. These and other issues should be explored further in the development of a buyer-oriented label for vehicles regulated under this rule. [EPA-HQ-OAR-2010-0162-1894.1, p.27]

Recommendation (labeling of heavy-duty pickups and vans): The final rule should include information and discussion in preparation for a subsequent labeling rule requiring that heavy-duty pickups and vans carry a label similar to the light-duty Monroney label. The label should include fuel consumption and GHG emissions in an appropriate metric, supplemented as needed with payload and towing capacity information. [EPA-HQ-OAR-2010-0162-1894.1, p.27]

Under the proposed rule, the label for heavy-duty pickup trucks and vans would continue to show compliance with criteria pollutant standards only (p.74263). A label similar to the light-duty vehicle label would be appropriate for these vehicles, however. [EPA-HQ-OAR-2010-0162-1894.1, p.27]

Miles per gallon values for heavy-duty pickups and vans may be far lower than those for similar vehicles with GVWR under 8500 pounds due to the higher test weights (curb weight plus half payload) specified for the heavy-duty vehicles. This has apparently raised a concern among manufacturers that such a label could unfairly disadvantage the heavy-duty vehicles in any cross-class comparisons that a consumer may make. However, the basis for the structure of the proposed standards, which vary by vehicle 'work factor', is that these vehicles are used for work purposes and that their buyers do not have the option of substituting vehicles with the towing capacity and rated payload of light-duty trucks. Hence this concern regarding shifting purchasers across classes seems unwarranted. [EPA-HQ-OAR-2010-0162-1894.1, p.27]

Furthermore, there are several possible approaches to designing a label that would address the differences in test weight, including: [EPA-HQ-OAR-2010-0162-1894.1, p.27]

• Noting prominently that the vehicle is a 'work truck' and changing label design features to highlight this difference; and

• Testing these vehicles at the light-duty test weight (as well as at the compliance test weight) and reporting that information on the label as well. [EPA-HQ-OAR-2010-0162-1894.1, p.28]

Organization: Union of Concerned Scientists (UCS)

Labeling of vehicle fuel economy and emissions is an important component to a successful efficiency standards program. It provides consumers important information about the vehicle they are purchasing and it impacts on oil consumption and global warming emissions. It also raises consumer awareness about the program and allows a standardized comparison of different vehicles. [EPA-HQ-OAR-2010-0162-1764.1, p.11]

Currently, there is no standardized fuel consumption or greenhouse gas emissions data available to either new or used truck buyers. While truck fuel consumption and emissions vary significantly from pickup trucks and vans to tractor trailers, purchasers will primarily be comparing data on vehicles that perform the same function. Providing standardized information on a vehicle label which includes both greenhouse gas emissions performance and fuel consumption performance would prove valuable information for both new and used truck purchasers and help to overcome a significant barrier to efficiency technologies in the trucking sector. [EPA-HQ-OAR-2010-0162-1764.1, p.11]

A consumer based label, similar to those on light-duty vehicles, should be displayed on Class 2B and 3 heavy-duty pickup trucks and vans which include both fuel economy and emissions performance information resulting from compliance testing. This would provide standardized information for truck buyers to compare similar heavy-duty vehicles and assist them in choosing the cleanest and most efficient options that meets their needs. [EPA-HQ-OAR-2010-0162-1764.1, pp.11-12]

For larger vehicles, a label should show estimates of fuel use over the three cycles required for certification, rather than the combined weighted average used for compliance purposes. Providing this disaggregated information would allow consumers to make the most appropriate comparison given the type of operation they expect. For example, a truck buyer who will use the vehicle to make local deliveries would be able compare the performance of different vehicles over the transient cycle. While another truck buyer doing regional operations may want to consider comparing the performance over a high speed cycle. [EPA-HQ-OAR-2010-0162-1764.1, p.12]

The greenhouse gas emissions of vocational trucks, tractors and engines should also be reported on the emissions label, regardless of a manufacturer's participation in the ABT program.[EPA-HQ-OAR-2010-0162-1764.1, p.12]

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

The preamble describes the complexities of the truck market, ranging from engine manufacturers, truck owners, trailer manufacturers, trailer owners, shipping companies, trucking operators, trade and others. Although the medium- and heavy-duty truck market could have increased its profit margin greatly through fuel-saving technologies, to date, truck buyers and operators have not taken advantage of opportunities to make investments in these types of technologies. Availability of reliable information regarding performance of new technologies may be one reason why truck buyers are not making more fuel-efficient purchases. Information availability, therefore, is a critical component toward steering this market to greater fuel efficiency. Although the proposed rules are not adopting the mandatory use of fuel consumption labeling for these types of vehicles due to the multitude of potential truck configuration and uses, New York State recommends, nevertheless, that fuel consumption labeling should be available to the truck buyer to enable more informed purchasing and to increase competition for more fuel-efficient engines and technologies. These fuel consumption labels could be derived from the testing models used to evaluate compliance with the standards. As engine certification tests must be 'highly accurate, reliable' (P74352), engine testing results could be made available to the truck buyer as well. Additional information could be provided with the understanding that fuel consumption may vary considerably based on terrain, urban and highway driving, driving behavior, vehicle configuration choices, etc. Ideally, truck sellers should be able to input data into fuel consumption models based on customers' desired vehicle configurations. Since lack of information availability has been a contributing factor in not steering the truck market towards improved fuel efficiency, every effort should be made to fill this information gap. [EPA-HQ-OAR-2010-0162-2047.1, p.3]

New York State supports technology and measures that inform drivers of the fuel use. For example, drivers could obtain real-time information on fuel usage through installation of fuel economy meters in the tractor cabs. New York State recommends this tool be part of the technology package for future model years. Driving behavior is an important contributor to fuel consumption. Good driving practices can improve a vehicle's fuel consumption by as much as 10 percent. The practice is commonly known as 'eco-driving' and could become part of training for commercial truck drivers. Although this is not proposed through rule-making, New York State recommends promoting fuel-efficient driving practice awareness. [EPA-HQ-OAR-2010-0162-2047.1, p.3]

Organization: International Council on Clean Transportation (ICCT)

Lack of consistent fuel efficiency information for buyers of trucks, both new and used, is a barrier to greater efficiency. All vehicles and engines should carry labels that provide the buyer with fuel consumption and greenhouse gas (GHG) emissions information that will help in choosing among products with similar functionality. [EPA-HQ-OAR-2010-0162-1945.1, p.22]

The labeling provisions of the proposed rule are minimal and are clearly intended to facilitate compliance and enforcement, rather than to provide consumer information. Given that lack of standardized fuel consumption information is a barrier to faster adoption of efficiency technologies in the heavy-duty vehicle market, it is important that a consumer-oriented label be put in place to support the new standards. [EPA-HQ-OAR-2010-0162-1945.1, p.22]

The agencies specifically decline to require fuel consumption labeling, because they believe it could mislead the purchaser (Proposed Standards p.74352). As for other products, including light-duty vehicles, medium- and heavy-duty vehicle labels cannot be expected to provide information that predicts individual users’ energy use. Labels are designed to help guide comparisons made in the purchasing process. How to provide information that is helpful rather than misleading to the consumer is a perennial challenge for labels. However, this challenge has been met in other cases through careful design of the label, and updating as needed, rather than by declining to provide the information at all. If the standards can be relied upon to reduce fuel consumption, as we believe they can, then it must be the case that vehicles' certification values relative to those standards would be meaningful information to buyers. [EPA-HQ-OAR-2010-0162-1945.1, p.22]

In the final rule, the agencies should indicate their intention to issue a rulemaking for labeling of the vehicles and engines covered by this rule. In addition, the final rule should require the issuance of an annual guide for buyers that would list, for each vehicle and engine subject to this rule, fuel consumption and GHG emissions rates, as well as additional information as appropriate. [EPA-HQ-OAR-2010-0162-1945.1, p.22]

Under the proposed rule, engine and vehicle labels would provide product specifications to facilitate identification and ensure in-use compliance. However, the proposed rule appears to require that the label state the product's certified emissions, or "Family Emissions Limit", only if the manufacturer is participating in the Averaging, Banking, and Trading (ABT) program (Proposed Standards p.74268). Fuel consumption information is not required on the label at all. [EPA-HQ-OAR-2010-0162-1945.1, p.22]

Whether or not the manufacturer is participating in ABT, GHG emissions and fuel consumption information should be provided on the label. Moreover, the label should include information designed to be most useful to the buyer. At a minimum, it should allow comparisons across similar vehicles or engines and promote the deployment of efficiency technologies. [EPA-HQ-OAR-2010-0162-1945.1, p.22]

In the final section of these comments, we recommend that among the data that manufacturers should report to the agencies for each vehicle model are fuel consumption and GHG emissions as calculated by the GEM model using actual vehicle specifications (including engine, transmission, frontal area, etc.), rather than the generic inputs required for certification purposes. [EPA-HQ-OAR-2010-0162-1945.1, p.22]

We recommend that this information be displayed on a buyer-oriented vehicle label as well. This would be analogous to the display of "5-cycle adjusted" fuel economy values, rather than CAFE certification values, on the light-duty Monroney label. In addition, displaying fuel consumption and GHG emissions on each of the required test cycles (transient, 55 mph cruise, and 65 mph cruise) separately, in addition to the specific weighted sum required for certification purposes, would allow buyers to better understand the suitability of a given vehicle for their duty cycle. [13] In fact, research conducted by West Virginia University (WVU) for the ICCT provides evidence that fuel consumption and GHG emissions over any heavy-duty drive cycle can be reasonably well approximated as a weighted sum of fuel consumption and GHG emissions over certain standard drive cycles. The weightings are determined by certain parameters associated with the drive cycle, such as average speed and average acceleration. Various combinations of three drive cycles, including some similar to the cycles proposed in the rule, were shown to produce good results. [EPA-HQ-OAR-2010-0162-1945.1, p.23]

Hence, it is likely that a buyer in principle could use fuel consumption values over the three cycles used for compliance testing to estimate the fuel consumption of a given vehicle knowing the characteristics of his or her own duty cycle. Showing the individual test cycle results on the label would be similar to listing city and highway fuel economy on the Monroney label; the car driver can form an opinion of the value to him or her of city or highway fuel economies, based on his or her own driving habits. In the WVU work, the parameter on which that view is based is not the split of miles driven in the city and highway, but rather the amount of time spent in each of three modes. That split could be measured by average speed and acceleration. [EPA-HQ-OAR-2010-0162-1945.1, p.23]

Issues arising from this proposal call for further investigation. For example, while truck fleets are likely to know the average speed over their duty cycles, they are less likely to have average acceleration data (though this can be approximated from second-by-second speed data if available). Also, the estimates of fuel consumption and GHG emissions produced by this method may differ from real-world values by a greater percentage than the required percentage improvement under the standard. These and other issues should be explored further in the development of a buyer-oriented label for vehicles regulated under this rule. [EPA-HQ-OAR-2010-0162-1945.1, p.23]

Under the proposed rule, the label for heavy-duty pickup trucks and vans would continue to show compliance with criteria pollutant standards only (Proposed Standards p.74263). However, a label similar to the light-duty vehicle fuel economy label would also be appropriate for these vehicles. [EPA-HQ-OAR-2010-0162-1945.1, p.23]

Miles per gallon values for heavy-duty pickups and vans may be far lower than those for similar vehicles with gross vehicle weight rating (GVWR) under 8,500 pounds due to the higher test weights (curb weight plus half payload) specified for the heavy-duty vehicles. This has apparently raised a concern among manufacturers that such a label could unfairly disadvantage the heavy-duty vehicles in any cross-class comparisons that a consumer may make. However, the basis for the structure of the proposed standards, which vary by vehicle “work factor”, is that these vehicles are used for work purposes and that their buyers do not have the option of substituting vehicles with the towing capacity and rated payload of light-duty trucks. Hence this concern regarding shifting purchasers across classes seems unwarranted. [EPA-HQ-OAR-2010-0162-1945.1, p.24]

Furthermore, there are several possible approaches to designing a label that would address the differences in test weight, including:

- Noting prominently that the vehicle is a “work truck” and changing label design features to highlight this difference; and

- Testing these vehicles at the light-duty test weight (as well as at the compliance test weight), and reporting that information on the label as well. [EPA-HQ-OAR-2010-0162-1945.1, p.24]

Recommendations:

1) The final rule should require that engine, tractor, and vocational truck labels include the Family Emissions Limits, regardless of whether the manufacturer is participating in ABT.

2) The final rule should require that fuel consumption and GHG emissions information be made available, on an annual basis for all vehicles and engines covered by the rule, in a buyer's guide similar to the Fuel Economy Guide that the EPA and DOE issue for light-duty vehicles, along with other information helpful for comparing and understanding the performance of these vehicles and engines.

3) The final rule should include information and discussion in preparation for a subsequent labeling rule requiring that:

• Tractor and vocational truck labels list the vehicle's fuel consumption and GHG emissions on each test cycle, in addition to the weighted average used for certification. Where possible, the values should reflect the actual vehicle configuration, rather than the standard GEM model inputs specified for certification purposes.

• Heavy-duty pickups and vans carry a consumer-oriented labeled similar to the light-duty Monroney label. The label should include fuel consumption and GHG emissions in an appropriate metric, supplemented as needed with payload and towing capacity information. [EPA-HQ-OAR-2010-0162-1945.1, p.24]

---

[13] Some commenters have rightly questioned the choice of these three cycles, in particular the transient cycle. The value of reporting fuel consumption and emissions over all required test cycles does not depend on the particular cycles proposed by the agencies, but would carry over to other cycles that the agencies may choose to use.

Organization: National Association of Clean Air Agencies (NACAA)

NACAA encourages EPA to include provisions for more labeling than is currently required, including some system for providing information and guidance to consumers to enable informed purchase decisions (e.g., OEMs buying engines and chassis to produce complete vehicles). EPA needs to further explore the possibilities for more informative labeling. [EPA-HQ-OAR-2010-0162-1607.1, p.4]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

EDF and ALA applaud the success of EPA's SmartWay program. The program has been effective in encouraging the development of fuel efficient technologies, working with fleets to implement fuel saving technologies and practices and advising fleets and owners on obtaining financing. SmartWay has helped increase the market penetration of fuel-saving technologies in the medium- and heavy-duty sector in the absence of regulation. It has also incentivized fuel-reducing practices through education. We encourage the agencies to build on this strong program by expanding its consumer outreach campaign. [EPA-HQ-OAR-2010-0162-3129.1, p.14]

Empowering consumers with information is an important and effective way to allow consumers to make informed purchasing decisions. For example, in the light-duty sector, the Agency provides the Green Vehicle Guide, consumer fuel economy labels, informational websites like www.fueleconomy.gov, and buying guides at dealerships. A similarly extensive outreach program would benefit medium- and heavy-duty vehicle purchasers. [EPA-HQ-OAR-2010-0162-3129.1, pp.14-15]

We also encourage the agencies to initiate a separate rulemaking to require consumer fuel efficiency and emissions labels on medium- and heavy-duty vehicles. Providing consumers with the information they need to accurately compare fuel use and emissions across vehicles will allow consumers to better express their preferences in their vehicle purchasing decisions. [EPA-HQ-OAR-2010-0162-3129.1, p.15]

Labels currently found on medium- and heavy-duty engines and vehicles are, importantly, required as a compliance tool. This rulemaking proposes additional compliance-related labeling requirements, which EDF and ALA support. We also ask the agencies to consider expanding the labeling program. The agencies will soon finalize new window labels for light-duty vehicles, designed to help consumers choose cleaner and more efficient vehicles and promote market penetration of efficient technologies. We strongly believe a similar rulemaking should be initiated for medium- and heavy-duty vehicles to deliver the same important decision-making tools to the consumers of those fleets. [EPA-HQ-OAR-2010-0162-3129.1, p.15]

In the proposal, the agencies contend that, based on the broad range of MD/HD vehicle configurations and uses, "a label or published fuel consumption value, based on testing under average conditions, would likely not provide an accurate assessment of individual vehicle fuel consumption performance, and may be misleading." However, Class 2b/3 pick-ups and vans do not come in a broad range of configurations, but are typically sold by manufacturers as complete vehicles. Because these heavy-duty pickups and vans are similar in configuration to light-duty vehicles, a labeling program similar to the one being developed for light-duty vehicles could meaningfully be applied to Class 2b/3 vehicles. [EPA-HQ-OAR-2010-0162-3129.1, p.15]

Additionally, while we agree that vocational and long-haul trucks can be configured and used in a broad range of ways, we also believe it is possible to accurately estimate fuel consumption and GHG emissions information from these vehicles. Research performed by the International Council on Clean Transportation, and previously submitted to EPA, shows that truck fuel use over a small number of cycles can be used to predict fuel use on wide range of duty-cycles. We respectfully request that the agencies take a close look at the range of opportunities to empower consumer choices with access to vital information about efficiency, fuel savings and pollution characteristics. [EPA-HQ-OAR-2010-0162-3129.1, pp.15-16]

Organization: Clean Air Task Force (CATF)

Current Actions Needed to Transition to Future Robust HD GHG Rulemaking Action We welcome EPA's stated intention to promulgate additional standards in the future requiring emission reductions from this sector beyond those in the current proposal, taking into consideration advanced technologies as well as other regulatory approaches. However, we believe that for those rulemakings to be as effective as possible, certain actions should be taken now to insure that advanced technologies can be included to the maximum extent for MY 2019 and later heavy-duty trucks. Those actions should include the following— [EPA-HQ-OAR-2010-0162-2734.1, p.12]

Organization: Institute for Policy Integrity

But the rules will also generate enormous private benefits, in the form of fuel savings, which suggests consumers might currently be under-investing in fuel-efficient technologies. Informational issues and the positional goods theory help explains that seemingly irrational underinvestment, and those explanations suggest additional government actions, in the form of labels and demonstration projects, might be beneficial as compliments to these regulations. [EPA-HQ-OAR-2010-0162-1895.1, p.1]

A number of informational issues may contribute to the energy efficiency paradox. Consumers may lack information about fuel-efficient technology, or may fail to consider available information or translate it into fuel savings when making vehicle purchase decisions. Consumers who might be interested in better fuel economy, moreover, may not have reliable information applicable to their vehicle or use. As the agencies suggest, informational issues may be an important explanation of consumers' failure to select more fuel-efficient vehicles. [EPA-HQ-OAR-2010-0162-1895.1, p.7]

The agencies are currently in the process of revising separate labeling requirements for light-duty vehicles, where they note how important access to information on fuel efficiency and environmental impacts is to average consumers of passenger vehicles. That rulemaking does not cover heavy-duty trucks. While many consumers of heavy-duty trucks and engines are businesses that, compared to average individuals, might have better access to information and more time and resources to make informed choices, [42] at least some heavy-duty vehicles are purchased by individuals (certain pickups, vans, mobile homes, and recreational vehicles). Moreover, there is no reason to assume that government entities and businesses might not also benefit from easier access to clearer information. [EPA-HQ-OAR-2010-0162-1895.1, p.7]

The agencies do not propose any major changes to current emission control information labels for heavy-duty engines and vehicles. The agencies seem to view these labels mainly as tools to aid inspection and enforcement rather than as information disclosure tools, but there is no reason they cannot serve both functions. EPA has the statutory authority under the Clean Air Act to require vehicle and engine labels that "contain such other information relating to control of motor vehicle emissions as the Administrator shall prescribe." NHTSA may also have some authority here, since Congress did not specify what it meant by "compliance and enforcement protocols" in the Energy Independence and Security Act of 2007. [EPA-HQ-OAR-2010-0162-1895.1, pp.7-8]

Labels may be most appropriate and straightforward for heavy-duty pickups and vans. At least some consumers of this class variety are individuals, who are perhaps most in need of additional information on fuel efficiency and environmental effects. Labels are also beneficial not just for intra-class comparisons, but also for cross-class comparisons. Though the agencies believe class switching may be unlikely, it is certainly possible between heavy-duty and light-duty pickups and vans. Indeed, class 2b and 3 vehicles share much in common with light-duty trucks, which is why the agencies were able to select a metric for fuel efficiency and emissions (gallons and grams per mile) analogous to the measure used in the light-duty context. Because of this common metric, the agencies may be able to adapt some features of the light-duty labels to the heavy-duty pickup and van context, allowing not only for administrative ease but also for cross-class comparisons by consumers. [EPA-HQ-OAR-2010-0162-1895.1, p.8]

For other vehicle categories, the different metrics (grams per unit of work), diversity of vehicle applications, and the chosen points of regulation (e.g., chassis manufacturers for vocational vehicles) may present new challenges for a labeling system. The labels developed for the light-duty context may not seamlessly apply. The agencies should consider whether clear, cost-effective labels can be developed for these other heavy-duty vehicle classes. The agencies might also consider whether a voluntary label or seal, analogous to the Energy Star program, can be developed, especially for those vehicles that the agencies have not regulated despite significant efficiency opportunities: for example, for aerodynamic improvements to vocational vehicle bodies. This may be most important for vehicles marketed to individual consumers, like mobile homes. [EPA-HQ-OAR-2010-0162-1895.1, p.8]

[42] Businesses are not necessarily always rational economic actors. The agencies suggest that "split incentives" within trucking firms cause them not to purchase more fuel-efficient models, as the firms' vehicle buyers do not adequately communicate with their fuel purchasers or vehicle operators. See Proposed Rulemaking at 74,305. As the agencies concede, there is little empirical evidence for such an explanation, and they should consider whether there is an adequate basis for the proposition that such split incentives help explain the energy efficiency paradox.

Organization: Sierra Club

To achieve the greatest reductions in oil consumption and greenhouse gas emissions, it is critical that consumers have readily available information about the efficiency of new vehicles. Just as consumers shopping for new light-duty cars and trucks have access to informative window labels, purchasers of medium and heavy duty vehicles should also have access to labels displaying the emissions and fuel economy of new vehicles. [EPA-HQ-OAR-2010-0162-1889.1, p. 3]

While the proposed rule includes a few labeling requirements for various vehicle types, the proposed rule does not require labels to include labeling to include fuel consumption information and does not require all vehicles to be labeled with greenhouse gas emissions. [EPA-HQ-OAR-2010-0162-1889.1, p. 3]

It is critical that information regarding fuel consumption and greenhouse gas emissions be readily available in the market. In the final rule, the agencies should require all medium and heavy duty vehicles to have some type of label that contains information regarding fuel consumption and greenhouse gas emissions. More specifically, Class 2B vehicles should be labeled with fuel consumption in gallons per 100 miles and labels for engines, tractors and vocational trucks should include the Family Emissions Limit. [EPA-HQ-OAR-2010-0162-1889.1, p. 3]

Response:

The agencies received a number of comments summarized above recommending that we finalize some form of consumer label or consumer tool to inform consumers of heavy-duty vehicles on fuel efficiency and GHG emissions of new vehicles. The agencies did not propose a consumer focused label, and we have decided not to finalize one in today's action. The agencies just finished a joint rulemaking to redesign the existing light-duty consumer fuel economy label. That rulemaking effort took approximately two years, involved 24 focus groups, an internet survey, an expert panel and more than 300 label design revisions to reach a final action putting in place a new label the agencies believed would most effectively communicate with light-duty vehicle consumers.

While we agree with the commenters' general point that consumer labels can be an important tool in our joint efforts to reduce fuel consumption and GHG emissions, we believe that the development of a consumer label is too complicated and important to accomplish in the time period between proposal and final rule in this action. Instead, the agencies will consider a consumer label in the context of our efforts with stakeholders to begin work on a second phase of this regulation.

In the interim, EPA will continue to rely on the SmartWay transportation program as the primary mechanism to increase freight consumer awareness of technologies and operating practices to reduce fuel consumption and GHG emissions.

Organization: United States Senators (Dianne Feinstein, Olympia Snowe, Maria Cantwell, Richard Durbin, Barbara Boxer, Benjamin Cardin, Sheldon Whitehouse, Jack Reed, Jeff Merkley, Joseph Lieberman, Frank Lautenberg, Bill Nelson, Robert Menendez, Mark Udall, Thomas Carper, Daniel Akaka, Daniel Inouye, and John Kerry)

We also would like to comment on the draft standards for medium and heavy duty trucks (Docket ID No. NHTSA-20 1 0-0079). We recommend that the final rules require fuel economy window stickers on large pick-ups and an online tool to allow purchasers to calculate the fuel economy of various truck configurations. Consumers benefit from knowing the fuel economy of vehicles on the market.

The Ten-in-Ten Fuel Economy Act is intended to help consumers and businesses save money at the pump. To accomplish this, American consumers and businesses need easy-to-use information about vehicle fuel economy, so that they may compare vehicles. According to the 2010 National Academy Report:

Given the high fuel consumption sensitivity of some medium- and heavy-duty vehicle purchasers, it appears that one priority should be to ensure that accurate information on the fuel consumption characteristics of a completed vehicle is available to the purchaser. Having such information would help drive the selection of vehicles with the lowest fuel consumption for the task performed.

Clearly, the businesses and consumers who purchase medium and heavy duty vehicles are mindful of the costs of fuel and would utilize information when making purchasing decisions. In light of the NAS guidance, we strongly recommend that the final medium and heavy duty truck fuel economy regulations require a window sticker on every pick-up truck and van above 8,500 pounds, modeled on the fuel economy label for light duty vehicles, which informs consumers of the vehicle's average fuel economy and estimated annual fuel cost.

The label would be especially helpful to the farmers, contractors, landscapers, and other small business owners who purchase approximately 785,000 of these pick-Up trucks each year, but who currently cannot compare the fuel economy of large pick-up truck models. By providing a small business owner with the information to select a truck that gets one additional mile per gallon, EPA and DOT would enable the business owner to save more than $500 per year.

We also recommend that DOT and EPA create an online tool to allow trucking companies and truck drivers to calculate the fuel economy of various vocational vehicle and tractor trailer truck configurations. As your agencies point out in your regulatory impact analysis, "truck fleets typically operate on a very thin profit margin (1-2 percent); therefore, increased truck fuel economy can greatly increase a company's profitability." American industry would profit from being given the information necessary to choose fuel efficient vehicle options.

Response:

The agencies recognize that consumer information in the form of a fuel efficiency label can be a valuable tool to help achieve our goals, and we note that the agencies have just recently finalized a new fuel economy label for passenger cars and light trucks. See 76 FR at 39478**.** That rulemaking effort focused solely on modifying an existing label and was a multi-year process with significant public input. As we did not propose a consumer label for heavy-duty pickups and vans in this action and have not appropriately engaged the public in developing such a label, we are not prepared to finalize a consumer-based label in this action. However, we do intend to consider this issue as we begin work on the next phase of regulations, as we recognize that a consumer label can play an important role in reducing fuel consumption and GHG emissions.

3.2. Future Engine Standards

Organizations Included in this Section:

Union of Concerned Scientists (UCS)
Sierra Club
Clean Air Task Force (CATF)
Natural Resources Defense Council (NRDC)
American Council for an Energy-Efficient Economy (ACEEE)
Lim, Daniel
Honeywell
American Lung Association (ALA) & Environmental Defense Fund (EDF)

Organization: Union of Concerned Scientists (UCS)

In addition to the separate engine standards proposed, the agencies should establish a long-term trajectory for engine improvements based on technology expected by 2020. The rule needs to provide enough information on the trajectory of engine standards to ensure sustained investment in next generation engine technologies. [EPA-HQ-OAR-2010-0162-1764.1, p.10]

Organization: Sierra Club

Establish a long-term trajectory for medium and heavy duty engine standards. The proposed standards will drive reductions in fuel consumption and greenhouse gas emissions in vehicles sold in model years 2014-2017. However, the need to bring advanced technologies into the market and to further reduce our dependence on oil does not stop with model year 2017. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

While the proposed standards are based largely on the use of existing technologies, additional technologies under development could significantly improve engine performance. Providing an indication of future stringency would encourage further development and investment of these advanced technologies. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

To ensure sustained investment in advanced technologies and to guarantee further oil and pollution reduction, EPA and NHTSA should include in the final preamble a discussion of future technologies identified by the National Academies of Sciences and identify 2020 targets for stringency for each engine category. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

Organization: Clean Air Task Force (CATF)

The proposed Rule needs to provide enough information on the trajectory of engine standards to ensure sustained investment in next generation engine technologies. In the final preamble, EPA should include 2020—2025 targets for stringency in each engine category based on technologies identified by the National Academy of Sciences (NAS) available over this time period. [EPA-HQ-OAR-2010-0162-2734.1, p.12]

Organization: Natural Resources Defense Council (NRDC)

The agencies should establish a trajectory for engine standards to 2020 based on the technologies evaluated by the National Academies of Science to be available in that year. In the preamble of the final rule, EPA and NHTSA should describe the 2020 engine technologies and their potential to reduce fuel consumption and GHG emissions for each regulatory category. [EPA-HQ-OAR-2010-0162-1776.1, p.12]

While we recognize that future standards cannot be included in this 2014-2018 rulemaking, a description of technology pathways expected to be included in the evaluation of future standards will provide needed certainty to engine manufacturers. This first phase of the Heavy-Duty National Program relies on established, off-the-shelf technologies but future standards will increasingly rely on new developments. A description of the expected engine technologies out to 2020 will provide manufacturers with greater certainty that their investments in new fuel-saving and GHG emissions technology will lead to adoption in the marketplace. [EPA-HQ-OAR-2010-0162-1776.1, p.12]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Recommendation (post-2017 engine improvements): Indicate in the final rule the likely trajectory of engine standards out to 2020 at a minimum, based on the NAS study and other sources. [EPA-HQ-OAR-2010-0162-1894.1, p.15]

Engine standards for medium- and heavy-duty vehicles should be designed to maximize fuel savings and spur investment in next generation technologies. The proposed standards establish two phases of medium- and heavy-duty engine emissions and fuel consumption stringency levels beginning in model year 2014 and model year 2017. The stringency levels are based on an assessment of engine-related technologies that are currently available today. Additional technologies not captured by the standards are identified but are not evaluated for their potential impact on future engine standards. [EPA-HQ-OAR-2010-0162-1894.1, pp.15-16]

Forthcoming technologies could provide major efficiency gains by 2020. The NAS report identified engine technologies that would allow heavy-duty tractor engines to achieve a 13 percent to 17 percent reduction in fuel consumption by 2020, compared to a 2010 engine. These technologies are in many cases being advanced through the SuperTruck program. In comparison, the proposal calls for a 6 percent reduction in fuel consumption by 2017. [EPA-HQ-OAR-2010-0162-1894.1, p.16]

The proposed engine standards will improve fuel consumption by requiring the use of off-the-shelf technology, but further advances in engine technology will require greater incentives. Laying out a technical roadmap and likely trajectory for engine standards beyond 2017, e.g. in the discussion on p.74172 of the rule, would encourage further investment, development, and deployment of these technologies. [EPA-HQ-OAR-2010-0162-1894.1, p.16]

Organization Lim, Daniel

When setting these standards, it is critical that the EPA and DOT chart a long-term course, beginning in 2014, to generate sustained investment in advanced technologies. [EPA-HQ-OAR-2010-0162-3297_Mass, p.1]

Organization: Honeywell

The proposal represents a significant first step towards structuring a longer term regulatory program covering this segment of the motor vehicle market. With regard to vocational vehicles, the agencies should ensure that the compliance measuring metrics used for each vehicle segment (e.g., CO2 grams/ton mile) both accurately reflect the vehicle segment and promote technologies in that segment offering real world fuel efficiency and CO2 benefits. To the extent that a different metric may more accurately measure real world fuel use and emissions, and may better encourage fuel saving technologies, the agencies should adopt such metrics either in this or in future rulemakings. The proposal, while significant in establishing a first-time structure, represents a relatively modest level of improvement during this initial time-frame. In the future, more substantial levels of improvement can be cost-effectively attained as advanced technologies proliferate and as further development resolves current concerns over trade-offs between turbochargers and EGRs. Honeywell looks forward to working with its partners in industry in continuing to define, research and implement technological advances with the most promise for attaining maximum benefits with least possible costs. Honeywell similarly looks forward to working with the agencies in defining future regulations that acknowledge and encourage these advances. [EPA-HQ-OAR-2010-0162-1891.1, p. 3]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

Engine standards are important to maximize emissions reductions and drive new technology. The proposal establishes two phases of heavy-duty tractor engine emissions and fuel consumption standards beginning in 2014 and 2017 and calls for a 6 percent fuel consumption reduction in model year 2017. The stringency levels are based on engine-related technologies that are currently available today. [EPA-HQ-OAR-2010-0162-3129.1, pp.11-12]

Yet, additional technologies under development, such as advanced waste heat recovery, could improve engine performance beyond the levels required in the proposed standards by 2020. The National Academies of Science identified engine technologies that would allow heavy-duty tractor engines to achieve a 13-17 percent reduction in fuel consumption by 2020, compared to a 2010 engine. [EPA-HQ-OAR-2010-0162-3129.1, p.12]

Manufacturers will need lead-time to bring these technologies to full commercialization by 2020. Laying out a technical roadmap and stringency target for engine improvements that go beyond 2017 would provide technology developers an indication of the future direction of the standards and encourage further investment, development, and deployment of these technologies. [EPA-HQ-OAR-2010-0162-3129.1, p.12]

We respectfully request that the agencies include in the final preamble a 2020 target for stringency in each engine category based on an evaluation of technologies identified by the National Academy of Sciences expected over this time period. [EPA-HQ-OAR-2010-0162-3129.1, p.12]

Response:

The agencies fully agree that greater fuel efficiency and GHG reductions can be expected with further technology development in the post 2018 timeframe. As indicated in the preamble for this final action, the agencies intend to begin work almost immediately on a second phase of regulation that will look to accomplish reductions consistent with the full range of technologies considered in the April 2010 NAS report on Medium and Heavy-Duty fuel efficiency. As the

NAS report shows, in the post 2018 model years those technologies in aggregate can approach reductions in fuel consumption on the order of 50 percent when compared to a 2008 vehicle baseline. The agencies intend to revisit a number of decisions reached in this regulation that are appropriate in the initial phase of a heavy duty sector GHG program but may not be in later model years. These issues include the appropriateness of developing a complete vehicle based standard rather than separate truck and engine standards as we are finalizing today for combination tractors and vocational trucks. Given that intent, we do not believe that setting a particular number target for a future rulemaking standard is appropriate as changes in test procedure and regulatory construct fundamentally influence the absolute standard level.

3.3. Funding and Financial Incentives

Organizations Included in this Section:

CALSTART
Heavy-Duty Fuel Efficiency Leadership Group
Daimler Trucks North America

Organization: CALSTART

We applaud EPA and NHTSA for taking action to improve the performance of the nation's truck fleet. The proposed rule is a very important step in our effort to reduce emissions and improve energy security. However, we note that these regulations will be much more effective if implemented as part of a comprehensive package of policies that also includes targeted incentives and investments. CALSTART, with funding from the Energy Foundation, has just completed a report outlining needed policies and incentives to make the fuel economy rules successful in the market. To do this, we identify a comprehensive approach of supporting measures, including: (1) national performance-based purchase incentives for high efficiency trucks that provide incentives based on overall benefits achieved; (2) consistent and elevated investments in research and development for efficient truck technologies; and (3) manufacturing grant support for US manufacturers and suppliers making high efficiency trucks and components. We realize this is beyond what your two agencies alone can achieve. However, we and our industry strongly believe that a more comprehensive approach across multiple agencies is needed to support the proposed regulations. [EPA-HQ-OAR-2010-0162-2121, p.5]

Organization: Heavy-Duty Fuel Efficiency Leadership Group

Complementary Policies: Financial and other incentives – including investment tax credits; accelerated depreciation of new capital investment; increased highway infrastructure spending and increased size and weight of vehicles – will accelerate the deployment of new, more fuel efficient trucks. These policies and others (decreased speed limits, driver training and congestion mitigation) will drive environmental, economic and energy security benefits and will greatly assist rapid fleet turnover of existing stock. [EPA-HQ-OAR-2010-0162-1620.1, p.6]

Although EPA and NHTSA may not have the authority to propose new tax policy incentives which would accelerate the rule's environmental, economic and energy security benefits through more rapid fleet turnover, these policy tools should not be ignored. The Leadership Group urges EPA/NHTSA to work with other agencies and Congress to consider the recommendations made by the NAS Panel and others in this area. Incentives such as targeted tax credits, vouchers or rebates, accelerated depreciation of capital and continued infrastructure investment are important complimentary policies which can help to ensure the success of the EPA/NHTSA standards. [EPA-HQ-OAR-2010-0162-1620.1, p.6]

Organization: Daimler Trucks North America

We Strongly Recommend Government Financial Incentives As A Manner To Further Incent Hybrid HDV Proliferation In The US Fleet. [EPA-HQ-OAR-2010-0162-1818.1, p.83]

We recommend that the Agencies work to revive the Congressional / IRS credit for hybrid HDVs, as hybrid HDVs without this tax credit are less financially appealing to customers and in turn less likely to get into the market place. [EPA-HQ-OAR-2010-0162-1818.1, p.83]

Technologies Like Optimized Idle, Which Cost-Effectively Achieve Idle Reduction But Allow For Occasional Engine-On Events, Should Be Given Fuel Saving And CO2 Reduction Credit Equal To That For Idle Shutdown Timers. [EPA-HQ-OAR-2010-0162-1818.1, p.96]

In the past, EPA has not given credit to Optimized Idle (OI), for example, in the list of technologies exempted from the Federal Excise Tax. OI saves fuel compared to prolonged engine idling, so the Agencies should give OI fuel- and CO2-credit. The criteria that the EPA used in determining which technologies qualify for the FET exemption were: [EPA-HQ-OAR-2010-0162-1818.1, p.96]

1. is affixed to a tractor; [EPA-HQ-OAR-2010-0162-1818.1, p.97]

2. is designed to provide services (such as heat, air conditioning, and/or electricity) to the vehicle or equipment that would otherwise require the operation of the main drive engine while the vehicle or equipment is temporarily parked or remains stationary; and [EPA-HQ-OAR-2010-0162-1818.1, p.97]

3. reduces unnecessary idling of such vehicle or equipment. [EPA-HQ-OAR-2010-0162-1818.1, p.97]

(Re.: http://www.epa.gov/smartway/transport/what-smartway/idling-reduction-fet-criteria.htm, last accessed Jan 10, 2011.) OI is part of engine software, so it is affixed to the engine. It provides capability to keep sleeper cab conditions within a desired temperature range and to do so with a minimum of engine idling. By keeping engine idling to a minimum, it reduces "unnecessary idling." Accordingly, OI meets all three FET exemption criteria. Further, it very likely saves as much fuel as other idle reduction options, like a gen-set APU that operates all night or like a battery-powered HVAC system that gets its power from having the engine's alternator charge the batteries. OI is an excellent fuel saving technology which the Agencies should encourage by allowing the same credit allowed for including an idle shutdown timer. [EPA-HQ-OAR-2010-0162-1818.1, p.97]

Response:

The agencies agree that today's standards are but one part of a broader effort to address fuel consumption and greenhouse gas emissions. The agencies are supportive of a wide range of complementary measures to further these goals. The SmartWay Transportation program and the Diesel Emission Reduction Act (DERA) programs are but two examples of programs that complement the program we are finalizing today. The agencies have also provided relevant analyses to the Congress (see for example, http://www.epa.gov/oms/climate/GHGtransportation-analysis03-18-2010.pdf and http://ntl.bts.gov/lib/32000/32700/32779/DOT_Climate_Change_Report_-_April_2010_-_Volume_1_and_2.pdf).

3.4. Approaches Outside Agencies' Authorities

Organization: Clean Air Task Force (CATF)

As with current exhaust emission standards for light duty vehicles and heavy duty engines, and current fuel efficiency standards for light duty vehicles, any new fuel efficiency regulations for HDVs would presumably apply only to new vehicles. [EPA-HQ-OAR-2010-0162-2734.1, p.13]

Opportunities also exist to improve the fuel efficiency of existing HDVs. Standardizing rolling resistance measurement methods and labeling aftermarket tires with their rolling resistance, for example, would enable vehicle owners to select low rolling resistance tires. Additional improvements can be achieved through the application of after-market retrofit technologies and/or engine upgrades. In conjunction with the imposition of fuel efficiency standards for new HDVs one could contemplate the imposition of complementary in-use standards. This is the approach that California has adopted as one early-action measure to reduce GHG emissions state-wide. [EPA-HQ-OAR-2010-0162-2734.1, p.13]

Other states could follow California's lead and impose in-use retrofit requirements as a condition of annual vehicle registration. At the federal level, engine upgrades to reduce CO2 emissions could be mandated in conjunction with engine overhaul/rebuilding. [EPA-HQ-OAR-2010-0162-2734.1, p.13]

Driver behavior can significantly increase or decrease fuel use for a heavy-duty vehicle. A few simple changes in driving habits may reduce fuel use by five percent or more. A Canadian study estimates that many fleets could achieve an average ten percent fuel economy improvement through driver training and monitoring. [EPA-HQ-OAR-2010-0162-2734.1, pp.14-15]

Common habits that can increase fuel use include driving with engine RPM too high, frequent or improper shifting, too-rapid acceleration, too-frequent stops and starts from failing to anticipate traffic flow, and excessive engine idling. Proper driving habits that help to save fuel can be taught. A study for the European Commission estimated that an annual one-day driver training course could improve truck fuel efficiency by five percent. [EPA-HQ-OAR-2010-0162-2734.1, p.15]

While clearly not a substitute for stringent engine and vehicle technology efficiency standards, annual or bi-annual refresher training on fuel saving driving techniques for commercial vehicle operators could be enforced by the states as a condition of renewal for commercial drivers licenses. [EPA-HQ-OAR-2010-0162-2734.1, p.15]

Aerodynamic drag increases as a square of vehicle speed – the faster a vehicle goes the more fuel it uses to push through the air and maintain its speed. The impact of speed on fuel economy depends on a number of factors, but a general rule of thumb indicates that increasing the speed of a Class 8 combination truck by one mile per hour will decrease fuel economy by 0.1 miles per gallon. [EPA-HQ-OAR-2010-0162-2734.1, p.13]

Reducing average highway speeds from 70 miles per hour to 60 miles per hour might increase fuel economy for a typical Class 8 combination truck by one mile per gallon or more, and save over 1,200 gallons of fuel annually per truck. For the 2 million combination trucks on the road the potential annual fuel savings could total 2 billion gallons or more, approximately six percent of the fuel currently used annually by heavy-duty trucks. [EPA-HQ-OAR-2010-0162-2734.1, p.13]

A national policy to reduce maximum allowable highway speeds, implemented and enforced by the states, could significantly reduce fuel use from the freight sector above and beyond any changes resulting from new vehicle standards. [EPA-HQ-OAR-2010-0162-2734.1, p.13]

EPA's proposed rule-making focuses on regulations to improve the efficiency of individual heavy duty trucks, many of which are used for goods movement. Improvements in HDV fuel efficiency will reduce over-all fuel usage and GHG emissions from the freight sector, but larger benefits could also accrue from modal shift of some shipments to other transportation modes. On a ton-mile basis rail and water-borne freight shipments generally use less fuel than shipments by truck, although total transport time may be longer. See Figure 2 for an illustration of the reductions in CO2 emissions possible from changes in freight strategies. [EPA-HQ-OAR-2010-0162-2734.1, pp.13-14]

[Figure 2 can be found on page 14 of this comment.]

In 2006, approximately 75% of goods carried domestically (by weight) were carried exclusively by truck, and only 9% were carried intermodally. While approximately 58% of the weight of exported goods and 79% of the weight of imported goods moved by intermodal shipment, just over one percent of purely domestic shipments moved intermodally. [EPA-HQ-OAR-2010-0162-2734.1, p.14]

Any national policy focused on reducing fuel use from the freight sector must address and encourage modal shift to more efficient freight modes, as well as improvements in efficiency of the individual modes themselves. [EPA-HQ-OAR-2010-0162-2734.1, p.14]

Response:

EPA and NHTSA recognize technologies, such as driver training and mode shifts, as discussed in RIA Chapter 2.8.7, can reduce GHG emissions and fuel consumption, certainly in individual instances. However, this type of technology is outside of the regulatory framework of this HD National Program

Organization: Rubber Manufacturers Association (RMA)

It is well documented that tire inflation pressure plays a significant role in vehicle fuel efficiency. In the NPRM, NHTSA should consider fuel efficiency losses associated with under-inflated tires in assessing environmental benefits of the proposed rule. As well, NHTSA should consider technologies available to monitor and maintain tire inflation pressure on trucks, and the environmental impacts of such technologies. Due to the importance of tire inflation maintenance to achieving optional fuel efficiency and maintaining the safe operation of vehicles, RMA recommends that EPA include requirements in the maintenance instructions subpart (§ 1037.125) to inform purchasers about the importance of tire inflation maintenance and instructions for conducting that maintenance. Proposed § 1037.125(i) is entitled "tire maintenance and replacement" but that section does not contain any requirements to provide tire maintenance information. The proposed section only contains a requirement to provide information about replacing tires. This section would be an ideal place to include a requirement to provide tire maintenance instructions, including tire inflation maintenance. [EPA-HQ-OAR-2010-0162-1963.1, pp.8-9]

Response:

The agencies recognize that proper tire inflation pressure can be maintained with a rigorous tire inspection and maintenance program or with the use of tire pressure and inflation systems. These systems monitor tire pressure; some also automatically keep tires inflated to a specific level. While the agencies recognize that such devices could have a beneficial effect on fuel efficiency, their use is not included in this regulatory framework. At this time, a baseline value or an estimate of the fuel savings from the use of automatic tire inflation systems cannot be quantified with enough certainty to evaluate the fuel efficiency losses associated with under-inflated tires in assessing environmental benefits achievable under the various alternatives outlined in this rulemaking. Meanwhile, EPA and NHTSA will continue to rely on the SmartWay program, which provides information on proper tire inflation pressure and on tire inflation and tire inflation pressure monitoring systems. Also, most fleet operators require pre-route vehicle inspections by drivers. These inspections typically include air pressure checks to, not only, help with the fuel efficiency benefits of proper tire inflation pressures, but to also help ensure safe vehicle operational characteristics.

Organization: National Automobile Dealers Association (NADA)

In its report, the NAS discussed numerous other approaches to increasing fuel efficiency, including comprehensive driver training, the use of higher productivity vehicles (e.g., longer combinations), congestion mitigation, more efficient vehicle deployment and routing, and rigorous maintenance practices. NADA/ATD recognizes the limited authority EPA and NHTSA have to regulate vehicles in-use. Nonetheless, agency resources should be devoted to promoting these and other effective fuel efficiency improvement strategies. [EPA-HQ-OAR-2010-0162-2705, p.12]

Response:

EPA and NHTSA recognize technologies, such as driver training, traffic congestion mitigation, mode shifts, and longer combination vehicles, as discussed in RIA Chapter 2.8.7, can reduce GHG emissions and fuel consumption. However, this type of technology is outside of the regulatory framework of this HD National Program.

Organization: New York State DOT

New York State agrees with USDOT that relaxing weight limits for freight would accelerate transportation infrastructure degradation and is, therefore, undesirable, especially in light of strained public resources. [EPA-HQ-OAR-2010-0162-2047.1, p.4]

Response:

USDOT weight limits for freight are outside of the regulatory framework of this HD National Program.

Organization: Robert Bosch LLC

Lastly, Bosch observes that the proposed rule contains no real discussion of what Bosch believes may be a key issue – the treatment of retrofits. Retrofit systems provide commercial fleets and HD vehicle owners a viable and affordable means through which to improve the GHG emissions performance and fuel efficiency of their vehicles, and retrofitters typically are the earliest adopters of innovative, cutting-edge technologies. The considerable durability and longevity of commercial diesel-powered HD vehicles makes retrofit systems an important tool – and in Bosch's view, a tool the agencies should consider using – for achieving improvements in the nation's HD fleet. [EPA-HQ-OAR-2010-0162-1630.1, p.27]

Bosch Rexroth, for example, currently offers demand-driven hydraulic cooling fan pumps as a commercial vehicle retrofit option for improving fuel consumption. It also is developing kits for retrofitting vehicles with hydraulic hybrid powertrain systems and H-IVT using the same Robert Bosch LLC Comments EPA-HQ-OAR-2010-0162 Page 28 hardware used on new HD vehicles. Other companies in the HD sector offer similar technologies, and EPA's National Clean Diesel Campaign has expressed an interest in extending its criteria pollutant program to GHG emissions/fuel consumption reduction technologies like hybrid powertrains. [EPA-HQ-OAR-2010-0162-1630.1, pp.27-28]

Bosch recognizes that the proposed standards would apply to "new" HD engines and vehicles, which effectively would mean, because of the early compliance option and EPA's proposed GHG emissions standards, HD engines and vehicles produced in MY 2013 and thereafter. Bosch notes, though, that the language of 49 U.S.C. section 32902(k) arguably does not preclude the inclusion of so-called legacy vehicles in the NHTSA fuel consumption standards. Nevertheless, irrespective of how the agencies want to handle retrofits (e.g., the hybridization) of HD vehicles that are already on the road, Bosch believes the issue of retrofits to post-MY 2012 HD engines and vehicles, and specifically how those retrofits would be treated under the final standards (e.g., would they generate early, AT, or IT credits, and if so, for whom), should be addressed. [EPA-HQ-OAR-2010-0162-1630.1, p.28]

To be clear, Bosch encourages both EPA and NHTSA to "begin [their] future work to develop a possible next set of regulatory standards" – standards that incorporate, for example, hybrid and other technologies – in an expeditious manner. Importantly for NHTSA, though, 49 U.S.C. section 32902(b)(3)(B) should be viewed for what it is – an impetus or driver for the next rulemaking – and not as a potential fallback or, worse yet, a justification for a delay. [EPA-HQ-OAR-2010-0162-1630.1, p.41]

Response:

EPA and NHTSA recognize technologies are available to improve the fuel consumption and GHG emissions of the legacy fleet (or retrofit market). However, this type of technology is outside of the regulatory framework of this HD National Program.

Organization: American Road and Transportation Builders Association (ARTBA)

Further, to improve traffic flow and reduce emissions and fuel waste, we must increase surface transportation system capacity. VMT has grown by over 150 percent since the 1970s. In stark contrast, the number of new lane miles in the United States has increased by only six percent. Providing additional lane miles requires a significant investment in our nation's future and we must update the HTF to adequately reflect changing circumstances. [EPA-HQ-OAR-2010-0162-1777.1, p.3]

Congestion levels have grown significantly between 1982 and 2009. Since 1982, the number of hours per commuter spent in congested traffic in increased from 14 hours to 34 hours. In 2009 alone, congestion caused urban Americans to travel 4.8 billion hours more and to purchase an extra 3.9 billion gallons of fuel for a congestion cost of $115 billion. Simply put, the nation's road system is falling far behind growth in usage. The direct consequence is rampant traffic congestion and, with it, unnecessarily increased emissions and pollution. [EPA-HQ-OAR-2010-0162-1777.1, p.3]

Insufficient capacity already produces specific bottlenecks cause 50 percent of total congestion on the nation's freeways. In 2004, a study of the nation's most severely congested highways highlighted the reality that significant reductions in emissions require a reduction in vehicle time traveled, not vehicle miles traveled. The study concluded that modest improvements to traffic flow at 233 bottlenecks would reduce carbon dioxide emissions by as much as 77 percent and conserve more than 40 billion gallons of fuel over a 20-year period. These fuel savings translate directly into lower CO2 emissions. [EPA-HQ-OAR-2010-0162-1777.1, p.3]

Response:

EPA and NHTSA recognize technologies, such as traffic congestion mitigation, as discussed in RIA Chapter 2.8.7, can reduce GHG emissions and fuel consumption. However, this type of technology is outside of the regulatory framework of this HD National Program.

Organization: Center for Neighborhood Technology

Many studies have now documented the role of public transportation in reducing auto usage and creating development and travel patterns with lower carbon impacts. Corporate and governmental climate action plans promote increased transit ridership as a method to reduce transportation greenhouse gas emissions; because travelers who switch from private vehicles to public transportation significantly reduce energy use and greenhouse gas emissions. CNT’s Housing and Transportation Affordability Index (H+T^{SM}) at htaindex.cnt.org shows that households that live near transit significantly reduce the greenhouse gas emissions associated with their travel as well as travel costs. Therefore, the more that is done to make transit vehicles energy efficient, low-carbon modes of transport the more they will be able to support households and businesses seeking to lower costs and reduce their carbon footprints. [EPA-HQ-OAR-2010-0162-2261.1, p.2]

Response:

The agencies project improvements in the GHG emissions and fuel efficiency of vocational vehicles, such as buses, through the HD National Program.

Organization: Savicorp

SaviCorp Inc has received an Executive Order D-677 on 1st September 2010 regarding the testing and verification of it DynoValve, an Electronic PCV which replaces the standard PCV mandated in 1963. We have achieved 90% reduction in Green House Gases and the attached EO is hereby submitted. Gasoline engines have reduced NOX's by 90%. Attached is our EO and information on the DynoValve. We have achieved .025 emission standard now. We are interested in making this available, with the EPA's & Dept. of Transportation's assistance immediately for implementation in the 270 million passenger cars in the US. The average passenger car emits 5.5 metric tons per year we reduce those emissions 4.95 metric tons per year. [EPA-HQ-OAR-2010-0162-0356-cp, p.1]

Response:

This HD National Program involves greenhouse gas emissions and fuel consumption standards for heavy-duty vehicles and engines. Passenger cars are outside of the scope of this rulemaking.

Organization: Waste Management

Perhaps our most significant concern as we look to the future of our refuse and recycling collection fleet is the trend towards increased vehicle weights as equipment is added to our trucks to reduce emissions. Over the past six years, refuse vehicles have added over 2,000 pounds in pollution control equipment (larger radiators and urea tanks) to meet the 2007 and 2010 criteria pollutant emission standards. Hybrid technologies that we have road-tested increase vehicle weight by an additional 2,000 pounds on average. Increases in vehicle weight must be accompanied by a concomitant reduction in payload because our trucks are constricted by federal and state gross vehicle weight limits. The unintended consequence of these rules has been the need to add additional trucks to our collection routes to make up for lost payload since the total amount of material that we must collect each day has not changed. The result is increased criteria pollutant emissions associated with the increased number of trucks on the road and reduced fuel efficiency (and higher GHG emissions) as measured per ton of waste hauled. This is a trend that seems to be continuing as more equipment is added to engines to reduce emissions. While changes to federal vehicle weight restrictions are not within the scope of this rulemaking, both NHTSA and EPA should develop GHG emission and fuel efficiency performance standards that address this conundrum. [EPA-HQ-OAR-2010-0162-1854.1, p.3]

Response:

The agencies do not anticipate any significant weight increase to refuse trucks due to the GHG regulations. The agencies anticipate that the technologies used to meet the vocational vehicle standards will be limited to low rolling resistance tires which do not weigh any more than standard tires. In addition, the technologies that can be used to meet the engine standards for engines installed in vocational vehicles include technologies such as optimized designs (fuel rail, fuel injector, water pumps, oil pumps, and turbochargers) which also will have negligible impacts on the weight of refuse trucks.

The agencies also note the response included in Section 2 of the Response to Comments document which discusses the impact of EPA's criteria pollutant standards for heavy-duty engines.

3.5. Other Mobile Sources

Organization: Institute for Policy Integrity

Several petitions are pending before EPA to regulate a variety of other mobile sources that produce significant greenhouse gas emissions, including other non-road engines, ocean-going vehicles, and aircraft, as well as a petition from Policy Integrity that would cover all vehicle fuels (see Section III below). In order to fully comply with its mandates under the Clean Air Act, EPA must address all significant sources of greenhouse gas emissions and must respond to these petitions. Addressing all these sources might not be appropriate in the context of the heavy-duty truck regulations; nevertheless, this rulemaking serves as an important reminder that heavy-duty trucks are just one component of a broader category of mobile sources, all tied together by the common use of vehicle fuel. [EPA-HQ-OAR-2010-0162-1895.1, pp.5-6]

On the other hand, certain currently un-regulated sources could be appropriately addressed in the context of this rulemaking, in particular trailers and motorcycles—both part of the § 202(a) endangerment finding that underlies this rulemaking. To the extent the agencies choose not to address such sources, and pursuant to the Administrative Procedure Act, 5 U.S.C. § 553(3), the Clean Air Act, 42 U.S.C. § 7401 et seq., and other relevant regulations and practices, Policy Integrity hereby petitions EPA to initiate a rulemaking procedure under the Clean Air Act. Specifically, Policy Integrity petitions the Administrator to propose and adopt regulations controlling emissions of greenhouse gases from the use of trailers in combination tractors and from highway motorcycles. [EPA-HQ-OAR-2010-0162-1895.1, p.6]

Response:

EPA is currently evaluating controls for motor vehicles other than those covered by this rulemaking, and is also reviewing seven motor vehicle related petitions submitted by various states and organizations requesting that EPA use its Clean Air Act authorities to take action to reduce greenhouse gas emissions from aircraft (under §231(a)(2)), ocean-going vessels (under §213(a)(4)), and other nonroad engines and vehicle sources (also under §213(a)(4)).

The agencies discuss the issue of GHG emissions and fuel consumption regulations for trailers in Section 12 of this response to comments document.

3.6. Other

Organization: ArvinMeritor, Inc.

Timing of Changes to the GEM Simulation Program – These suggested opportunities for improvement would all require a change to the GEM simulation program. ArvinMeritor recognizes that large scale changes to the program may not be possible at this late stage of the process, due to the aggressive, mid-2011 target for final release of the regulations. Given this reality, we have the following recommendations:

o Consider these changes for implementation during the second set of regulated limits that take effect in 2017.

o Consider a far more comprehensive simulation approach for future (post- 2017) regulations. [EPA-HQ-OAR-2010-0162-1605.1, p.6]

Summary of Recommendations – Area 3 – Phase 2 (post-2017) Regulations

- An enhanced simulation program with (1) more input parameters; and (2) greater ability to evaluate complete systems should be developed for certifying vehicles during the next set of regulations. [EPA-HQ-OAR-2010-0162-1605.1, p.10]

- In general, chassis dynamometer testing should not be utilized for certifications. Cost, duration of testing, and availability of equipment are the key items that factor into this recommendation. Chassis dynamometers can be used to validate accuracy of new or modified simulation programs, and to certify unique powertrains, such as hybrids. [EPA-HQ-OAR-2010-0162-1605.1, p.11]

- Continue to offer the flexibility provided by advanced and innovative technology credits. The 50 percent bonus credit and transfer of credits between regulatory categories should be offered for both types. [EPA-HQ-OAR-2010-0162-1605.1, p.11]

- Include trailers in the next wave of regulations. There are a number of currently available trailer technologies that can have a positive impact on fuel efficiency and emissions. [EPA-HQ-OAR-2010-0162-1605.1, p.11]

Response:

As the agencies discuss in preamble Section I.G, to more completely capture the complex interactions of the total vehicle and the potential to reduce fuel consumption and GHG emissions through the optimization of those interactions may require a more sophisticated approach to vehicle testing than we are adopting today for the largest heavy-duty vehicles. In future regulations, the agencies expect to fully evaluate the potential to expand the use of vehicle compliance models to reflect engine and drivetrain performance. Similarly, we intend to consider the potential for complete vehicle testing using a chassis dynamometer, not only as a means for compliance, but also as a complementary tool for the development of more complex vehicle modeling approaches. In considering these more comprehensive regulatory approaches, the agencies will also reevaluate whether separate regulation of trucks and engines remains necessary.

Organization: Manufacturers of Emission Controls Association (MECA)

Since the beginning of the industrial revolution, concentrations of CO2 have increased by nearly 30%, methane concentrations have more than doubled, and nitrous oxide concentrations have increased by approximately 15%. Emissions from the transportation sector contribute about 33% of the CO2 emissions in the U.S. and accounts for 96% of the radiative-forcing effect from transportation sources. A majority of anthropogenic CO2 emissions come from combustion of fossil fuels. Despite improvements in vehicle engine efficiency, transportation energy use is expected to grow by 48% between 2003 and 2025. As such, controlling greenhouse gas emissions from the transportation sector is essential to the overall efforts to alleviate long-term impacts on the climate. [EPA-HQ-OAR-2010-0162-1530.2, pp.1-2]

There are a large set of technologies that can significantly reduce, either directly or indirectly, mobile source emissions of CO2, N2O (as well as other NOx emissions), CH4, and black carbon. Our comments focus on available exhaust emission control technologies and the impacts these technologies can have on greenhouse gas emissions. [EPA-HQ-OAR-2010-0162-1530.2, p.2]

[See pp.2-7 of this comment summary for descriptions of technologies available to reduce CO2 emissions from mobile sources: Diesel Particulate Filter (DPFs), Selective Catalytic Reduction (SCR) and Lean NOx Adsorber Catalysts for Diesel Engines, and Gasoline Direct Injection Technology; See pp.7-8 of this comment summary for descriptions of technologies available to reduce Nitrous Oxide (N2O) and Methane (CH4) from mobile sources.]

Looking ahead, transportation greenhouse gas emissions are forecast to continue increasing rapidly, reflecting the anticipated impact of factors such as economic growth, increased movement of freight by trucks, ships, and rail, and continued growth in personal travel. The transportation sector is the largest source of domestic CO2 emissions, producing 33% of the nation's total in 2006. There are significant opportunities to reduce greenhouse gas emissions from the transportation sector through the design of fuel efficient powertrains that include advanced exhaust emission controls for meeting even the most stringent criteria pollutant standards. MECA believes that advanced emission control systems have a critically important role in future policies that aim to reduce mobile source greenhouse gas emissions. These emission control technologies allow all high efficiency powertrains to compete in the marketplace by enabling these powertrains to meet current and future criteria pollutant standards. In nearly all cases, these fuel-efficient powertrain designs, combined with appropriate emission controls, can be optimized to either minimize fuel consumption impacts associated with the emission control technology, or, in some cases, improve overall fuel consumption of the vehicle. This optimization extends beyond carbon dioxide emissions to include other significant greenhouse gases such as methane and nitrous oxide. In the case of gasoline vehicles, additional climate change benefits could be obtained by lowering federal gasoline fuel sulfur levels to enable the use of lean NOx adsorber catalysts on gasoline lean-burn engines. [EPA-HQ-OAR-2010-0162-1530.2, p.9]

Response:

The agencies considered emission control technologies which improve GHG emissions, as detailed in the preamble Sections II and III, along with RIA Chapter 2.

Organization: Natural Gas Vehicle Interests

Diurnal plus hot soak standard. The HD Rule requests comment on proposed changes to evaporative emission standards. However, even though “EPA regards these proposed changes as discrete, minimal, and for the most part clarifications to the existing standards” (75 FR 74276), the Rule contains a major revision of the diurnal plus hot-soak standards. The current standard in 40 CFR 86.004-11(b)(3)(ii)(A)(1) for vehicles with a GVWR greater than 14,000 lbs. is 4.0 grams: “For the full three-diurnal test sequence described in § 86.1230–96, diurnal plus hot soak measurements: 4.0 grams per test.” [EPA-HQ-OAR-2010-0162-2119.1, p.12]

However, the HD Rule proposes that this standard be reduced to 1.9g (and also reduces the standard for vehicles below 14,000 lbs. GVWR from 3.0g to 1.4g); the proposed new regulation at 40 CFR 1037.103(a)(1) states that: The sum of diurnal and hot soak measurements from the full three-day diurnal test sequence described in 40 CFR 86.1230-96 may not exceed 1.4 g for vehicles with GVWR at or below 14,000 pounds, and may not exceed 1.9 g for vehicles with GVWR above 14,000 pounds. [EPA-HQ-OAR-2010-0162-2119.1, p.12]

Because EPA states that the proposed changes in evaporative emissions standards are being done for housekeeping purposes, and in any event provides no explanation for why it would reduce this standard by more than 50%, the Natural Gas Vehicle Interests request clarification of this provision. [EPA-HQ-OAR-2010-0162-2119.1, p.12]

Organization: Daimler Truck North America

We Support The Agencies’ Proposed Approach To Evaporative Emission Standards: Retaining The Current Requirements. [EPA-HQ-OAR-2010-0162-1818.1, p.108]

The Agencies appear to have retained the current evaporative emission standards with only minor changes. We believe this is the correct approach, as the current requirements are stringent yet appropriate. [EPA-HQ-OAR-2010-0162-1818.1, p.108]

The Agencies’ Proposed Evaporative Emission Regulations Will Best Spur Development And Sale Of Low-GHG Alternative Fueled Vehicles If The Regulations Do Not Reach Down To De Minimis Evaporation. [EPA-HQ-OAR-2010-0162-1818.1, p.108]

DTNA believes that our natural gas vehicles, which have a fuel system that is sealed and pressurized, should have zero evaporative emissions. We do have flexible plumbing in our system might have some de minimis permeation as might the engine itself, but the fact that it must hold its 3500 psi working pressure means that permeation must be very low. We interpret the Agencies’ NPRM to require testing and / or calculation of evaporative emissions but not to require accounting of de minimis permeations. Assuming our interpretation is correct, we support the Agencies’ proposal. [EPA-HQ-OAR-2010-0162-1818.1, p.108]

Response:

EPA has decided to defer action on evaporative emissions standards to a future action.

4. Administrative Comments

Organization: Daimler Trucks North America

In 49 CFR §553.21 and on 75 Fed. Reg. 74154, NHTSA limits the length of comments that interested parties can submit. With a rule as extensive and far-reaching as the Agencies' present NPRM (a 306 page document in the Federal Register, impacting engine certification, vehicle certification, tires, aerodynamics, and much more), the Agency's limit on submissions is inappropriate. Limiting input on extensive and farreaching regulations is counter to the requirements of, among other laws, the Administrative Procedure Act §553(c). Although NHTSA states that it will allow unlimited attachments, the intent and/or effect of the regulation can only be to limit input or to force interested parties to go through machinations to submit all of their relevant comments. Neither is appropriate. We recommend that in future rulemakings, neither NHTSA nor EPA put such limits on submissions and in this case our joint submission to both the EPA and NHTSA dockets is not and cannot be limited to 15 pages. [EPA-HQ-OAR-2010-0162-1818.1, p.26]

Response:

NHTSA notes that the intent of the 15-page limit on main comments is to encourage commenters to structure their comments so as to raise their most important points to the agency's attention as early as possible, but we have absolutely no intent to limit in any way the ability of a commenter to provide input. As the commenter recognizes, NHTSA allows unlimited attachments to any comments, and the agency is obligated to review and consider each attachment in full. Therefore, each commenter's ability to provide input to a proposed rule, while subject to a format restriction, is substantively unlimited, and we welcome any and all input that commenters wish to provide.

Organization: Daimler Trucks North America

While we have done our best to identify our issues and concerns, this is a groundbreaking, comprehensive, and highly complex rulemaking, involving engines, vehicles, vehicle components, new test methods, new testing procedures and models, shortened timelines, and two federal agencies. Thus, while we have worked diligently to identify all of the significant issues that remain to be resolved, it is not unlikely that some number of additional issues will rise to the surface as this rulemaking moves toward finalization. Accordingly, we reserve our rights to submit additional comments and concerns to the Agencies if and when other issues arise. [EPA-HQ-OAR-2010-0162-1818.1, p.2]

Response:

EPA believes that it provided adequate notice and opportunities for public comment in the form of multiple public hearings, a public comment period, and numerous post-comment period meetings with affected entities (summaries of which are part of the public docket for this rulemaking), including this commenter.

Organization: Volvo Group

Although we have undertaken considerable effort to study the NPRM, we remain concerned that, with a regulation of this size and complexity, it is extremely difficult to find all the potential problems that may only surface upon full implementation. Because of the strong financial impact of fuel efficiency on commercial fleet operations, the actual results of efficiency regulation will be closely measured and monitored by fleet owners. Thus, it is important that the regulation deliver the expected in-use performance. Given the complexity and potential for unintended consequences, we believe a trial period of at least two years should precede actual enforcement of the regulation. The trial period would allow for full evaluation of regulatory protocol, metrics, reporting, and potential unintended consequences prior to actual enforcement of the rules, as is already the case for NHTSA's implementation plan. [EPA-HQ-OAR-2010-0162-1812.2, pp.2-3]

Response:

EPA disagrees. Although both agencies will of course carefully monitor implementation of the HD GHG program, it is important that standards take effect starting in MY 2014 in order to achieve the important emission reduction and fuel efficiency improvements of the program.

Organization: Pacific Legal Foundation

Third, because the two public hearings scheduled by EPA were held before the proposed regulations were made public by publication in the Federal Register, the hearings did not provide the public with an effective 'opportunity for the oral presentation of data, views, or arguments' on the proposed regulations, as required by 42 U.S.C. § 4207(d)(5)(ii). Accordingly, EPA must reopen the public comment period and reschedule the hearings, thereby affording the public with a reasonable opportunity to orally present 'data, views, or arguments.' [EPA-HQ-OAR-2010-0162-1604.1, p.3]

42 U.S.C. § 7607(d)(5)(ii) provides that EPA 'shall give interested persons an opportunity for the oral presentation of data, views, or arguments, in addition to an opportunity to make written submissions.' By requiring EPA to provide the opportunity for oral comments, Congress

intended to maximize the opportunity for public participation in EPA rulemaking under the Clean Air Act. Sierra Club v. Costle, 657 F.2d at 398. [EPA-HQ-OAR-2010-0162-1604.1, p.13]

EPA published the proposed regulations in the Federal Register for the first time on November 30, 2010. Yet it provided the opportunity for oral presentation several weeks before the publication of the proposed rules. Specifically, hearings at which oral testimony was taken were held on November 15, 2010, in Chicago, Illinois, and on November 18, 2010, in Cambridge, Massachusetts. Although it is true that an advance copy of the proposed regulations was posted on EPA's website immediately before the public hearings were held, each page of the advance copy contained the following declaration: [EPA-HQ-OAR-2010-0162-1604.1, p.13]

This document is a prepublication version, signed by the EPA Administrator, Lisa Jackson and the Secretary of Transportation, Ray LaHood, on October 25. We have taken steps to ensure accuracy but it is not the official version. (Emphasis added.) [EPA-HQ-OAR-2010-0162-1604.1, p.14]

It is remarkable that the public was not provided with the 'official version' of the proposed regulations upon which to make oral comments until after the close of the hearings intended to elicit oral comments on the proposal. Surely this is not what Congress envisioned when it enacted 42 U.S.C. § 7607(d)(5)(ii). It would be absurd if EPA had sought to elicit written comments on a document not available for review. It is just as absurd that EPA sought oral comments on an unavailable document. [EPA-HQ-OAR-2010-0162-1604.1, p.14]

Given the unavailability of the official version of the regulations for public review prior to the hearings, EPA has 'utterly failed' to comply with the requirements of 42 U.S.C. § 7607(d)(5)(ii) and, in effect, has not given 'interested persons an opportunity for the oral presentation of data, views, or arguments' on the proposed regulations. Under Small Refiner Lead Phase-Down Task Force, such an utter failure to comply is reversible error. Consequently, EPA must give interested persons a true opportunity to make oral presentations in connection with at least one public hearing scheduled after the publication of the proposed rules in the Federal Register, namely, after November 30, 2010. As a practical matter, this means EPA must reopen the public comment period, if for no other reason then at least in order to comply with the requirements of 42 U.S.C. § 7605(d)(5)(ii). [EPA-HQ-OAR-2010-0162-1604.1, pp.14-15]

Response:

There is no requirement in the Clean Air Act which requires that the public hearings be held after the proposal is published in the Federal Register. The agencies provided the proposal on both NHTSA's and EPA's website on October 25, 2010, prior to the public hearings held on November 15 and November 18, 2010. The entities which were directly affected by the proposal (e.g., Engine Manufacturers Association, Ford Motor Company, General Motors, Chrysler Corporation, Cummins, Volvo, Navistar, PACCAR, Daimler, among many others including environmental groups and public citizens) participated in the hearings and did not voice this concern. Notwithstanding the commenter's broadbrush allegations, there is no evidence on this record of any prejudice to the public due to the scheduling of the public hearings.

Organization: Recreation Vehicle Industry Association (RVIA)

Furthermore, per the recent Executive Order issued by President Obama, EPA and NHTSA must consider the impact of these cost increases not in isolation, but rather in conjunction with other environmental and safety regulatory requirements that are planned to take effect in the 2014 to 2018 timeframe. [EPA-HQ-OAR-2010-0162-3300, pp.4-5]

[See p.5 of this comment summary for examples of proposals]

To accomplish this, EPA and NHTSA must jointly compile a list of regulatory requirements that will go into effect in the 2014-2018 timeframe. Once compiled, EPA and NHTSA should place this list along with the accompanying aggregate cost assessment into the docket for public review. On the benefits side of the equation, EPA and NHTSA must take into consideration the fact that work trucks purchased primarily for RV towing will not see anywhere near the mileage acrued by commercial truck owners over the same compressed time period. Thus, the fuel savings benefits for this group of work truck owners will typically be far less than those realized by commercial businesses. The EPA and NHTSA cost-benefit analysis should be revised to reflect this reality. In doing so, you should meet not only with business owners, but also with private individuals to assess their likely reaction to varying price increase levels. It is our expectation that if work truck manufacturers are forced to impose a price increase on private individuals of several hundred dollars per model year, there will likely be a major drop in not only tow vehicle sales by noncommercial owners, but towable RV sales as well. [EPA-HQ-OAR-2010-0162-3300, pp.5-6]

EPA and NHTSA must meet with and talk to private citizens, not industry groups, about what level of price increase they will tolerate before they will defer or abandon the purchase of discretionary work trucks (e.g., pickups used for RV towing). [EPA-HQ-OAR-2010-0162-3300, p.12]

Per the Jan. 18, 2011, Executive Order, EPA and NHTSA must assess the implications of price increases not in isolation but rather in conjunction with other environmental and safety regulatory requirements that are planned to take effect in the 2014 to 2018 timeframe. EPA and NHTSA must compile a joint list of emissions, fuel economy and safety regulatory requirements that will go into effect in the 2014-2018 timeframe and submit this list along with the accompanying aggregate cost implications to the docket for public review and consideration. In carrying out recommendation #4 above, EPA and NHTSA should use these cost increases, not the numbers that are limited to this single rulemaking. [EPA-HQ-OAR-2010-0162-3300, p.12]

Unlike work trucks purchased for commercial purposes by landscaping operations, construction companies, etc., towable RVs and often the vehicles capable of towing them are discretionary items. Whereas when the landscaper's work truck dies, he has no choice but to purchase a new truck or otherwise go out of business. He will absorb the cost increase of the new truck by increasing the costs of his services. The situation is quite different when it comes to the purchase of an RV. If either the RV or the vehicle needed to tow it becomes unaffordable, the potential purchaser will simply forego the acquisition. [EPA-HQ-OAR-2010-0162-3300, p.12]

Response:

Executive Order 13563 “is supplemental to and reaffirms the principles” of Executive Order 12866. See Executive Order 13563 at section 1 (b). EPA has fully documented the analyses it conducted pursuant to Executive Order 12866 both at proposal (see 75 FR at 74356) and in the final rule. In this regard, Executive Order 12866, like Executive Order 13563, contains a directive for agencies, to the extent practicable, to consider costs of cumulative regulations (section 1 (b)(2)). As stated in that Executive Order 12866 and to the extent permitted by law, each agency must, among other things:... (2) tailor its regulations to impose the least burden on society, consistent with obtaining regulatory objectives, taking into account, among other things, and to the extent practicable, the costs of cumulative regulations.

Costs and effects of other rules affecting heavy duty vehicles, including recreational vehicles, are reflected in these analyses. In particular, the baselines from which the agencies are assessing impacts incorporate all existing regulatory requirements. For example, the baseline medium and heavy heavy-duty engines are assumed to meet the applicable NOx standards, and all vehicles in the baseline are assumed to meet applicable safety standards. EPA has also accounted for phase in of prior regulations in assessing lead time needed to meet the GHG standards. For example, the MHD and HHD engine standards are structured to align with the redesign cycles for these engines which are, in part, adapted to emission standards for criteria pollutants from these engines. See 75 FR at 74177. EPA is also providing an alternative, short-term engine standard for MHD and HHD engines which have GHG levels significantly higher than the average baseline in part due to compliance strategies for criteria pollutants, another instance of adapting the regulations to account for the effects of other rules affecting the heavy duty sector. See preamble at II.B.2.b and II.D.2.b.i. EPA is also providing a compliance option whereby engines can simultaneously certify for OBD and GHG standards to align regulatory timetables and so decrease administrative burdens on industry. See preamble at II.B.2.b and II.D.2.b.i.

The commenter’s point about VMT for recreational vehicles being different from and less than VMT for other vocational vehicles is addressed at the response to comments document, Section 11.

5. Statutory and Executive Order Reviews

5.1. Statutory Obligations

Organizations Included in this Section:

American Lung Association
Environmental Defense Fund
National RV Dealers Association
Chamber of Commerce of the United States
Allison Transmission
Daimler Trucks North America
American Petroleum Institute
National Petrochemical and Refiners Association
Western States Petroleum Association
Center for Biological Diversity
Chamber of Commerce of the United States
Engine Manufacturers and Truck Manufacturers Associations
National Automobile Dealers Association
Navistar, Inc.
Pacific Legal Foundation
Plass, B.
Recreation Vehicle Industry Association
Robert Bosch LLC
Sierra Club
Volvo Group

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

The compliance and enforcement provisions for medium- and heavy-duty vehicles in EISA are described only in one sentence, which instructs NHTSA to "adopt and implement appropriate test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols that are appropriate, cost-effective, and technologically feasible for commercial medium- and heavy-duty on highway vehicles and work trucks." 49 U.S.C. § 32902(k)(2). NHTSA is therefore left to its own discretion to adopt compliance and enforcement provisions by regulation. 75 Fed. Reg. 74171 ("Congress did not speak directly to the 'compliance and enforcement protocols' it envisioned. Instead, it left the matter generally to the Secretary . . . . It appears, therefore, that Congress has assigned this matter to the agency's discretion."). With this discretion, NHTSA is proposing to establish a compliance program that "utilizes existing EPA testing protocols and certification procedures." 75 Fed. Reg. 74258. However, NHTSA's compliance program as laid out in regulation can more easily be altered or weakened than EPA's compliance and enforcement provisions, which are anchored in statute. [EPA-HQ-OAR-2010-0162-3129.1, p.8]

EPA follows strong compliance and enforcement provisions laid out in detail in the Clean Air Act. See, e.g., 42 U.S.C. §§ 7413-7414, 7522, 7524-7525, 7541-7542, 7604. These statutory requirements are clearly delineated, rigorous, expansive and more secure than NHTSA's regulations governing compliance and enforcement. Specific elements of compliance and enforcement and the statutory requirements pertaining to them are discussed below. [EPA-HQ-OAR-2010-0162-3129.1, p.8]

Section 203(a)(1) of the Clean Air Act requires all new motor vehicles sold in commerce to be covered by a certificate of conformity issued by EPA. The requirements and procedures for EPA to issue this certificate are laid out in detail in Section 206 of the Clean Air Act. For example, EPA cannot issue a certificate of conformity for a period in excess of one year. 42 U.S.C. § 7522 (a)(1). The certificate of conformity may be issued only if EPA determines that the manufacturer "has established to the satisfaction of the Administrator that any emission control device, system, or element of design installed on, or incorporated in, such vehicle or engine conforms to applicable requirements of Section 202(a)(4) (control device, system, or element of design must not "cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation or function"). 42 U.S.C. § 7525 (a)(3)(A). "EPA proposes the certificate of conformity be a single document that would be applicable for both criteria pollutants and greenhouse gas pollutants." 75 Fed. Reg. 74259. [EPA-HQ-OAR-2010-0162-3129.1, p.8]

NHTSA has no certification provisions outlined in EISA. In the absence of specific statutory direction, NHTSA has chosen to "assess compliance with its fuel consumption standards based on the results of the EPA GHG emissions compliance process for each engine family." 75 Fed. Reg. 74259. NHTSA is therefore relying on EPA's statutorily established certification process. However, NHTSA is not statutorily bound by EPA's certification process. [EPA-HQ-OAR-2010-0162-3129.1, p.8]

Section 202(a)(1) of the Clean Air Act states that EPA's motor vehicle emission standards "shall be applicable to vehicles . . . for their useful life." 42 U.S.C. § 7521(a)(1). EPA is authorized to test new motor vehicles or new motor vehicle engines to determine whether they "do in fact conform with the regulations with respect to which the certificate of conformity was issued." 42 U.S.C. § 7525 (b). EPA is using this authority in the proposed medium- and heavy-duty rule. 75 Fed. Reg. 74197 ("EPA would use a variety of mechanisms to conduct assessments of compliance with the proposed in-use standards, including . . .in-use monitoring once vehicles enter customer service. . . . The same standards would apply to vehicles used in pre-production and production line testing, except that deterioration factors would not be applied."). EPA identifies various benefits of in-use testing and compliance requirements, including (1) the ability to identify components failing at a higher than normal rate and to respond to this problem with a product recall or other service campaign, and (2) the discouragement of control strategies catered to certification test cycles. 75 Fed. Reg. 74268-69. In addition, the long life of heavy-duty trucks makes in-use testing particularly important for durable emissions reductions. [EPA-HQ-OAR-2010-0162-3129.1, p.9]

EISA's open-ended delegation of compliance and enforcement authority allows NHTSA to decide whether or not to conduct in-use testing. See 49 U.S.C. § 32902(k)(2). Because NHTSA is focused on fuel consumption, which is not likely to deteriorate notably over a vehicle's useful life, the agency is proposing not to adopt in-use standards for its fuel efficiency program. 75 Fed. Reg. 74197. EPA's standards are therefore distinct in applying to vehicles once they have entered commerce. [EPA-HQ-OAR-2010-0162-3129.1, p.9]

The Clean Air Act gives EPA powerful enforcement authority through various means. EPA may impose violation penalties of up to $37,500 per vehicle for violations of various prohibited acts under Section 203. 42 U.S.C. § 7524; see also 74 Fed. Reg. 49,465 (Sept. 28, 2009); 42 U.S.C. § 7413. Prohibited acts under this section include "the introduction into commerce or the sale of an engine or vehicle without a certificate of conformity." 42 U.S.C. § 7524. NHTSA is interpreting EISA to allow the agency to impose civil penalties of its own for violations of fuel economy standards, but it is limiting these penalties to the amount allowed under the Clean Air Act. 75 Fed. Reg. 74,279-80 (Nov. 30, 2010); see also 49 U.S.C. § 32902(k)(2). [EPA-HQ-OAR-2010-0162-3129.1, p.10]

EPA may also suspend or revoke the certificate of compliance for any vehicle found after testing to not conform with the regulations with respect to which the certificate of conformity was issued and with the requirements of Section 202(a)(4) related to the safety of emissions control devices, systems, or elements of design. 42 U.S.C. § 7525 (b)(2)(A)(i). The procedures governing this revocation or suspension are detailed in Section 206(b)(2)(B). 42 U.S.C. § 7525(b)(2)(B). If EPA determines that a substantial number of any class or category of vehicles or engines do not conform to the motor vehicle regulations under Section 202 when in actual use throughout their useful life, EPA must require the manufacturer of such nonconformity to submit a plan for remedying the nonconformity. 42 U.S.C. § 7541 (c)(1) (emphasis added). NHTSA does not operate under any such detailed recall and remedy provisions in EPCA or EISA. 74 Fed. Reg. 49,464 (Sept. 28, 2009). [EPA-HQ-OAR-2010-0162-3129.1, p.10]

EPCA establishes the remedy for noncompliance with NHTSA's fuel economy provisions in 49 U.S.C. section 32912(b). The remedy is a monetary penalty limited to a specified amount, which allows manufacturers to purposefully decide to pay the penalty in lieu of compliance with fuel economy standards. 49 U.S.C. § 32912(b); see also 75 Fed. Reg. 25,342 (May 7, 2010). EPA, on the other hand, may allow nonconformance penalties in lieu of suspension or revocation of a certificate of compliance only in limited circumstances where specific criteria are met. See 42 U.S.C. § 7525(g) (listing criteria, limitations, and requirements for nonconformance penalties). EPA has determined that its proposed standards are "readily feasible," and the agency is therefore proposing not to allow nonconformance penalties in its GHG emissions reduction program. 75 Fed. Reg. 74,280 (Nov. 30, 2010). The fact that EPA does not allow payment of a penalty in lieu of compliance with its GHG emissions standards is a notable difference from NHTSA's fuel economy program. [EPA-HQ-OAR-2010-0162-3129.1, p.10]

Section 304(1) of the Clean Air Act allows any person to commence a civil action against "any person (including (i) the United States, and (ii) any other governmental instrumentality or agency . . . who is alleged to have violated (if there is evidence that the alleged violation has been repeated) or to be in violation of (A) an emission standard or limitation under this chapter or (B) an order issued by the Administrator or a State with respect to such a standard or limitation." 42 U.S.C. 7604(1). EPCA does not allow citizen enforcement. The Clean Air Act provides a vital avenue for individual citizens to ensure the protection of their health and welfare in a way that would not otherwise be available. [EPA-HQ-OAR-2010-0162-3129.1, pp.10-11]

Organization: National RV Dealers Association (RVDA)

EPA will need to address the Regulatory Flexibility Act ("RFA") requirements for this proposal on the RV industry, including RV manufacturers and RV dealers. The key requirement of the law is that federal agencies must analyze the impact of their regulatory actions on small businesses and, where the regulatory impact is likely to be 'significant', affecting a 'substantial number' of these small entities, seek less burdensome alternatives for them. This regulation will have an impact on the entire RV industry, made up of RV manufacturers and RV dealers. [EPA-HQ-OAR-2010-0162-1775.1, p.4]

Organization: Chamber of Commerce of the United States

NHTSA, on the other hand, must take into account the analysis and findings of the NAS report it commissioned pursuant to the enactment of EISA. EISA explicitly added requirements for both an NAS study of vehicle fuel economy standards and a report assessing technologies and costs, the practical integration of technology into medium- and heavy-duty fleets, and other matters. The NAS report, however, cannot be the sole basis for the promulgation of standards. Instead, in setting standards NHTSA must consider the "maximum feasible improvement" for a fuel efficiency improvement program and must adopt and implement several measures, including appropriate test methods and measurement metrics. NHTSA then has statutory flexibility to not propose or adopt the LSFC standard. Moreover, NHTSA is required under the Administrative Procedures Act to consider comments submitted for the record in this rulemaking proceeding. [EPA-HQ-OAR-2010-0162-2152.1, p.10]

EPA, and to a different degree NHTSA, is not required to adopt the NAS recommended metric but must exercise independent judgment consistent with the statutory authority of each agency. Both agencies have discretion, in exercising their statutory authority, to make necessary adjustments and alterations to the metric recommended by the NAS report. Thus either or both agencies could adopt the vehicle average speed corrected metric outlined above or otherwise "correct" certification data to reflect the actual performance of a vehicle in complying with an appropriate drive cycle. [EPA-HQ-OAR-2010-0162-2152.1, p.10]

Similarly, both EPA and NHTSA have substantial degree of discretion with respect to the timing of any regulatory effort concerning medium- and heavy-duty vehicles. Under the announced timeframe, a final rulemaking is to be completed in approximately 6 months. Yet neither EPA nor NHTSA are required by any statute to meet such a deadline. Both agencies should then balance any need to promulgate standards against the factors provided for in their authorizing statutes and the agencies' general duty to fully review relevant technical information. As the first regulation of its type for medium- and heavy-duty vehicles (and indeed the first regulation for medium- and heavy-duty vehicles ever promulgated by NHTSA), both agencies should also pay close attention to the comments received during the public notice and comment process. In short, both agencies should avoid any "rush to judgment" in this matter. EPA and NHTSA are proposing to regulate a large segment of the nation's transportation system and one tied directly to the nation's economic viability. Sufficient time and care must be taken to ensure that the final regulations promulgated are supportable on a technical, legal and policy basis. [EPA-HQ-OAR-2010-0162-2152.1, pp.10-11]

Organization: Allison Transmission

Pursuant to Section 107-108 of the Energy Independence and Security Act ('EISA'), NHTSA was required to contract with the National Academy of Sciences ('NAS') to develop a report evaluating medium-duty and heavy-duty truck fuel economy standards. Based on this report, the Energy Independence and Security Act of 2007 ('EISA') section 102(h) required the Secretary of Transportation in consultation with the Department of Energy ('DOE') and EPA to determine the appropriate test procedures and methodologies for measuring 'the fuel efficiency of [medium- and heavy-duty on-highway] vehicles and work trucks.' (Emphasis added). Therefore, EISA clearly directed NHTSA to focus on a different metric from that utilized in the LDV program (i.e., a corporate average fuel economy metric) and to develop regulations based on the new authority explicitly granted to NHTSA for the first time through enactment of EISA. [EPA-HQ-OAR-2010-0162-2735.1, p.3]

The NAS Report utilized in this proposed rule ('NAS Report') recommended adoption of a load-specific fuel consumption ('LSFC') standard expressed in gallons/100 ton-miles. While EPA and NHTSA did conduct further analysis, the NAS Report clearly provides the basis for both EPA and NHTSA's proposed combination truck and vocational vehicle standards. As further detailed in comments provided as Attachment 2 [See docket number 2737.1], the NAS report, however, is deficient in several respects. While the report accurately notes that average speed (and correspondingly, time of transporting a given ton-miles) is an important consideration in determining the fuel efficiency of a commercial vehicle, the NAS failed to incorporate this factor into the LSFC. [EPA-HQ-OAR-2010-0162-2735.1, pp.3-4]

The NAS report additionally does not fully satisfy NHTSA's obligations under EISA to develop 'fuel efficiency' standards for different classes of vehicles. While EISA certainly directs NHTSA to examine the fuel efficiency of medium- and heavy-duty vehicles and work trucks following publication of the NAS report, NHTSA rulemaking authority as contained in EISA section 102(b) is not constrained to the NAS recommendations. There is no explicit statutory language directing NHTSA to 'base' its standards on the NAS report, or even to directly consider the NAS recommendations in setting the required standards. Instead, EISA directs NHTSA to promulgate a 'fuel efficiency improvement program' based on several factors, including factors explicitly outside the scope of the NAS review as established in EISA section 108 (e.g., 'compliance and enforcement protocols'). In enacting EISA, Congress clearly set out factors that NHTSA must independently analyze and evaluate in developing the fuel efficiency program that is required for medium- and heavy-duty on-road vehicles and work trucks. [EPA-HQ-OAR-2010-0162-2735.1, p.4]

NHTSA has apparently attempted to fulfill its independent statutory obligations in this matter by issuing a new report, but this report is insufficient to provide a suitable informational basis for the proposed rule. In October 2010, NHTSA published a report, Factors and Considerations for Establishing a Fuel Efficiency Regulatory Program for Commercial Medium- and Heavy-Duty Vehicles. This report largely tracks and directly quotes from the NAS report and contains relatively little independent analysis. Moreover, NHTSA admits that the agency's effort was driven by a non-statutory deadline and that much more study needs to be done with regard to a fuel efficiency program. Specifically, the report states: [EPA-HQ-OAR-2010-0162-2735.1, p.4]

The agencies are able to meet the President's ambitious time table for regulation in part because of our relatively simplified approach, which is different than the more holistic and complicated approach envisioned by NAS, but which should contribute to significant improvements in fuel efficiency while minimizing the impact on the segments of the medium- and heavy-duty truck industry that are more complicated to regulate given their diversity. . . NHTSA emphasizes that it recognizes that much more study needs to be done given the lack of information regarding the impacts of fuel efficiency regulations on the MD/HD fleet. NHTSA intends to continue its study going forward, to ensure that subsequent phases of the HD National Program are well-informed, and to help ensure that the best information is available both to the government and to the public as the National Program continues. [EPA-HQ-OAR-2010-0162-2735.1, p.5]

In sum, NHTSA must conduct further analysis to support the proposal of a fuel efficiency metric. NHTSA cannot simply rely on the NAS Report as the basis for its proposed metric and the agency's independent examination of these issues, by its own admission, suffers from a 'lack of information' and is therefore insufficient to support the proposed rule. [EPA-HQ-OAR-2010-0162-2735.1, p.5]

Neither the Clean Air Act or the Energy Independence and Security Act Dictate that EPA and NHTSA Adopt the NAS Recommended Metric or Promulgate Final Standards within the Announced Timeframe. [EPA-HQ-OAR-2010-0162-2735.1, p.20]

EPA relies upon and directly cites the CAA as the source of its authority to set GHG standards for MD and HD vehicles. As previously cited by the Agency with respect to its use of the same authority in the LDV rule, EPA considers that CAA section 202 provides the Agency with broad authority to set standards. EPA considers that it is authorized to set standards whether vehicles and engines are designed as complete systems or incorporate devices to prevent or control pollution. In other mobile source rulemakings, EPA has also relied on its stated ability to allow standards to take effect in such time periods as to permit the development of requisite technology, giving appropriate consideration to the cost of compliance within such period. [EPA-HQ-OAR-2010-0162-2735.1, p.20]

Since EPA indicates that it is acting within this same authority in this proposed rule, the Agency certainly may consider the NAS Report in evaluating options for the control of GHGs from MD/HD vehicles. However, EPA is under no mandate to directly consider the NAS Report, nor does the Agency owe NAS any statutory deference. Technical comments and evaluations from other parties, if supported, must be given equal weight. The CAA does not provide - as it does with respect to other standard setting provisions - that EPA either directly consider or respond to NAS' recommendations. [EPA-HQ-OAR-2010-0162-2735.1, p.20]

In addition, EPA is not under a statutory duty or judicial order requiring the Agency to promulgate MD/HD standards by any particular date. Instead, the planned deadline for a final regulation is the result of policy decisions. EPA is also not required by law to conform its CAA rulemaking to any other statutory authority; the CAA does not cross-reference other statutory authority (e.g., EPCA) or require a direct consultation of the EPA Administrator with other members of the Executive branch (e.g., Department of Transportation). EPA then has significant flexibility with regard to the timing of this rulemaking, including the timeframe for initial application of standards. [37] In addition, EPA must fully consider information submitted to the Agency as part of the public notice and comment procedures required under both the CAA and the Administrative Procedures Act. In making these observations, Allison is neither suggesting that EPA not consider the NAS report, nor carefully consider its analysis. In fact, EPA should further review and give weight to the NAS observations concerning the effect of transmission technology on fuel economy and emissions. As reflected in Attachment 1 and below in Section VII, the NAS recognized that transmissions can have a significant effect on fuel consumption and vehicle emissions. Concomitantly, the NAS also recognized the importance of average vehicle speed in measuring fuel efficiency, stating that '[t]he fuel efficiency of a truck is not readily characterized by a single number, but rather by a curve against average speed.... If varying operating weight is also considered a factor, fuel efficiency information forms a surface of values against the axes of average speed and operating weight.' [EPA-HQ-OAR-2010-0162-2735.1, pp.20-21]

Undoubtedly NHTSA must take into account the analysis and findings of the NAS report it commissioned pursuant to the enactment of EISA. EISA explicitly added requirements for both an NAS study of vehicle fuel economy standards and a report assessing technologies and costs, the practical integration of technology into MD/HD fleets and other matters. The NAS report, however, cannot be the sole basis for the promulgation of standards. Instead, in setting standards NHTSA must consider the 'maximum feasible improvement' for a fuel efficiency improvement program and must adopt and implement several measures, including appropriate test methods and measurement metrics. NHTSA then has statutory flexibility to not propose or adopt the LSFC standard. Moreover, NHTSA is required under the Administrative Procedures Act to consider comments submitted for the record in this rulemaking proceeding. [EPA-HQ-OAR-2010-0162-2735.1, pp.21-22]

In Massachusetts v. EPA, the Supreme Court indicated that it saw 'no reason' why EPA and NHTSA could not coordinate the use of their respective statutory authorities to avoid conflict in regulation. EPA and NHTSA therefore proceeded to work together on both the LDV rule and this rulemaking. [EPA-HQ-OAR-2010-0162-2735.1, p.22]

The ability of the agencies to coordinate their standards so as to avoid inefficiencies and regulatory overlap is not at issue in the instant rulemaking. Instead, the issue is with respect to the degree to which EPA and NHTSA owe deference to the NAS report conclusions and proposed metric, either singly or as part of a coordinated rulemaking effort. In this regard, both EPA and NHTSA must give proper evaluation of the extent to which they have carefully considered and carried out their statutory duties under the CAA and EISA/EPCA. NHTSA must consider and EPA may consider the NAS report, but the bottom line of fulfilling their statutory duties is to promulgate standards in accordance with the full range of directives that Congress established in their enabling statutes. [EPA-HQ-OAR-2010-0162-2735.1, p.22]

In this regard, it is somewhat anomalous that EPA has deferred or given considerable weight to one element of NHTSA statutory authority by adopting the NAS metric - while not similarly recognizing the statutory restraint placed on NHTSA to not implement new standards with at least 4 years of lead time. As a result, NHTSA appears to be placed in the awkward position of proposing 'voluntary' standards within MY 2014-2015 instead of EPA acting to 'harmonize' the exercise of its CAA authority with a direct restraint placed on NHTSA by law. [EPA-HQ-OAR-2010-0162-2735.1, p.22]

In sum, EPA, and to a different degree NHTSA, is not required to adopt (or solely consider) the NAS recommended metric but must exercise independent judgment consistent with the statutory authority of each agency. Both agencies have discretion, in exercising their statutory authority, to make necessary adjustments and alterations to the metric recommended by the NAS report. Neither agency can delegate its responsibilities in this matter to the NAS, but rather, must exercise independent judgment in accordance with relevant CAA and EPCA authority. Thus either or both agencies could adopt the vehicle average speed corrected metric outlined above or otherwise 'correct' certification data to reflect the actual and real world performance of a vehicle in complying with an appropriate drive cycle. [EPA-HQ-OAR-2010-0162-2735.1, pp.22-23]

In a similar fashion, both EPA and NHTSA have substantial degree of discretion with respect to the timing of any regulatory effort concerning MD/HD vehicles. Under the announced timeframe, a final rulemaking is to be completed in approximately 6 months. Yet the CAA does not require this action; the CAA in fact contains no specific date by which this MD/HD rule must either be proposed or finalized. While NHTSA is subject to certain timelines pursuant to EPCA, such requirements also do not dictate that NHTSA finalize its part of this rulemaking package by July of 2011. In fact, the Supreme Court recognized that NHTSA has a singular duty, apart from EPA, to coordinate its vehicle rulemakings with standards of other federal agencies, including EPA. [EPA-HQ-OAR-2010-0162-2735.1, p.23]

Both agencies should then balance any need to promulgate GHG/FE standards against the factors provided for in their authorizing statutes and the agencies' general duty to fully review relevant technical information. As the first regulation of its type for MD/HD vehicles (and indeed the first regulation for MD/HD vehicles ever promulgated by NHTSA), both agencies should also pay close attention to the comments received during the public notice and comment process. In short, both agencies should avoid any 'rush to judgment' in this matter and get it right the first time. EPA and NHTSA are proposing to regulate a large segment of the nation's transportation system and one tied directly to the nation's economic viability. Sufficient time and care must be taken to ensure that the final regulations promulgated are supportable on a technical, legal and policy basis. [EPA-HQ-OAR-2010-0162-2735.1, pp.23-24]

We recognize - as cited in the proposed rule - that direction to complete this rulemaking has been issued by the President. We also acknowledge and share the goal of reducing GHG emissions and improving the FE of MD/HD vehicles. But as is the case with complex rulemakings of this type, we believe the public interest can better be served by taking sufficient time to complete EPA and NHTSA's ongoing work on the GEM model, to more carefully review and validate the NAS report analysis, to examine the comments submitted to date to the Agency and to undertake further agency analysis. [EPA-HQ-OAR-2010-0162-2735.1, p.24]

Both EPA and NHTSA have certainly gained more knowledge in the time period following the May 21, 2010 announcement of the 'aim' of completing a final rule by the end of July 2011. However, part of the direction for this rulemaking was also to 'take into account the market structure of the trucking industry and the unique demands of heavy-duty vehicle applications.' As cited throughout these comments, but especially with regard to the submitted comments on the incomplete metric, the incomplete GEM model and the overweighting of high speed steady-state MD/HD vehicle operations, more work needs to be done on the proposed rules and their supporting technical analysis. We believe it would be consistent with the Presidential Memorandum to take additional time to recognize and fully account for the unique demands and realistic operation of the MD/HD on-road vehicle fleet. [EPA-HQ-OAR-2010-0162-2735.1, p.24]

[37] We would note that under the announced timeframe, EPA would promulgate standards that would take effect for Model Year 2014. Considering requirements of the Congressional Review Act, this would mean that compliance with new standards would need to occur approximately 27-28 months from the publication of final regulations in the Federal Register. This short compliance window stands in contrast to past Agency practice whereby EPA typically allowed several model years before standards in this vehicle segment would take effect.

Response:

The agencies agree that sufficient time must be taken to ensure that the final rule is properly supported and believe that the final rule is indeed amply supported by the administrative record. At the same time, the agencies have postponed regulation where there is insufficient time available to analyze the requisite data, such as in developing potential rules for trailers. Another example is the reasonable caution the agencies have exercised in developing initial standards for vocational vehicles, given the enormous diversity of vehicles in this sector and the agencies' (and commenters') inability to suggest a reasonable means of evaluating performance of many potential control technologies given the absence of any type of meaningful baseline for comparison. Cf. Sierra Club v. EPA, 325 F. 3d 374, 380 (D.C. Cir. 2003) (in implementing a technology-forcing provision of the CAA, EPA reasonably adopted modest initial controls on an industry sector in order to better assess rules' effects in preparation for follow-up rulemaking).

The agencies also believe that their consideration of the NAS report was reasonable and proper. First, an agency does not improperly delegate its authority or judgment merely by using work performed by outside parties as the factual basis for its decision making. See U.S. Telecom Ass'n v. FCC, 359 F.3d 554, 568 (D.C. Cir. 2004);21 United Steelworkers of Am. v. Marshall, 647 F.2d 1189, 1216-17 (D.C. Cir. 1980). Here, although EPA and NHTSA carefully considered the NAS report, the agencies' consideration and use of the report was not uncritical and the agencies' exercised reasonable independent judgment in developing the proposed and final rule. Consistent with EISA's direction, NAS submitted a report evaluating MD/HD fuel economy standards to NHTSA in March of 2010. The agencies reviewed the findings and recommendations of the NAS report when developing the proposed rule, as was clearly intended by Congress, but also conducted an independent study, as described throughout the rulemaking record and summarized in Section X of the NPRM. 75 FR at 74351-56. In conducting its analysis of the NAS report, several key recommendations, such as the use of fuel efficiency metrics, were found to be the best approach to implementing the new program. Development and use of a predictive model for compliance for vocational vehicles and combination tractors is another instance where the final rule acts upon an NAS recommendation. However, the agencies did not follow other recommendations of the NAS report, for example in adopting separate regulation for engines and vehicles.

In response to the RVDA comment, the agencies proposed and are adopting provisions to exempt small businesses, and therefore, there is no impact on those entities. For those engine manufacturers and vocational vehicle chassis manufacturers which are not small businesses, the rule accounts for the costs and benefits of the program.

Organization: Daimler Trucks North America

In §§1036.255(c)(7) and 1037.255(c)(7), the EPA grants itself the authority to revoke certificates if a manufacturer takes "any action that … circumvents the intent of the Act." This language is simply too broad. It attempts to grant the EPA nearly unlimited authority to withhold certificates for violations of the CAA whether or not related to any requirement imposed by the GHG and FE regulations. This provision should not be included in the regulation. [EPA-HQ-OAR-2010-0162-1818.1, p.26]

Response:

EPA has revised the regulations to narrow this provision. It now says we deny, suspend, or revoke a certificate if the manufacturer takes any action that otherwise circumvents the intent of the Act or this part, with respect to the specific engine family.

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

The primary purpose of EPA's regulation under the Clean Air Act is "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population." 42 U.S.C. § 7401(b)(1) (emphasis added). This protective purpose is reflected in the text of Section 202 of the Act. Section 202(a) requires the EPA Administrator to promulgate standards for the emission of air pollutants from new motor vehicles "which in his [her] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." 42 U.S.C. § 7521(a) (emphasis added). Both the "may reasonably be anticipated" and "endanger" language reflect Congress' intent for EPA to act in a manner that prevents, rather than merely responds to, harm. See Ethyl Corp. v. EPA, 541 F.2d 1, 12 (D.C. Cir. 1976) ("[E]ndangers means something less than actual harm. When one is endangered, harm is threatened; no actual injury need ever occur."). Because of the important public health purpose and preventative nature of the Clean Air Act's mandate, EPA's authority to regulate under it is far-reaching. [EPA-HQ-OAR-2010-0162-3129.1, p.5]

The National Highway Traffic Safety Administration (NHTSA)'s purpose in implementing the Energy Policy Conservation Act (EPCA) is "to provide for improved energy efficiency of motor vehicles." 42 U.S.C. § 6201(5). This mandate, while vital to curbing our Nation's energy use, is narrowly focused on one aspect of motor vehicles—fuel efficiency—

without regard to the vehicles' effects on public health and welfare. The purposes of these two Acts are "wholly independent," as the Supreme Court made clear in Massachusetts v. EPA, 549 U.S. 497, 531-32 (2007): [EPA-HQ-OAR-2010-0162-3129.1, pp.5-6]

EPA finally argues that it cannot regulate carbon dioxide emissions from motor vehicles because doing so would require it to tighten mileage standards, a job (according to EPA) that Congress has assigned to DOT. See 68 Fed. Reg. 52929. But that DOT sets mileage standards in no way licenses EPA to shirk its environmental responsibilities. EPA has been charged with protecting the public's "health" and "welfare," 42 U. S. C. 7521(a)(1), a statutory obligation wholly independent of DOT's mandate to promote energy efficiency. See Energy Policy and Conservation Act, §2(5), 89 Stat. 874, 42 U. S. C. §6201(5). The two obligations may overlap, but there is no reason to think the two agencies cannot both administer their obligations and yet avoid inconsistency. [EPA-HQ-OAR-2010-0162-3129.1, p.6]

For heavy-duty vehicles, as well as light-duty vehicles, EPA's authority, and imperative, to protect human health and the environment through rigorous emission standards is more far-reaching and effective than the U.S. Department of Transportation's authority to set standards for fuel economy because of EPA's ability to address all greenhouse gases, to efficiently and effectively address the interactions between all vehicle components, and due to the flexible mechanisms inherent in the Clean Air Act. To allow only NHTSA's regulations to go forward without being complemented by EPA's broad authority under the Clean Air Act would be to lose "roughly 1/3rd of the Light-Duty Vehicle Rule's GHG reductions," not to mention additional GHG reductions under the Medium- and Heavy-Duty Vehicle Rule. [EPA-HQ-OAR-2010-0162-3129.1, p.6]

Pursuant to 49 USC 32902(k)(2) (EPCA as amended by EISA), NHTSA has authority to "determine in a rulemaking proceeding how to implement a commercial medium- and heavy-duty on-highway vehicle and work truck fuel efficiency improvement program designed to achieve the maximum feasible improvement." To that end, NHTSA must "adopt and implement . . . fuel economy standards." Id. No mention is made of controlling air pollution or of regulating vehicles in any way other than to improve fuel efficiency. [EPA-HQ-OAR-2010-0162-3129.1, p.6]

In contrast, EPA has broad authority under Section 202(a)(1) of the Clean Air Act to "prescribe . . . standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare." 42 U.S.C. § 7521(a)(1) (emphasis added); see also id. §7521 (a) (EPA authorized to set standards for air pollutants from vehicles and engines "whether such vehicles and engines are designed as complete systems or incorporate devices to prevent or control such pollution"). This language clearly delegates to EPA the responsibility to adopt standards for air pollutants. EPA relies on this authority in the proposed MD/HD vehicle rule to regulate, in addition to CO2, N2O, CH4, and hydrofluorocarbon (HFC) emissions. 75 Fed. Reg. 74163. All of these substances are listed among the "primary GHGs of concern" as contributors to global warming. Id. at 74156-57.

However, NHTSA does not have the authority to regulate pollution. Id. at 74207 ("NHTSA's authority under EISA relates exclusively to fuel efficiency."). Without EPA's GHG emissions standards under this proposed rule, air pollution standards would not be adopted and harmful airborne contaminants such as nitrous oxide, methane, and HFC emissions would potentially experience "significant increase[s]." 75 Fed. Reg. 74163. [EPA-HQ-OAR-2010-0162-3129.1, pp.6-7]

Section 202(a) of the Clean Air Act gives EPA authority to set standards "applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines" 42 U.S.C. § 7521 (emphasis added). Conversely, EISA only requires NHTSA to set standards for "commercial medium- and heavy-duty on-highway vehicles and work trucks." 49 U.S.C. § 32902(k). NHTSA interprets this language to exclude recreational vehicles such as motor homes. 75 Fed. Reg. 74156. EPA, however, is properly using its authority to set GHG emissions standards for motor homes. Id. [EPA-HQ-OAR-2010-0162-3129.1, p.7]

EPA's greenhouse gas emission standards will apply to Model Year 2014 vehicles, while NHTSA's mandatory fuel efficiency standards will not take effect until Model Year 2016 (voluntary standards begin in MY 2014). NHTSA is required to wait until 2016 because of the lead-time and stability provisions in 42 U.S.C. § 32902(k)(3) (EPCA, as amended by EISA). These provisions require NHTSA's medium- and heavy-duty fuel economy standards to provide a lead-time of at least four model years and to remain stable for at least three model years. Unlike NHTSA, EPA is not required to build prescribed lead-time or stability into its heavy-duty GHG regulations and can provide for a more calibrated lead-time and stability based on a practical, functional analysis of the facts. [EPA-HQ-OAR-2010-0162-3129.1, p.7]

Section 202(a)(1) of the Clean Air Act provides the general authority for regulations governing "any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines." 42 U.S.C. § 7521(a)(1). Section 202(a)(2) governs lead time, allowing that "any regulation prescribed under paragraph 1 . . . shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to cost of compliance within such period." Id. § 7521(a)(2). [EPA-HQ-OAR-2010-0162-3129.1, p.7]

Because of EPA's broad authority to regulate emissions under the Clean Air Act, its standards can catalyze the technological changes necessary for air pollution reductions to protect human health and the environment two years before NHTSA's standards begin to require improved fuel efficiency. [EPA-HQ-OAR-2010-0162-3129.1, p.7]

Section 114(a) of the Clean Air Act confers broad information-gathering authority on EPA for the purposes of carrying out any provision of the Act, except a provision of Title II applying to manufacturers of new motor vehicles or new motor vehicle engines. 42 U.S.C. § 7414(a). Section 208(a) of the Act fills in any gaps left by Section 114 by giving EPA similar broad authority to gather information from manufacturers of new motor vehicles or new motor vehicle engines. Id. § 7542(a). Section 208(a) requires such manufacturers to keep records, perform tests, make reports, and provide information that EPA may reasonably require to determine whether the manufacturer is in compliance or to otherwise carry out the mobile source provisions in Title II. Id. In addition, Section 206(c) of the Act authorizes “officers or employees duly designated” by the EPA to “enter . . . any plant or other establishment” of a manufacturer to “test[ ] vehicles or engines in the hands of the manufacturer. Id. § 7525(c); see also id. § 7542 (b)(1). Under the same provision, an EPA officer or employee is authorized “to inspect . . . records, files, papers, processes, controls, and tests” under EPA regulations. Id. § 7525(c); see also id. § 7542 (b)(2). [EPA-HQ-OAR-2010-0162-3129.1, p.9]

EISA does not specifically outline this authority for NHTSA; rather, NHTSA is left to determine its own information-gathering and testing rules through regulation. [EPA-HQ-OAR-2010-0162-3129.1, p.9]

Response:

EPA agrees that it may establish standards for heavy duty vehicles and engines commencing in MY 2014 for heavy duty vehicles and engines.

Organization: Center for Biological Diversity

The applicable statutes require that the Proposed Rule implement fuel efficiency standards that achieve the maximum feasible improvement in HD Vehicle fuel efficiency. The Proposed Rule fails to fulfill this mandate. [EPA-HQ-OAR-2010-0162-2506.1, p.2]

(a) The Applicable Standards The purposes of the Energy Policy Conversation Act (“EPCA”) are to decrease the nation’s dependence on foreign imports, to enhance national security and to achieve the efficient utilization of scarce resources. To achieve these goals, EPCA, as amended by the Energy Independence and Security Act of 2007 (“EISA”), expressly demands that NHTSA set maximum feasible fuel economy standards. In the case of HD Vehicles, Section 32902(k) of EPCA requires NHTSA to set standards and implement a HD Vehicle “fuel efficiency improvement program designed to achieve the maximum feasible improvement.” The requisite standards shall be “appropriate, cost-effective, and technologically feasible for commercial medium-and heavy-duty on-highway vehicles and work trucks.” In fulfilling its duties under Section 32902(a), NHTSA “cannot set fuel economy standards that are contrary to Congress’s purpose in enacting the EPCA – energy conservation,” it cannot act arbitrarily and capriciously; it cannot advance conclusions unsupported by the evidence; if it conducts cost-benefit analyses, it may not assign values of zero to benefits that can be ascertained within a range; and it cannot bias its cost-benefit analysis. Section 32902(k) imposes the same requirements. In addition, fuel efficiency standards under EPCA and EISA must be technology-forcing. [7] [EPA-HQ-OAR-2010-0162-2506.1, p.2]

EPA's authority to regulate greenhouse gas emissions from HD Vehicles is codified in section 202(a) of the Clean Air Act ("CAA"). The Act's pollution emission reduction goals are technology-forcing:

Case and statutory law support the broad authority of EPA to force substantial change on the status quo on an industry-wide basis. The 'technology-forcing goals' of Subchapter 11, the portion of the Clean Air Act that establishes emissions standards for moving vehicles, are well recognized. See Whitman v. American Trucking Ass'ns, 531 U.S. 457, 491-492, 121 S. Ct. 903, 149 L. Ed. 2d 1 (2001) (Breyer, J. dissenting). The technology-forcing authority of the Clean Air Act is embodied in the language of the Act that directs EPA to promulgate standards 'that reflect the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available for the model year to which the standards apply, ...' 42 U.S.C. § 7521(a)(3)(A)(i). EPA is thus empowered to set standards for future model years based on reasonable projections of technology that may not be available currently. NRDC v. Thomas, 256 U.S. App. D.C. 310, 805 F.2d 410, 429 (D.C. Cir. 1986). [EPA-HQ-OAR-2010-0162-2506.1, p.3]

Cent. Valley Chrysler-Jeep, Inc. v. Goldstene, 529 F. Supp. 2d 1151, 1178 (E.D. Cal. 2007); see also Motor Vehicle Mfrs. Ass'n v. New York State DEC, 17 F.3d 521, 536 (2nd Cir. 1994) (noting that the Clean Air Act is 'technology forcing' in the context of California's LEV program). [EPA-HQ-OAR-2010-0162-2506.1, p.3]

The Proposed Rule fails to achieve the statutory mandates of setting maximum feasible fuel efficiency improvements, and of forcing technological innovation, by purposefully limiting itself to the application of technology that is already commercially available today, by setting standards that at lax enough to permit manufacturers to exclude even some of this available technology, and by failing to present an alternative that truly presents the "maximum feasible" emission reductions. The Agencies should revise the Proposed Rule and adopt standards that meet their statutory obligations. [EPA-HQ-OAR-2010-0162-2506.1, p.3]

The Agencies have also asked for comment on a proposal to permit the Proposed Rule, once finalized, to stay in effect indefinitely. The Center believes such a decision would constitute a per se violation of Section 32902(k). Even though that section does not prescribe the precise dates when the Secretary of Transportation must set new fuel efficiency standards for HD Vehicles, standards that are not continually and regularly updated (while retaining four years of lead time and three years of regulatory stability) by definition cannot achieve maximum feasible, or indeed any, fuel efficiency improvements over time. An announcement that no further regulation will be forthcoming would also remove all incentives for future research and development to reduce greenhouse gas emissions and slow HD Vehicles' fuel consumption. This proposal flies in the face of EPCA's, EISA's and the CAA's goals and should be definitively rejected. [EPA-HQ-OAR-2010-0162-2506.1, p.8]

[7] EPCA and EISA are meant to encourage technological innovation in the field, not simply promote the wider adoption of existing technologies. See, e.g., Center for Auto Safety v. Thomas, 847 F.2d 843, 870 (D.C. Cir. 1988) (overruled on other grounds) ("[t]he experience of a decade leaves little doubt that the congressional scheme in fact induced manufacturers to achieve major technological breakthroughs as they advanced towards the mandated goal"); Green Mt. Chrysler Plymouth Dodge Jeep v. Crombie, 508 F. Supp. 2d 295, 358-359 (D. Vt. 2007) (discussing technology-forcing character of EPCA and the use of increased fuel efficiency to augment performance rather than mileage): Kennecott Greens Creek Min. Co. v. Mine Safety and Health Admin., 476 F.3d 946, 957 (D.C. Cir. 2007) ("when a statute is technology forcing, the agency can impose a standard which only the most technologically advanced plants in an industry have been able to achieve – even if only in some of their operations some of the time"). The Clean Air Act is similarly technology-forcing. Legislative history indicates that the primary purpose of the Act was not "to be limited by what is or appears to be technologically or economically feasible," which may mean that "industries will be asked to do what seems impossible at the present time." 116 Cong. Rec. 32901-32902 (1970), Legislative History of the Clean Air Amendments of 1970 (Committee Print compiled for the Senate Committee on Public Works by the Library of Congress), Ser. No. 93-18, p. 227 (1974); see also Whitman v. American Trucking Association, 531 U.S. 457, 491 (2001). [EPA-HQ-OAR-2010-0162-2506.1, pp.2-3]

Response:

The standards adopted in the final rule are consistent with section 202 (a) of the CAA and section 32902 (k)(2) of EISA With respect to the EPA rules, we note at the outset, that CBD's premise that EPA must adopt "technology-forcing" standards for heavy duty vehicles and engines is wrong. A technology-forcing standard is one that is to be based on standards which will be available, rather than technology which is presently available. NRDC v. Thomas, 805 F. 2d 410, 429 (D.C. Cir. 1986).   Clean Air Act provisions requiring "the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available" are technology-forcing. See e.g. CAA sections 202 (a)(3)(1)[1]; 213 (a)(3). Section 202(a) (1) standards are technology-based, but not technology-forcing, requiring EPA to issue standards for a vehicle's useful life "after providing such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period." See NACAA v. EPA, 489 F. 3d 1221, 1230 (D.C. Cir. 2007) upholding EPA's interpretation of similar language in CAA section 231 (a) as providing even greater leeway to weigh the statutory factors than if the provision were technology-forcing. See generally 74 FR at 49464-465 (Sept. 28. 2009); 75 FR at 74171.

[1] CBD cites the District Court's opinion in Cent. Valley Chrysler-Jeep Inc. v. Goldstene, 529 F. Supp. 2d 1151, 1178 (E.D. Cal. 2007) for the proposition that standard-setting provisions of Title II of the CAA are technology forcing, but the court was citing to the technology-forcing provision section 202 (a)(3)(A)(i), which is not the applicable authority here.

Section 202 (a)(1) of course allows EPA to consider application of technologies which will be available as well as those presently available, id., and EPA exercised that discretion here. For example, the agencies carefully considered application of hybrid technologies and bottoming cycle technologies for a number of the standards. Thus, the critical issue is whether EPA's choice of technology penetration on which the standards are premised is reasonable considering the statutory factors, the key ones being technology feasibility, technology availability in the 2014-2018 model years (i.e. adequacy of lead time), and technology cost and cost-effectiveness. EPA has considerable discretion to weigh these factors in a reasonable manner (even for provisions which are explicitly technology-forcing, see Sierra Club v. EPA, 325 F. 3d 374, 378 (D.C. Cir. 2003)), and has done so here.

Neither EPCA nor EISA define "maximum feasible" in the context of setting CAFE standards. Instead, NHTSA is directed to consider three factors when determining what the maximum feasible standards are – "appropriateness, cost-effectiveness, and technological feasibility." 32902(k)(2). These factors modify "feasible" in the context of the MD/HD rule beyond a plain meaning of "capable of being done." *See Center for Biological Diversity v. National Highway Traffic Safety Admin*., 538 F.3d 1172, 1194 (9th Cir. 2008). EPCA "gives NHTSA discretion to decide how to balance the statutory factors – as long as NHTSA's balancing does not undermine the fundamental purpose of EPCA: energy conservation." *Id*. at 1195. Where Congress has not directly spoken to a potential issue, NHTSA's interpretation must be a "reasonable accommodation of conflicting policies… committed to the agency's care by the statute." *Id*. (discussing consideration of consumer demand) (internal citations omitted). In the context of light-duty, it was determined that Congress delegated the process for setting the maximum feasible standard to NHTSA with *broad* guidelines concerning the factors that the agency must consider. *Id.* (emphasis in original). This interpretation is applicable in developing standards for the heavy-duty sector. Section 32902 (k) prescribes statutory factors commiserate to, and equally broad as, those prescribed for light-duty. Thus, NHTSA believes that it is firmly within our discretion to weigh and balance the factors laid out in 32902(k) in a way that is technology-forcing, as evidenced by these standards promulgated in this final rule, but not in a way that requires the application of technology which will not be available in the lead time provided by the rule, or which is not cost-effective, or is cost-prohibitive, as CBD evidently deems mandated.

As detailed in Section III of preamble to the the final rule, the agencies have considered and weighed the appropriateness, cost-effectiveness, technological feasibility and available lead time of the standards for each regulatory category in designing a program to achieve the maximum feasible fuel efficiency improvement.

NHTSA disagrees that the indefinite duration of the standards in this rule would prevent the agency from setting future standards at the maximum feasible level in future rulemakings. The absence of an expiration date for these standards should not be interpreted to mean that there will be no future rulemakings to establish new MD/HD fuel efficiency standards for MYs 2019 and beyond – the agencies have already previewed the possibility of such a rulemaking in other parts of this final rule preamble. Therefore, NHTSA believes this concern is unnecessary.

Organization: Chamber of Commerce of the United States

The Chamber believes that the Clean Air Act is not the appropriate tool to address greenhouse gas emissions. EPA's insistence that Title II of the Act be used to address what has historically been the province of NHTSA has added little to no value from a policy standpoint but has resulted in severe regulatory uncertainty for stationary greenhouse gas emitters. [EPA-HQ-OAR-2010-0162-2152.1, p.2]

The Energy Policy and Conservation Act, as amended by the Energy Independence and Security Act of 2007, empowers NHTSA to develop a commercial medium- and heavy-duty on-highway vehicle and work truck fuel efficiency improvement program "in consultation with the Secretary of Energy and the Administrator of the Environmental Protection Agency." It does not require EPA to issue a parallel rule; rather, the plain language of the statute seems to discourage it by placing EPA in a "consultant" role. [EPA-HQ-OAR-2010-0162-2152.1, p.2]

In addition, EPA is not under a statutory duty or judicial order requiring the Agency to promulgate medium- or heavy-duty standards by any particular date. Instead, the planned deadline for a final regulation is the result of policy decisions. EPA has significant flexibility with regard to the timing of this rulemaking, including the timeframe for initial application of standards. [EPA-HQ-OAR-2010-0162-2152.1, p.9-10]

Response:

As explained in other comment responses, EPA has a mandatory duty to issue GHG standards under section 202 (a) (1) for new heavy duty vehicles and engines. As to timing of those rules, EPA notes both that this duty became mandatory as soon as the endangerment and cause and contribute findings were made 18 months ago. This is sufficient time for EPA's mandatory issue to issue standards to ripen. Moreover, delay would mean foregoing standards for MY 2014 and possibly 2015, foregoing considerable environmental benefit in the form of feasible, cost-effective emission reductions. EPA estimates these reductions, over the life of the vehicles and engines in question as 96 MMT of CO_2 emissions. See preamble Section I.D.

Organization: Daimler Trucks North America

The EPA does not address the statutory lead time requirements of the Clear Air Act (CAA) in its general discussions of lead-time issues in the NPRM. (Re. 75 Fed. Reg. 74170 et seq). The CAA does not give the EPA discretion to waive the lead time requirements. Rather, EPA emission standards for HD engines and vehicles generally require significant lead time (4 years) under the CAA. (See 42 U.S.C. §7521(a)(3)(C)) In this case, however, the Proposed GHG Standards are slated to take effect with only 2 full years of lead time, commencing in the 2014 model year. This timeframe poses serious challenges for all manufacturers, including larger manufacturers such as Daimler. Indeed, Congress inherently recognized this serious limitation by mandating lead time in the Energy Independence and Security Act of 2007. (See 49 U.S.C. §32902(k)(3)).

Response:

A number of commenters, including Daimler, evidently assumed that EPA was issuing these rules pursuant to section 202 (a) (3) (A) of the Act, in which case the lead time requirements of section 202 (a)(3)(C) – standards to commence four years from promulgation to apply for a period of at least three model years – would also apply.. Although section 202 (a)(3)(A) applies to certain standards for heavy duty trucks and engines, it is limited to standards for emission of the pollutants enumerated in section 202 (a)(3)(A): “hydrocarbons, carbon monoxide, oxides of nitrogen, and particulate matter”. Carbon dioxide, nitrous oxide, and hydroflourocarbons are not among these pollutants. Hence, the standards for those pollutants under this rule are issued pursuant to section 202 (a) (1), as EPA noted at proposal. Section 202 (a)(1) does not mandate a specific lead time, but rather requires that rules take effect “after such period as the Administrator finds necessary to permit the development and application of the requisite technology”. EPA has documented why the lead time for all of the standards adopted in today’s rules satisfy this requirement. Indeed, in the remainder of its comment, Daimler indicates that the lead time for the rules is adequate.

Organization: Daimler Trucks North America

Nevertheless, the near-term 2014 commencement date could be feasible for Daimler as a result of the following agreed-upon core principles that serve as the framework for the Proposed GHG/FE standards: [EPA-HQ-OAR-2010-0162-1818.1, p.12]

• Increased use of existing technologies to achieve significant near-term reductions in GHG emissions and fuel consumption by way of a simple, manageable, and implementable program; [EPA-HQ-OAR-2010-0162-1818.1, p.12]

• Implementation of an HD National Program that results in one nationwide set of GHG emission and fuel-efficiency standards (including in California); [EPA-HQ-OAR-2010-0162-1818.1, p.12]

• A National Program that achieves a harmonized set of test methods and procedures for determining a HD vehicle’s GHG emissions and fuel efficiency; [EPA-HQ-OAR-2010-0162-1818.1, p.12]

• Standards that recognizing the commercial needs of the trucking industry and that do not disrupt the existing marketplace for commercial vehicles and engines; [EPA-HQ-OAR-2010-0162-1818.1, p.12]

• Establishment of appropriate incentives to spur the introduction of advanced technologies, while preserving a level playing field and marketplace for HD engine and vehicle manufacturers; and [EPA-HQ-OAR-2010-0162-1818.1, p.12]

• Recognition that the opportunities for reductions in GHG emissions and fuel consumption from a HD vehicle involve the entire vehicle and its operation, and acknowledgement of the benefits of globally-harmonized methods for determining a HD vehicle's GHG emissions and fuel efficiency, considering the global nature of the issues and the industry involved in this rulemaking. [EPA-HQ-OAR-2010-0162-1818.1, p.12]

Because DTNA believes that the Agencies' proposed GHG and FE standards could be technologically feasible and could be effective in meeting the agencies' GHG and fuel efficiency policy goals – Daimler could support the adoption of the standards on the proposed time table, but only if the Agencies address the concerns with the proposed regulations noted in our comments and assure that final rule is fully consistent with each of the core principles set forth above. [EPA-HQ-OAR-2010-0162-1818.1, p.13]

In the NPRM, the agencies expressed a general "expectation based on our ongoing work with the State of California that the California ARB will be able to adopt regulations equivalent in practice to those in this HD National Program, just as it has done for past EPA regulation of heavy-duty trucks and engines." While the agencies are correct to recognize the past role of California and states in developing emissions standards, the agencies appear poised to miss an historic opportunity to guarantee truly uniform national regulations going forward in this new area. This omission would miss a major opportunity to improve on the nation's automotive emissions regulatory regime, which has been plagued for decades with the inefficiencies and inequities associated with requiring manufactures to design and build vehicles to two different and frequently inconsistent emissions standards and which suffers from chronic uncertainty created by dual state/federal regulatory regimes. Missing this opportunity would also fall short of the commitment the agencies have made to industry regarding "harmonization" in its' stated "core principles" [EPA-HQ-OAR-2010-0162-1818.1, pp.14-15]

If the agencies more clearly asserted their federal prerogative to preempt inconsistent and conflicting state regulation in this new area they could provide manufacturers, and consumers of all the benefits of such uniformity, as well as the benefits of increased regulatory certainty that are missing from the current dual regulatory regime for other criteria pollutants. [EPA-HQ-OAR-2010-0162-1818.1, p.15]

The agencies should not overlook the potential for perpetuating the historical patchwork of Federal and California emissions standards, or their ability to prevent this undesired result. To develop ground breaking and unprecedented federal GHG requirements for heavy-duty vehicles, with the mere "expectation" that California would then develop it's own set of harmonious overlapping requirements would be a mistake. Although EPA may "expect" California to adopt regulations that are "equivalent in practice" this would ignore over 30 years of history with CARB rulemakings (including light-duty), which suggest the opposite. Moreover, the agencies should expressly recognize the fact that they have complete control over whether California and other states regulate in this area or not, as outlined in more detail below. [EPA-HQ-OAR-2010-0162-1818.1, p.15]

Response:

The agencies agree that a single national program for heavy duty vehicles and engines is a desirable outcome and believe that the rules adopted here effectuate that result.

Organization: Daimler Trucks North America

Required Waiver Not Yet Granted. Specifically, the agencies should expressly clarify that EPA has not yet granted the CAA waiver that would be required for California to develop heavy-duty GHG standards. EPA's waiver decision for LDVs did not address CARB's separate heavy-duty GHG emission standards. In fact, there is no evidence that CARB has even requested a waiver for HD GHG emission standards. [7] [EPA-HQ-OAR-2010-0162-1818.1, p.15]

Waiver Would Not Be Inappropriate Even if California requested a waiver in the future, it would not be appropriate to grant it. First and foremost, a waiver would be inappropriate because it would defeat the goal of national uniformity embodied in the current rulemaking. Unlike the light duty segment, where the waiver was granted prior to and during the implementation of new GHG regulations, in this sector the federal regulatory program is already developed and is being constructed with input from California. To mandate the federal program and subsequently grant a waiver would inject vast uncertainty into the regulatory structure and undermine the assurances a National Program is intended to provide. [EPA-HQ-OAR-2010-0162-1818.1, p.16]

Moreover, a waiver would not meet the mandatory waiver criteria embodied in the CAA.[8] For example, unlike the criteria pollutants that that California has been allowed to regulate in the past, it is far from clear that the GHG emissions from vehicles operating in California present any unique, compelling, or extraordinary risks to the state that are not presented by GHG emissions introduced into the globe's common atmosphere from other parts of the United States, and which could be regulated with equal effect on a nationwide basis. Similarly, because CARB's SmartWay certification regulation relates only to sleeper equipped tractors hauling 53 foot or longer box van trailers (and requires SmartWay tires for other tractors), a subset of the vehicles that EPA and NHTSA regulate, and since CARB's regulation only touches a few of the many technologies that EPA and NHTSA regulate, there is a question as to whether CARB's program will be as protective as EPA and NHTSA's standards, as required by the CAA. [EPA-HQ-OAR-2010-0162-1818.1, pp.16-17]

Indeed, although not challenged by the automobile industry, the legality of the waiver granted to California to regulate greenhouse gas emissions from light duty vehicles is nonetheless subject to a legal challenge. Daimler prefers to work closely with EPA, NHTSA and CARB to design a workable and consistent regulation that will promote environmental benefits more expeditiously – and not to be forced into unnecessary litigation in order to ensure a program capable of being met through one uniform vehicle fleet. [EPA-HQ-OAR-2010-0162-1818.1, p.17]

Response:

EPA agrees that California has not sought a waiver with respect to California rule controlling GHG emissions from heavy duty vehicles and engines. There is no point in speculating about what EPA might do should California seek such a waiver.

Organization: Daimler Trucks North America

On page 75 Fed. Reg. 74172, the Agencies point out that they are working with regulators from other countries for harmonized test cycles. DTNA applauds the Agencies for doing so. As the NAS panel found in its study of medium- and HDV regulations, "[t]he heavy-duty-truck fuel consumption regulations in Japan, and those under consideration and study by the European Commission (EC), provide valuable input and experience to the U.S. plans." (Re. NAS, Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles, Finding 3-2, 2010.) Moreover, GHG reduction is a world wide concern and the issue can be most efficiently and effectively addressed if the world is working together. Most heavy truck and engine manufactures are worldwide companies. If the world community comes together to develop harmonized standards the commercial vehicle industry can use economies of scale to more efficiently design fuel efficient products that can be used throughout the world. Accordingly, we strongly recommend the Agencies work with European regulators and others for common engine and vehicle certification programs. Moreover, we recommend that the Agencies work with European regulators and others for a common hybrid certification program. Common regulatory programs can save money while achieving uniform environmental targets. In turn, common regulatory programs are the most cost-effective. And, especially in the hybrid vehicle market, where costs are high and sales volumes (across which costs can be apportioned) are low, cost-effectiveness is extremely important. When multiple programs, such as the US and European HDV GHG programs, require the same types of procedures, such as those for measuring aerodynamic drag coefficients, regulators create unnecessary cost and complexity if they require different procedures or test methods. We recommend, in order to achieve the most cost-effective programs worldwide, that regulators use joint, harmonized procedures. [EPA-HQ-OAR-2010-0162-1818.1, p.20]

That said, we are concerned that the Agencies are not making enough of an attempt to work with regulators in other countries. DTNA recommends that the Agencies work more strongly for worldwide harmonization of GHG / FE programs. On page 75 Fed. Reg. 74356, the Agencies state "international harmonization in HD fuel consumption/GHG regulations is desirable and expect harmonization may increase over time, given the global presence of many HD vehicle manufacturers." (emphasis added) Manufacturers already request harmonization. We have requested it several times from the Agencies. We need the Agencies to create that harmonization. We believe that the Agencies could do more to develop harmonized procedures and that, although there are some inevitable differences between a program suitable for the US and those used in Europe and Japan, the Agencies should do more than simply review and reject the other regions' programs. [EPA-HQ-OAR-2010-0162-1818.1, p.20]

The following are principles that we believe should guide the Agencies in their attempts to harmonize worldwide: [EPA-HQ-OAR-2010-0162-1818.1, p.20]

1. Harmonization should be a guiding principle for the Phase 2 of the Agencies' program. [EPA-HQ-OAR-2010-0162-1818.1, p.20]

2. In order to allow for regional or national differences in GHG / FE programs, we recommend a clear distinction between: [EPA-HQ-OAR-2010-0162-1818.1, p.21]

a. issues for which an international harmonization is reasonable and possible and [EPA-HQ-OAR-2010-0162-1818.1, p.21]

b. issues which are characterized by regional/national differentiation. For example, with differences between the driving speeds and drive cycles in the US, Europe, and Japan, it may not make sense to use one common drive cycle as input to the GEM model. But such a small difference should not derail other work. [EPA-HQ-OAR-2010-0162-1818.1, p.21]

3. We recommend that the Agencies strive for compromise on the following issues: [EPA-HQ-OAR-2010-0162-1818.1, p.21]

a. Realistic Nature of Cycle Definitions: The main target for drive cycles is to give realistic fuel consumption values for all vehicle variants. Therefore the cycles should be defined as routes (altitude/grade profiles versus distance and maximum allowable speed) instead of given speed profiles, in that the latter has more fidelity to in-use driving. [EPA-HQ-OAR-2010-0162-1818.1, p.21]

b. Measuring Methods/Test procedures: It is important to get worldwide harmonized test specifications and procedures for all of the simulation input data that must be measured (e.g., engine fuel map, vehicle air drag). Measuring/test methods are already under discussion for Phase 1 (e.g., test procedures for aerodynamic drag), but these methods should be harmonized worldwide. [EPA-HQ-OAR-2010-0162-1818.1, p.21]

c. Simulation tool: As much as possible, the Agencies and their international counterparts should develop simulation tools that correlate to in-use driving. In particular, detailed tool specification should include: evaluation of GEM tool in practise and definition of a list of additional parameters that are relevant input data needed for the simulation model. [EPA-HQ-OAR-2010-0162-1818.1, p.21]

Response:

EPA has carefully considered these recommendations, although the issue of worldwide harmonization of heavy duty rules is beyond the scope of this rulemaking.

Organization: Daimler Trucks North America

4. We recommend starting harmonization activities as soon as possible, to avoid unnecessary duplication of work. [EPA-HQ-OAR-2010-0162-1818.1, p.21]

We understand that the Agencies are working with Environment Canada for a unified program, and we applaud this effort. A joint compliance program means (1) one shared set of procedures and a common model for demonstrating compliance and (2) one shared target for any vehicle category. We appreciate that the Agencies and Environment Canada will use the same procedures and the GEM model. Our concern is that, with different sales mixes in the different countries, and with compliance based upon a manufacturer's sales mix, common numerical CO2 or fuel consumption targets would result in different levels of stringency in the two countries. Rather, the US Agencies should work with Environment Canada to define achievable target penetrations of the various technologies that are appropriate for Canada (as the US Agencies did for the US) and calculate the numerical targets based on these penetration rates. Alternatively, the US and Canadian Agencies could work on one continent-wide set of numerical targets, which would necessarily be different than the US targets listed in the NPRM, because of Canada's different sales mix. [EPA-HQ-OAR-2010-0162-1818.1, p.21]

Response:

EPA has likewise carefully considered this comment, although the issue discussed is again beyond this rulemaking's scope.

Organization: Engine Manufacturers and Truck Manufacturers Associations

Notwithstanding EMA's and TMA's comments and concerns regarding the Proposed GHG/FE Standards, one of the principal hallmarks of this regulatory initiative is the vast amount of common ground that the Agencies and the regulated industries, including the members of

EMA and TMA, have been able to develop. That broad common ground is, in fact, the linchpin to the implementation of the first-ever GHG emission and fuel-efficiency standards that are being proposed in this rulemaking for MD and HD vehicles and engines, and which are to be implemented on what is an extremely aggressive timetable. In that regard, EPA emission standards for HD engines and vehicles generally require significant leadtime (typically 4 years) under the Clean Air Act ('CAA'). (See 42 U.S.C. §7521(a)(3)(C).) Similarly, under the Energy Independence and Security Act of 2007 ('EISA'), any fuel efficiency standards that NHTSA adopts for HD commercial vehicles must provide not less than 4 full model years of regulatory leadtime. (See 49 U.S.C. §32902(k)(3).) In this case, however, the Proposed GHG/FE Standards are slated to take effect with only 2 full years of leadtime, commencing in 2014. -In addition, both the CAA and EISA require 3 full model years of regulatory stability between changes in any emission standards applicable to HD vehicles and engines. Since there already are HD emission standards set to take effect in the 2013 model year ('MY'), the proposed 2014 effective date for the GHG/FE standards does not provide the necessary 3 years of stability. Nevertheless, the near-term 2014 commencement date is potentially feasible (and therefore potentially acceptable to the regulated industry) as a result of and premised on the agreed-upon core principles that serve as the framework for the Proposed GHG/FE standards. [EPA-HQ-OAR-2010-0162-1940.1, pp.1-2]

Response:

As noted in the response to Daimler, the CAA standards are being adopted pursuant to section 202 (a)(1), which does not contain specific lead time requirements, only a requirement that lead time be accounted for in establishing standards. EPA also notes the commenter's agreement that the standards are feasible commencing in model year 2014.

NHTSA has reviewed the comments on lead time and believes that the regulatory schedule is consistent with the lead time requirement of 32902(k)(3). To clarify, NHTSA will not be imposing a mandatory regulatory program until 2016, and none of the voluntary standards will be "mandates." As described in later sections, the voluntary standards would only apply to a manufacturer if it makes the voluntary and affirmative choice to opt-in to the program.[2] The voluntary period of 2014 and 2015 will provide manufacturers with the flexibility to prepare for the imposition of standards in 2016 and earn compliance credits, in accordance with their varied business practices and timelines. NHTSA believes the 2014 and 2015 voluntary period will enhance the usefulness of the four years of lead time until regulation by allowing manufacturers greater flexibility in the timeframes and speed in which they must meet the 2016 standards. Mandatory NHTSA standards will first come into effect in 2016, giving industry four full years of lead time.

[2] Prior to or at the same time that a manufacturer submits its first application for a certificate of conformity; see Section V below.

As discussed in Section II of the preamble to the final rule, NHTSA's final standards follow different phase-in schedules based on differences between the regulatory categories. Consistent with NHTSA's statutory obligation to implement a program designed to achieve the maximum feasible fuel efficiency improvement, the standards increase in stringency based upon increasing fleet penetration rates for the available technologies. The NPRM proposed phase-in schedules aligned with EPA's, some of which followed pre-determined stringency increases. The NPRM also noted that NHTSA was considering alternate standards that would not change in stringency during the time frame when the regulations are effective for those standards that increased throughout the mandatory program. As described in Section II of the preamble, the final rule includes the proposed alternate standards for those that standards that follow such a stringency phase-in path. Therefore, NHTSA believes that the final rule provides ample stability for each standard.

Each standard, associated phase-in schedule, and alternative standard implemented by this final rule was noticed in the NPRM, and no standards that were not noticed at the time of this rulemaking will take effect before 2019. This ensures that the standards in this rule will remain in effect for at least three years, providing the three full years of regulatory stability mandated under EPCA/EISA, and ensuring that manufacturers will not be subject to new or amended standards too rapidly. Therefore, NHTSA believes the commenters' concern about regulatory stability under EPCA/EISA is addressed in the structure of the rule.

Organization: National Automobile Dealers Association (NADA)

NADA/ATD actively supported the enactment of Section 102 of EISA, which established a detailed Congressionally-mandated national program for the first-time-ever regulation of commercial vehicle fuel efficiency. EISA required that: [EPA-HQ-OAR-2010-0162-2705, p.2]

The National Academy of Sciences (NAS) conduct and publish a study of potential commercial vehicle fuel efficiency improvement strategies, and [EPA-HQ-OAR-2010-0162-2705, p.2]

NHTSA, in consultation with the Secretary of Energy (DOE) and EPA, examine the fuel efficiency of commercial medium- and heavy-duty on-highway vehicles and work trucks and determine: [EPA-HQ-OAR-2010-0162-2705, p.2]

(A) the appropriate test procedures and methodologies for measuring the fuel efficiency of such vehicles; [EPA-HQ-OAR-2010-0162-2705, p.2]

(B) the appropriate metric for measuring and expressing fuel efficiency performance, taking into consideration, among other things, the work performed by such vehicles and the types of operations in which they are used; [EPA-HQ-OAR-2010-0162-2705, p.2]

(C) the range of factors, including, without limitation, design, functionality, use, duty cycle, infrastructure, and total overall energy consumption and operating costs that affect the fuel efficiency of such vehicles; and (D) such other factors and conditions that could have an impact on a program to improve the fuel efficiency of such vehicles. [EPA-HQ-OAR-2010-0162-2705, p.2]

Not later than 24 months after completion of the NAS study, NHTSA consult with DOE and EPA and determine by rulemaking how to implement a commercial medium- and heavy-duty on-highway vehicle and work truck fuel efficiency improvement program designed to achieve the maximum feasible improvement, and adopt and implement appropriate test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols appropriate, cost-effective, and technologically feasible for such vehicles, prescribing as appropriate separate standards for different classes of vehicles. Such rules were to provide for not less than 4 full model years of regulatory lead-time and 3 full model years of regulatory stability. [EPA-HQ-OAR-2010-0162-2705, p.2]

The NAS completed its study in March 2010. Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles (TRB, NAS March 2010). Despite EISA's allowance of up to two years after issuance of the NAS study (until April 2012) for regulatory development, NHTSA and EPA have indicated that they intend to publish a final rule by September 2011. The proposal indicates that EPA would require compliance beginning in MY 2014, aggressively cutting by half the Congressionally-directed four years of lead-time. In an apparent attempt to pay some deference to Congress' explicit instructions, the proposal also purports to make NHTSA's mandates "voluntary" until MY 2016. The proposal seems also to suggest that EISA's requirement for regulatory "stability" is to be satisfied by the "certainty" of a MY 2014-2017/2018 phase-in period. However, any "certainty" and "predictability" associated with the proposed phase-in periods by no means equates to the statute's requirement for at least three model years of regulatory stability. To the contrary, it is generally understood that the proposal, if finalized, will be followed by an even more stringent set of standards designed to take effect immediately following the phase-in timeframe. [EPA-HQ-OAR-2010-0162-2705, pp.2-3]

The proposal ignores Congress' clear intent that NHTSA take the lead with respect to developing and implementing the standards at issue, while consulting with EPA and DOE as appropriate. Putting aside the efficacy of ignoring Congressional intent, the proposal poses several untoward, unintended, and unnecessary outcomes for dealerships that directly result from EPA's taking the lead instead. These potential outcomes are discussed in detail below. [EPA-HQ-OAR-2010-0162-2705, p.3]

Lastly, while Congress required NHTSA to consult with DOE and EPA, it did not specifically authorize DOE or EPA to regulate concurrently, let alone redundantly. Thus, NADA/ATD objects to provisions in the proposal that would create enforceable, redundant EPA mandates. Of course, this position in no way lessens ATD's support for the excellent work EPA and DOE have done and continue to do to promote and incentivize efficient freight operations through programs such as Smartway and SuperTruck, nor does it lessen ATD's support for the appropriate consultative application of EPA and DOE's expertise and experience. [EPA-HQ-OAR-2010-0162-2705, p.4]

Response:

The commenter is mistaken in its innuendo that section 102 of EISA explicitly or implicitly limits EPA's authority to promulgate GHG standards for heavy duty vehicles and engines. Indeed, EPA's duty to do so is mandatory following EPA's finding under CAA section 202 (a) (1) that certain enumerated greenhouse gases are an air pollutant which, taken in combination, endanger the public health and welfare and that the combined emissions of these GHGs from new motor vehicles and engines cause or contribute to that endangerment. See CAA section 202 (a)(1) which states that if EPA makes the endangerment finding, EPA "shall" prescribe standards to control the emissions from new motor vehicles and engines which which contribute to the endangerment. See also State of Massachusetts v. EPA, 549 U.S. 497, 533 (same). Moreover, the suggestion that section 102 of EISA implicitly repealed EPA's section 202 (a)(1) authority over greenhouse gases from the heavy duty sector is similar to the argument already rejected by the Supreme Court in State of Massachusetts v. EPA. See 549 U.S. at 529-30 (2007) ("[r]ather than relying on statutory text, EPA invokes postenactment congressional actions and deliberations it views as tantamount to a congressional command to refrain from regulating greenhouse gas emissions. Even if such postenactment legislative history could shed light on the meaning of an otherwise-unambiguous statute, EPA never identifies any action remotely suggesting that Congress meant to curtail its power to treat greenhouse gases as air pollutants"). The text of EISA section 102 does not evince any intent to restrict EPA's authority, and EPA is aware of no legislative history to that provision suggesting any such Congressional intent (nor does the commenter cite any such legislative history).

NHTSA has reviewed the comments on lead time under EPCA/EISA and believes that the regulatory schedule is consistent with the lead time requirement of 32902(k)(3). To clarify, NHTSA will not be imposing a mandatory regulatory program until 2016, and none of the voluntary standards will be "mandates." As described in later sections, the voluntary standards would only apply to a manufacturer if it makes the voluntary and affirmative choice to opt-in to the program.[3] Mandatory NHTSA standards will first come into effect in 2016, giving industry four full years of lead time.

As discussed in Section II of the preamble to the final rule, NHTSA's final standards follow different phase-in schedules based on differences between the regulatory categories. Consistent with NHTSA's statutory obligation to implement a program designed to achieve the maximum feasible fuel efficiency improvement, the standards increase in stringency based upon increasing fleet penetration rates for the available technologies. The NPRM proposed phase-in

[3] Prior to or at the same time that a manufacturer submits its first application for a certificate of conformity; see Section V below.

schedules aligned with EPA's, some of which followed pre-determined stringency increases. The NPRM also noted that NHTSA was considering alternate standards that would not change in stringency during the time frame when the regulations are effective for those standards that increased throughout the mandatory program. As described in Section II of the preamble, the final rule includes the proposed alternate standards for those standards that follow such a stringency phase-in path. Therefore, NHTSA believes that the final rule provides ample stability for each standard.

Each standard, associated phase-in schedule, and alternative standard implemented by this final rule was noticed in the NPRM, and no standards that were not noticed at the time of this rulemaking will take effect before 2019. This ensures that the standards in this rule will remain in effect for at least three years, providing the three full years of regulatory stability mandated under EPCA/EISA, and ensuring that manufacturers will not be subject to new or amended standards too rapidly. Therefore, NHTSA believes the commenters' concern about regulatory stability under EPCA/EISA is addressed in the structure of the rule.

Organization: National RV Dealers Association (RVDA)

The issue of non-commercial vehicles was addressed by Congress when it created the Energy and Independence Security Act of 2007 (EISA). By limiting the medium- and heavy-duty vehicle fuel consumption mandate to commercial trucks, EISA reflected and appropriately dealt with the important distinctions that exist between commercial and non-commercial vehicles. [EPA-HQ-OAR-2010-0162-1775.1, p.3]

RVDA recognizes that EPA is not bound by the EISA mandate, however, for the reasons discussed previously we believe that the rule will impact private individuals (purchasers of non-commercial vehicles) in a manner that is very different from the way in which it will impact commercial businesses and that it would therefore be inappropriate to extend the applicability of the requirements to non-commercial vehicles. [EPA-HQ-OAR-2010-0162-1775.1, p.4]

<u>Response:</u>

NHTSA notes that EISA does not rely on the word "commercial" in defining "commercial medium- and heavy-duty on-highway vehicle," but rather defines the category by weight only.[4]

---

[4] 49 U.S.C. 32902(k)(2). "Commercial medium- and heavy-duty on-highway vehicles" are defined as on-highway vehicles with a gross vehicle weight rating of 10,000 pounds or more, while "work trucks" are defined as vehicles rated between 8,500 and 10,000 pounds gross vehicle weight that are not MDPVs. *See* 49 U.S.C. §§ 32901(a)(7) and (a)(19).

In response to the RVDA comment, the agencies evaluated the payback of the vocational vehicle technologies to a typical RV user. As shown in Section 11 of this response to comments document, those fuel savings remain highly cost effective.

Organization: Navistar, Inc.

Title II of the Clean Air Act ("CAA") governs regulation of on-highway, heavy-duty engines and vehicles. In particular, according to EPA, the Proposed GHG Rule implements Section 202(a) of Title II of the CAA. That section requires EPA to "prescribe (and from time to time revise) . . . standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in [EPA's] judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health and welfare." 42 U.S.C. § 7521(a)(1). This general prescription is supplemented and qualified by additional provisions applicable to certain engines and vehicles that EPA seeks to regulate in the NPRM. Two such provisions are critical to the Proposed GHG Rule. [EPA-HQ-OAR-2010-0162-1871.1, p.3]

First, EPA emission standards for heavy-duty vehicles and engines must apply for no less than 3 model years (i.e., stability) and go into effect no less than 4 model years after promulgation (i.e., minimum statutory lead time). See 42 U.S.C. § 7521(a)(3)(C). As discussed below, the purpose of this statutory provision is two-fold – namely, heavy-duty manufacturers must have sufficient time to (i) design, test and produce engines and vehicles to meet any new or revised standards and (ii) recoup their capital investments toward compliance with new or revised standards. Although EPA might determine that more than 4 years of lead time is necessary for a particular rule, EPA has no discretion to ignore the minimum requirement. As noted below, the same requirement is imposed on NHTSA under the Energy Independence and Security Act of 2007 ("EISA"). [EPA-HQ-OAR-2010-0162-1871.1, p.3]

Second, independent of the minimum statutory lead time requirement, as EPA itself admits in the NPRM, "[e]mission standards set by EPA under CAA section 202(a)(1) ... must be based on a finding of technological feasibility." EPA is correct that "standards promulgated under CAA § 202(a) are to take effect only 'after providing such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.'" Even if EPA had the discretion to ignore the minimum 4-year lead time requirement (which it does not), EPA cannot base a finding of technological feasibility or any other finding in connection with agency action upon unsupported assumptions, rely on factors Congress did not intend, fail to consider important aspects of a problem, offer an explanation that runs counter to the evidence, or issue "implausible" decisions. [EPA-HQ-OAR-2010-0162-1871.1, pp.3-4]

<u>Response:</u>

As noted previously, the commenter is mistaken that section 202 (a)(3)(C) lead time requirements apply to a rule issued pursuant to section 202 (a)(1). Section 202 (a)(3)(C) establishes lead time requirements for "[a]ny standard promulgated or revised under this paragraph", referring to paragraph 3 of section 202 (a). Paragraph 3 applies only to standards addressing emissions of hydrocarbons, carbon monoxide, oxides of nitrogen (which, incidentally does not include nitrous oxide), and particulate matter. CO_2, N_2O and HFCs are not among these pollutants.

Organization: Navistar, Inc.

NHTSA is subject to similar statutory prescriptions that limit its authority. Congress directed, as in the CAA, that any fuel economy standard be subject to 4 model years of regulatory lead time and 3 model years of regulatory stability. See 49 U.S.C. § 32903(k)(3). Under EISA, as in the CAA, Congress tasked the Secretary of Transportation with the independent requirement of determining "how to implement a commercial medium- and heavy-duty on-highway vehicle and work truck fuel efficiency improvement program designed to achieve maximum feasible improvement." 49 U.S.C. § 32902(k)(2). Congress directed that any adopted "test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols [be] appropriate, cost-effective, and technologically feasible." [EPA-HQ-OAR-2010-0162-1871.1, p.4]

With this general legal framework in mind, it is clear that the Proposed GHG Rule in its current form does not meet the requirements for EPA under the CAA and/or for NHTSA under EISA for three independent reasons. First, the Agencies have failed to provide the required 4-year statutory minimum lead time and 3-year stability. Most importantly, even if the Agencies had the discretion to determine that the GHG Rule were technologically feasible in something less than 4 years (they do not), the CAA and EISA unambiguously require a minimum of 4-years. Second, for the reasons discussed below, and assuming (falsely) that the Agencies had the discretion to reach such a conclusion, the Proposed GHG Rule is not in fact "technologically feasible." Many of the Agencies' conclusions with respect to the emission and fuel economy standards, compliance provisions, program flexibilities, etc. are not supported by the current record and, thus, are arbitrary and capricious. Moreover, the foundation of the rule as proposed is urea fluid-based Selective Catalyst Reduction ("SCR"), which is itself an infeasible technology for NOx control. A proposed GHG standard that is feasible – EPA claims – only because CO_2 can be controlled by violating the NOx standard is by definition infeasible (and is also illegal in that it promotes continuing violation of an existing emission standard or a changed standard without rulemaking).

Response:

The commenter is mistaken in its assertion that use of SCR causes engines to violate NOx standards and therefore renders the heavy duty standards infeasible. This issue is addressed in responses to comments maintaining that EPA has selected an improper baseline engine for developing MHD and HHD engine standards because the baseline includes use of SCR. See also section II of the preamble to the final rule.

Organization: Navistar, Inc.

Third, as also discussed below, some of the proposed regulations are contrary to constitutional right, power, privilege or immunity. These provisions would be invalid even if the Agencies had complied with the minimum statutory lead time requirements and even if the Proposed GHG Rule were technologically feasible. For all these reasons, the Proposed GHG Rule is in excess of the Agencies' authority. [EPA-HQ-OAR-2010-0162-1871.1, pp.4-5]

At various points in the proposed standard, the rules envision that EPA will make findings and take determinations impacting certifications and ABT credits. The process set out in the proposed regulations, however, does not adequately comport with due process requirements required for certificates and ABT credits. [EPA-HQ-OAR-2010-0162-1871.1, p.44]

The Due Process Clause of the Fifth Amendment requires notice and opportunity for a hearing before an agency action may deprive a party of an identifiable property interest. For many of EPA's proposed provisions, however, it is not explicitly provided that a manufacturer may seek a hearing on an EPA decision, even when the decision is of major consequence to the manufacturer and potentially to third parties. One stunning example of this is the absence of any express provision allowing a hearing on the voidance of a certificate for a credit shortfall. Although from other proposed provisions it appears that EPA's intent is to provide a hearing in these circumstances, the proposed rules must be made clear that a hearing will be provided. This could include, for example, a revision in the language of proposed subpart 1036.750(d) to make it more clear that a hearing will be provided if EPA seeks to void a certificate for any reason in proposed subpart H and/or a similar revision in the language of proposed subpart 1036.255. [EPA-HQ-OAR-2010-0162-1871.1, p.44]

Even where the opportunity to request a hearing is provided, the rules are too limited. For instance, other CAA programs, including ABT credit programs, correctly provide the opportunity for a hearing before the revocation/suspension of a certificate becomes effective. This is what the law requires, but nearly identical provisions in the proposed rules suggest a hearing will only be offered, if at all, after the decision to revoke or suspend has already been made. This procedure does not comport with due process requirements, which generally requires the opportunity for a hearing before the revocation or suspension at issue takes effect. EPA employs this process in other ABT programs and must also do so here. [EPA-HQ-OAR-2010-0162-1871.1, p.45]

Moreover, providing a hearing before actual suspension or revocation would correct other procedural defects created by EPA's currently proposed rules. For instance, EPA gives itself the discretion to deny a hearing and only allows a hearing if a request "raises a substantial factual issue." This is not legally appropriate in this context. There are many situations where a manufacturer may differ with EPA's interpretation of a rule, rather than raising a factual issue. EPA cannot afford process simply to factual issues and give itself the last word on every other decision point. Does this mean that EPA's legal findings are only subject to challenge by filing an action in the U.S. Court of Appeals? Moreover, if the decision to revoke has already been made as the proposed rules suggest, is that decision stayed during the pendency of the hearing? It appears that EPA's rules create the chance of parallel proceedings if there is both a substantial issue of fact and one of regulatory interpretation or if the revocation takes effect before any hearing is actually provided. In either case, a manufacturer would be required to pursue judicial review in order to preserve its rights under the CAA and administrative law. That certainly cannot be EPA's intent or goal, and the language of the proposed rules should be changed. [EPA-HQ-OAR-2010-0162-1871.1, pp.45-46]

Response:

As proposed, §§1036.255(f) and 1037.255(f) state that manufacturers may request a hearing if we void a certificate.

Organization: Navistar, Inc.

As discussed throughout these comments, there are a number of unduly burdensome reporting and recordkeeping provisions that EPA and NHTSA are proposing, particularly where these requirements stem from duplication and overlap between EPA's and NHTSA's rules. EPA and NHTSA acknowledge and recognize the special compliance problems created by their "joint" rulemaking. The very Supreme Court case affirming EPA's authority to regulate GHGs under the CAA relied on the presumption that EPA and NHTSA would not subject manufacturers to "inconsistency" in their regulatory regime. Neither agency has authority to propose reporting and recordkeeping requirements that are duplicative or overly burdensome. [EPA-HQ-OAR-2010-0162-1871.1, p.46]

In this case, EPA and NHTSA estimate that the "total annual information collection burden" from the proposed regulations will be 25,052 hours. This collection burden includes the "time, effort, or financial resources expended by persons to generate, maintain, retain, or disclose or provide information to or for a Federal agency." Spread equally over the 34 heavy-duty vehicle and engine manufacturers the Agencies expect to be affected, this amounts to over 730 hours, spent annually, by each affected manufacturer to comply with just the new rules. (EPA's and NHTSA's estimates do not include the time already spent by such manufacturers to comply with other mobile source regulations.) The Agencies have severely underestimated the time manufacturers will need to spend to comply, but even their estimated time commitment is extremely significant. [EPA-HQ-OAR-2010-0162-1871.1, p.46]

The Agencies must eliminate excessive reporting and recordkeeping requirements that exist from duplication and overlap in the joint programs. These include requirements relating to the submission of certification applications, ABT reports, preliminary and final compliance reports, and voluminous record-keeping obligations. The engine-related submission requirements are found at proposed subparts 1036.205, 1036.210, 1036.225, 1036.250, 1036.725, 1036.730, 1036.735, 1036.755, and 1036.825. The vehicle-related submission requirements are found at proposed subparts 1037.201, 1037.205, 1037.210, 1037.225, 1037.250, 1037.725, 1037.730, 1037.735, 1037.755, and 1037.825. And the submission requirements for NHTSA are found at proposed subpart 535.8. [EPA-HQ-OAR-2010-0162-1871.1, pp.46-47]

In sum, Navistar supports a "joint" rulemaking between EPA and NHTSA, including a coordinated framework and structure for compliance with the proposed regulations. However, EPA and NHTSA cannot require manufacturers to expend time, effort, and financial resources to meet overly burdensome reporting and recordkeeping requirements. [EPA-HQ-OAR-2010-0162-1871.1, p.47]

Response:

The agencies have eliminated the duplication of reporting and recordkeeping requirements for the final rulemaking. In addition, the agencies have significantly increased the burden estimate for the final rulemaking.

Organization: Navistar, Inc.

As EPA acknowledges in the preamble, it has proposed a "very aggressive" timeline for implementation of the proposed standards. By the time the final rule is promulgated, not in any case before summer 2011, the standards will come into effect in far less than 4 years from their proposed effective date in MY 2014. Manufacturers will be in MY 2012 by the time the rules are promulgated, leaving only one model year lead time. Additionally, other heavy-duty emission standards (i.e., on-board diagnostic requirements) are scheduled to become effective in MY 2013, thus providing only one model year of stability between standard changes. As a result, the proposed rule falls far short of the required lead time and stability minimums. [EPA-HQ-OAR-2010-0162-1871.1, p.52]

The CAA expressly addresses lead time and stability when it comes to emission standards for heavy-duty vehicles and engines. Section 202(a)(3)(C) provides that "[a]ny standard promulgated or revised under the paragraph ... shall apply for a period of no less than 3 model years beginning no earlier that the model year commencing 4 years after such revised standard is promulgated." 42 U.S.C. § 7521(a)(3)(C). Congress determined that 4 model years of lead time was the adequate amount of time for heavy-duty engine and vehicle manufacturers to design, test and produce engines and vehicles to meet any new or revised standards. See, e.g., 95 Cong. Conf. Report H. Rept. No. 564, at 163 (discussing 4-year lead time). Congress also determined that 3 model years of stability was the time needed between changes in any emission standards in order to allow manufacturers to recoup their investment toward compliance with the emission standards. Courts have not looked favorably on past attempts to evade these Congressionally mandated requirements. See, e.g., NRDC v. Thomas, 805 F.2d 410, 434-37 (D.C. Cir. 1986) ("[I]t is Congress itself that has refused to give the agency any leeway in adjusting deadlines ... ."). [EPA-HQ-OAR-2010-0162-1871.1, pp.52-53]

EPA does not directly address Section 202(a)(3)(C), but it appears that EPA's position is that the CAA's 4-year lead time and 3-year stability requirements do not apply to GHG pollutants. By contrast, NHTSA's proposed fuel consumption standards – which EPA itself admits are simply the opposite side of the same GHG coin – do follow Congress' instruction in the EISA on a minimum 4-year lead time and 3-year stability and are not effective until MY 2017. Navistar aggress that the standards can take effect no sooner than MY 2017. The statutory text and the clear intent of Congress foreclose EPA's reading of the Act. [EPA-HQ-OAR-2010-0162-1871.1, p.53]

Section 202(a)(3)(C) nowhere limits the statutorily prescribed lead time and stability requirements for heavy-duty engine and vehicles to any prescribed type or list of "air pollutants." Rather, CAA § 202(a)(3)(C) applies the 4-year lead time and 3-year stability requirements to any new or revised emission "standard" pertaining to heavy-duty vehicles and engines adopted under CAA 202(a).

Response:

This is incorrect. Section 202 (a)(3) (C) applies to "[a]ny standard promulgated or revised under this paragraph", which unambiguously refers to paragraph (3). The pollutants covered by paragraph (3) are enumerated in subparagraph (3)(A) and do not include the greenhouse gases CO2, N2O, or HFCs.

Organization: Navistar, Inc.

When enacted in 1977 and reaffirmed in 1990, Congress clearly intended that 4 years was the necessary lead time for heavy-duty vehicle and engine manufacturers to respond to new or revised emission standards and 3-years was the necessary time for such manufacturers to recoup their investment before any change to the standards. This reasoning is equally true for EPA's proposed standards for GHGs. It is no easier for manufacturers to develop and deploy emission control technology for CO2 than it is for NOx, CO, PM, or HC. Thus, there not only is no CAA language limiting the "air pollutants" to which Section 202(a)(3)(C) applies, but any such reading would be irrational under the statutory language and the Congressional goals and policies of the Act. [EPA-HQ-OAR-2010-0162-1871.1, p.53]

Response:

The commenter is again incorrect. The record for each of the standards indicates why there is sufficient time for standards to apply starting in MY 2014 (for those standards for which that is the initial model year of compliance). Indeed, many industry commenters agreed there was sufficient lead time for the MY 2014 standards.

Organization: Navistar, Inc.

Moreover, Section 202(a)(3)(C) specifically refers to 202(a)(3)(B) which authorizes EPA to "promulgate regulations under [202(a)(1)] revising any standard promulgated under, or before the date of, the enactment of the Clean Air Act Amendments of 1990 (or previously revised under this subparagraph) and applicable to classes or categories of heavy-duty vehicles or engines." Section 202(a)(1), of course, refers to any "air pollutant." As a result, under Section 202(a)(3)(C), any change to a previously promulgated standard (e.g., reducing NOx from 1.25g to 0.2g) or any addition of a new emission standard that did not exist before (e.g., adding CO2) is a "revision" of the standards and requires 4-years lead time and 3-years stability. The term "standard" as used in Section 202(a)(3)(C) clearly refers to emissions of all types of "air pollutants" rather than any limited list. See NRDC, 805 F.2d at 434-37 (holding revisions to heavy-duty standards require 4 model years of lead time); see also Engine Mfg. Ass'n. v. South Coast Air Quality Mgmt. Dist., 541 U.S. 246 (2004) (holding that "a standard is a standard" and is not limited in the Act).137 And, nothing in the legislative history suggests that Congress meant to limit lead time and stability to specific pollutants as distinguished from CAA § 202(a) emission "standards" generally. [EPA-HQ-OAR-2010-0162-1871.1, pp.53-54]

Response:

EPA disagrees. Section 202 (a)(3)(B) is still a part of paragraph (3) of section 202 and so applies only to those pollutants covered by paragraph (3): hydrocarbons, carbon monoxide, NOx and PM (i.e. criteria pollutants). The reference to paragraph (1) in section 202 (a)(3)(B) to which the commenter refers thus refers to revisions under paragraph (1) which revises standards for one or more of those pollutants. Not only is this the literal sense of the statutory language, but also fits better the idea of a "revised" standard. The standards in today's final rules are new. They do not change, alter, modify, or , in a word, revise any previous standard for the heavy duty sector.

Organization: Navistar, Inc.

If there were any confusion, Congress clearly resolved it when it enacted EISA. Congress spoke directly to the lead time and stability it believed was necessary in order for heavy-duty vehicle and engine manufacturers to comply with the new GHG controls and recoup their investment. See 49 U.S.C. § 32902(k)(3). As in the CAA, Congress made a special distinction for heavy-duty vehicles and engines, recognizing the unique characteristics and issues applicable to commercial vehicles and engines that requires mandatory lead time and stability. Not surprisingly, the language of EISA exactly tracks the requirements of the CAA, providing 4 years of lead time and 3 years of stability. Id. And, as demonstrated throughout the “joint” proposal, EPA’s emission standards and NHTSA’s fuel consumption standards are essentially identical, which the Agencies themselves readily admit. See, e.g., NPRM at 74,157 (“The technologies available for improving fuel efficiency and therefore for reducing both CO2 emissions and fuel consumption, are one and the same.”); see also id. at 74,177 (“NHTSA’s fuel consumption standards, ... would contain voluntary engine standards starting in 2014 model year, with mandatory engine standards starting in 2017 model year, harmonized with EPA’s 2017 model year standards.”). [EPA-HQ-OAR-2010-0162-1871.1, p.54]

Response:

As noted in response to the comment from NADA, EPA does not view section 102 of EISA as implicitly or explicitly limiting EPA’s authority under section 202 (a)(1) of the CAA.

Organization: Navistar, Inc.

Congress intended that any GHG emission standard EPA promulgated would be subject to a 4-year lead time and 3-year stability under the Clean Air Act. Cf. Massachusetts, 549 U.S. at 532 (holding EPA’s regulatory authority to regulate GHG emissions under the Clean Air Act is premised on assumption that EPA and NHTSA will avoid inconsistency). For all practical purposes, EPA’s proposed GHG emission standards are the functional equivalent of NHTSA’s fuel consumption standards from the standpoint of the manufacturers required to implement the standards – that is, the GHG emission and fuel consumption standards essentially govern the same behavior. As a result, anything less than 4 model years of lead time and 3 years of stability for EPA’s proposed standards would render EISA’s statutory requirements superfluous and allow the Agencies to evade – as they propose to do here – the legislative scheme and mandated timeline put in place by Congress. Clearly, that was not the result that Congress intended. [EPA-HQ-OAR-2010-0162-1871.1, p.55]

If one considers all of the deadlines currently faced by heavy-duty engine and vehicle manufacturers, there are as many as four different major regulatory compliance deadlines within only a five-year period, as illustrated in the Figure 1. [EPA-HQ-OAR-2010-0162-1871.1, p.55]

[Figure 1 can be found on page 55 of this comment.]

This occurs on the heels of the major emissions cap phase-in for NOx in 2010. Clearly, the cumulative burden on manufacturers to deal with changing regulations phased in such a short period of time is very substantial and is something that must be considered by EPA. As noted above, any change to a previously promulgated standard or any addition of a new emission standard requires 4 model years of lead time and 3 model years of stability. *See supra* at Part VII.F. Congress sought to preclude the very situation Figure 1 reflects. [EPA-HQ-OAR-2010-0162-1871.1, p.55]

<u>Response:</u>

The agencies have included provisions in the final rulemaking that provide manufacturers with the option to align the timing of the CO_2 emissions and fuel consumption standards for engines with the existing requirements for OBD. The agencies received comments from other engine manufacturers, such as Cummins and Daimler, who supported the 2014 model year engine standards. See Section 6.2.2.2 of this response to comments document.

Organization: Navistar, Inc.

It is also important to note that manufacturers have a built-in incentive to bring fuel economy improvements to market on their own if available in advance of a regulatory deadline. Customers for commercial vehicles are highly sensitive to fuel economy improvements and the incentives created by those customer preferences are substantial. However, regulatory deadlines that are too aggressive can punish manufacturers who may invest somewhat more time in developing what may well be superior technologies. [EPA-HQ-OAR-2010-0162-1871.1, pp. 55-56]

<u>Response:</u>

As detailed in Section III of the preamble to the final rule, the agencies have considered the appropriateness, cost-effectiveness, and technological feasibility of the standards for each regulatory category in designing a program to achieve the appropriate and maximum feasible fuel efficiency improvement.

With respect to EPCA/EISA, NHTSA has reviewed the comments on lead time and believes that the regulatory schedule is consistent with the lead time requirement of 32902(k)(3). To clarify, NHTSA will not be imposing a mandatory regulatory program until 2016, and none of the voluntary standards will be "mandates." The voluntary standards would only apply to a manufacturer if it makes the voluntary and affirmative choice to opt-in to the program.[5] The voluntary period of 2014 and 2015 will provide manufacturers with the flexibility to prepare for the imposition of standards in 2016 and the potential to earn compliance credits, in accordance

---

[5] Prior to or at the same time that a manufacturer submits its first application for a certificate of conformity; see Section V below.

with their varied business practices and timelines. Mandatory NHTSA standards will first come into effect in 2016, giving industry four full years of lead time.

Organization: Pacific Legal Foundation

We address four issues regarding the proposed regulations. First, the proposed regulations must be submitted to EPA's Science Advisory Board ('SAB') for review during the public comment period, pursuant to 42 U.S.C. § 4365. In addition, the preamble to the final regulations should set forth in detail the time and circumstances of EPA's submittal of the proposed regulations to SAB, as well as any comments provided by SAB, whether EPA made changes to the proposed rules in response to such comments, and why or why not. [EPA-HQ-OAR-2010-0162-1604.1, p.2]

Second, EPA must comply with the special rulemaking provisions of 42 U.S.C. § 7607(d) in connection with the promulgation of the proposed regulations. Among other things, that subsection of the Clean Air Act sets forth detailed requirements for EPA's 'promulgation ... of regulations under section 202' of the Clean Air Act. Because EPA is promulgating the regulations under section 202(a)(l) of the Clean Air Act, the regulations are subject to the special rulemaking requirements of 42 U.S.C. § 7607(d). EPA must document in detail in the preamble to the final HDEV regulations the precise manner in which it has complied (or not complied) with such requirements. [EPA-HQ-OAR-2010-0162-1604.1, p.2]

Fourth, EPA has provided legally insufficient justification for its failure to follow the detailed recommendations of the National Academy of Sciences in connection with the HDEV rules. Accordingly, EPA must reopen the public comment period and either adopt the recommendations of the National Academy of Sciences or provide legally sufficient justification for not adopting them. [EPA-HQ-OAR-2010-0162-1604.1, p.3]

The remainder of this letter sets forth in detail the reasons Peanuts perform the four actions summarized above. [EPA-HQ-OAR-2010-0162-1604.1, p.3]

SAB was created as an independent scientific review board to give an assurance of credibility to EPA's scientific determinations. 40 C.F.R. § 1.25(c) (SAB's mission is to provide 'expert and independent advice to the [EPA] on the scientific and technical issues facing the Agency' and to assist EPA 'in identifying emerging environmental problems.'); id., see also Joe G. Conley, Note, Conflict of Interest and the EPA's Science Advisory Board, 86 Tex. L. Rev. 165, 168 (2007) ('Congress established the EPA Science Advisory Board in 1978 to provide independent scientific and technical advice to the EPA.'). [EPA-HQ-OAR-2010-0162-1604.1, pp.3-4]

The SAB statute provides that, at the time EPA proposes any 'criteria document, standard, limitation, or regulation under the Clean Air Act,' it 'shall make available' the proposal to the SAB, 'together with relevant scientific and technical information in the possession of the [EPA] on which the proposed action is based.' 42 U.S.C. § 4365(c)(1). This is a nondiscretionary requirement for all EPA Clean Air Act 'standards' and' regulations.' American Petroleum Institute v. Costle, 665 F.2d 1176, 1188 (D.C. Cir. 1981), cert. denied, 455 U.S. 1034 (1982). The proposed HDEV regulations constitute not only proposed 'standards' but also proposed 'regulations' covered by 42 U.S.C. § 4365(c)(1). [EPA-HQ-OAR-2010-0162-1604.1, p.4]

The HDEV proposal is a 'standard' because it is being proposed by EPA under 42 U.S.C. § 7521(a) ('The [EPA] Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.') (emphasis added). In it's preamble to the proposed regulations, EPA specifically refers to the proposed regulations as 'proposed carbon dioxide (CO[2]) emissions standards,' 42 Fed. Reg. at 74,152 (emphasis added), and admits that the standards are being proposed under 42 U.S.C. § 7521(a). 42 Fed. Reg. at 74,170.n.31. [EPA-HQ-OAR-2010-0162-1604.1, pp.4-5]

The HDEV proposal is a 'regulation' because, when promulgated, it will have the force of law. A regulation, also known as a legislative rule, is 'an agency statement of general or particular applicability and future effect designed to ... prescribe law or policy.' 5 U.S.C. § 551(4). Thomas v. New York, 802 F.2d 1443, 1445-47 (D.C. Cir. 1986), cert. denied, 482 U.S. 918 (1987); Appalachian Power Co. v. EPA, 208 F.3d 1015, 1024-25 (D.C. Cir. 2000); William Funk, When Is a 'Rule' a Regulation? Marking a Clear Line Between Nonlegislative Rules and Legislative Rules, 54 Admin. L. Rev. 659, 660 n.7 (2002) (rules are regulations when they have the force of law); see generally Richard J. Pierce, Administrative Law Treatise, Chapter 6 (2002); see also Peter L. Strauss, Publication Rules in the Rulemaking Spectrum: Assuring Proper Respect for an Essential Element, 53 Admin. L. Rev. 803, 804 n.1 (2001) (legislative rules constitute 'regulations'). See also 2 U.S.C. § 658(10) (legislative rules are the equivalent of regulations). Here, the proposed regulations, when finalized under the detailed rulemaking requirements of the Clean Air Act, would be 'generally applicable' to manufacturers, distributors, and users of heavy and medium duty engines and vehicles and would prescribe enforceable legal requirements on them, thereby constituting legally binding regulations. United States v. Mead Corp., 533 U.S. 218, 230 (2001) ('Congress contemplates administrative action with the effect of law when it provides for a relatively formal administrative procedure tending to foster the fairness and deliberation that should underlie a pronouncement of such force.'). [EPA-HQ-OAR-2010-0162-1604.1, pp.5-6]

The SAB statute requires that proposed standards and regulations be 'made available' to SAB by EPA 'at the time' such proposals are made available to other federal agencies 'for formal review and comment.' Such formal review and comment occurs during the public comment period on proposed regulations, when federal agencies as well as the general public are given the opportunity to comment. Lead Industries Ass 'n v. EPA, 647 F.2d 1130, 1137 (D.C. Cir. 1980); American Petroleum Institute, 665 F.2d at 1188. Accordingly, EPA must submit the proposed regulations to SAB within a reasonable amount of time before the close of the comment period to allow the SAB an opportunity to make available 'its advice and comments [to EPA] on the adequacy of the scientific and technical basis of the proposed ... standard[s] ... or regulation[s].' 42 U.S.C. § 4365(c)(2). If EPA does not do so before the close of the public comment period, it must reopen the public comment period before promulgating the proposed regulations. American Petroleum Institute, 665 F.2d at 1188 ('The language of the statute indicates that making a proposed ... standard available to the SAB for comment is mandatory ....'). [EPA-HQ-OAR-2010-0162-1604.1, p.6]

One of the commenters joining in this comment letter (Pacific Legal Foundation) filed a Freedom of Information Act request asking EPA whether it had submitted the Light Duty Vehicle Rule to SAB during the public comment period on that rule. See generally 75 Fed. Reg. 25,324 (May 7, 2010) (the 'LDVR'). EPA's response indicated that it had not. For the reasons set forth above, EPA's failure to submit the proposed LDVR to the SAB was a violation of 42 U.S.C. § 4365(c)(1). In reviewing the preamble and background documents to the instant proposed regulations, the commenters did not see any indication that EPA submitted, or intended to submit, the proposed regulations to SAB for review during the comment period. The commenters hereby put EPA on notice that EPA's failure to submit the proposed regulations to the SAB would constitute an actionable violation of 42 U.S.C. § 4365(c)(l). [EPA-HQ-OAR-2010-0162-1604.1, pp.6-7]

Response:

The commenter states that EPA is required to "submi[t]" the proposed regulations to EPA's Science Advisory Board "during the public comment period". (Comments of Pacific Legal Foundation p. 2.) The commenter states that this requirement comes from 42 USC section 4365 (c), which provides that "[t]he Administrator, at the time any proposed criteria document, standard, limitation, or regulation under the Clean Air Act ,,, is provided to any other Federal agency for formal review and comment, shall make available to the Board such proposed criteria document, standard, limitation, or regulation, together with relevant scientific and technical information in the possession of the Environmental Agency on which the proposed action is based."

The commenter is correct that section this provision applies to the proposed heavy duty greenhouse gas standards. However, the commenter assumes (without explanation) that the provision requires that EPA "submit" the proposed regulation to the SAB, whereas the statute requires EPA to "make available" to the SAB the proposed regulation and supporting technical information. Documents are made available when they are "accessible" or "obtainable". Webster's New Collegiate Dictionary (definition of "available"). EPA made the proposed rule and underlying support documents accessible and obtainable by publication of the proposed rule in the Federal Register, and by posting all of the scientific and technical support documents on the web at http://www.epa.gov/otaq/climate/regulations.htm. EPA is aware that the D.C. Circuit, in holding that EPA had not made available a proposed regulation to the SAB stated that EPA had not "submitted" the proposed regulation to the Board. American Petroleum Inst. v. EPA, 665 F. 2d 1176, 1189 (D.C. Cir. 1981). This case, however, antedated the present period of instantaneous availability of documents via electronic dissemination. EPA believes that by publishing and posting the proposed regulation and the scientific and technical support documents those materials have been made available to the SAB.

EPA does agree with the commenter regarding the timing of the requirement to make documents available. Since the only regulations subject to the provision are those which have been "proposed", the provision on its face does not apply to pre-proposal documents. Moreover, pre-proposal documents would ordinarily be deliberative and hence not subject to disclosure, but the SAB is a Federal Advisory Committee governed by the Federal Advisory Committee Act, meaning that all of its deliberations are typically public as are documents under the SAB's review. Submitting deliberative (i.e. pre-proposal) documents would thus be in tension with the FACA disclosure requirements, reinforcing the view that section 4365 © applies after regulations have been proposed.

EPA notes further that the commenter has made no claim that "there is a substantial likelihood that the rule would have been significantly changed" if EPA had physically submitted the proposed regulation and supporting materials to the SAB, or otherwise expressly notified the Board. See CAA section 307 (d)(8). Yet it is the commenter's burden to do so. See, e.g. <u>Union Oil Co. v. EPA</u> , 821 F 2d at 684 and n. 5 (DC Cir 1986); <u>George Warren Corp. v. EPA,</u> 159 F. 3d at 626 (DC Cir. 1988). Moreover, no such assertion would be credible. The proposed rule is consistent with, and based in part on the advice and recommendations of the National Academy of Science, which produced a report on MD/HD truck fuel economy pursuant to section 108 of the Energy Independence and Security Act (codified at 49 USC section 32902 (k)). See 75 FR at 74351-356 summarizing the findings and recommendations of the March 2010 NAS Report and an issue-by-issue summary of EPA's and NHTSA's response. Under these circumstances, the NAS Report is a functional proxy for SAB review. We note further that the proposed rule does not present issues of cutting-edge science, but rather deals with technical engineering determinations of control technology effectiveness and cost. Under these circumstances, EPA does not believe that physical submission of the proposed rule to the SAB would have resulted in a significant change in the rule. See <u>API v. EPA</u>, 665 F. 2d at 1189, where the court held that it was harmless error for EPA not to have "submitted" a proposed rule to SAB for review where the SAB had reviewed underlying criteria on which the rule was based, and the rule was otherwise well supported in the administrative record. Here, the NAS Report is analogous to the SAB review of criteria in <u>API</u>, and, as in <u>API,</u> the final rule is fully supported in the record (the commenter made no claim that the proposed rule lacked technical foundation or otherwise lacked record support).

Organization: Pacific Legal Foundation

42 U.S.C. § 7607(d)(2)-(7) sets forth rulemaking procedures with which EPA must comply in promulgating a variety of regulations under the Clean Air Act. Included among the types of regulations subject to such rulemaking procedures are rules promulgated under 42

U.S.C. § 7521, known as section 202 of the Clean Air Act. 42 U.S.C. § 7607(d)(l)(K). The HDEV regulations are being promulgated by EPA under 42 U.S.C. § 7521. Accordingly, the rulemaking procedures set forth in 42 U.S.C. § 7607(d)(2) apply to the HDEV regulations. [EPA-HQ-OAR-2010-0162-1604.1, p.7]

Response:

EPA has satisfied all requirements under section 307 (d) of the Act, as noted below.

Organization: Pacific Legal Foundation

The rulemaking provisions set forth numerous procedural requirements, which may be summarized as follows:

1. EPA must establish a rulemaking docket no later than the date of proposal. 42 U.S.C. § 7607(d)(2).

Response:

EPA has done so. See 75 FR at 74152/3.

Organization: Pacific Legal Foundation

2. The proposal must be published in the Federal Register, with a statement of the rule's basis and purpose, the public comment period, the docket number, the docket location, the times available for public inspection, the factual data supporting the proposal, the methodology used in obtaining the data and analyzing the data, the major legal interpretations and policy considerations underlying the proposed rule, a summary of findings of the Scientific Review Committee established under 7409 (d) and the National Academy of Sciences, and reasons why the proposal differs from their recommendations. 42 U.S.C. § 7607(d)(3).

Response:

All information regarding docketing appears at 75 FR 74152/3. The preamble to the proposed rule supplies the basis and purpose of the proposed rule, as well as its methodology, and factual underpinnings, and a description of the legal authorities on which the proposed rule is based. See, e.g 75 FR at 74155-172, as well as the draft RIA to the proposed rule. However, the “Scientific Review Committee established under 7409(d)” refers exclusively to actions establishing National Ambient Air Quality standards and consequently is inapplicable here. The commenter is thus incorrect in its reference to section 307(d)(3).

Organization: Pacific Legal Foundation

3. Requirements regarding public inspection of the rulemaking docket contents, and miscellaneous requirements regarding docket contents, including specific requirements regarding EPA's interaction with the Office of Management and Budget regarding the rule. 42 U.S.C. § 7607(d)(4). [EPA-HQ-OAR-2010-0162-1604.1, p.8]

Response:

EPA has done so. The docket for the proposed rule contains the materials submitted by EPA to OMB as part of the interagency review process, as well as interagency comments received on that draft rule. See docket #EPA-HQ-OAR-2010-0162-0336, 0337, 0339, 0340, 0341, 0342, 0358, and 0359.

Organization: Pacific Legal Foundation

4. EPA must provide opportunity for both oral and written presentations and comments. 42 U.S.C. § 7607(d)(5).

Response:

EPA has done so. This commenter’s comment, pursuant to that notice, serves as an example.

Organization: Pacific Legal Foundation

5. The promulgated rule must be accompanied by a statement of basis, an explanation of any major changes from the proposed rule, and a response to each significant comment, criticism, or new data presented in written or oral form during the comment period, and may not be based on any information or data which had not been placed in the docket as of the date of promulgation. 42 U.S.C. § 7607(d)(6). [EPA-HQ-OAR-2010-0162-1604.1, p.9]

Response:

EPA has complied with these requirements as well.

Organization: Pacific Legal Foundation

These detailed and carefully crafted procedural safeguards were put in place by Congress to insure sound EPA rulemaking and to give the public an effective opportunity for participation in the regulatory process. Sierra Club v. Castle, 657 F.2d 298,398 (D.C. Cir. 1981). Congress created these special rulemaking procedures because it was concerned that the Administrative Procedure Act 'did not provide procedures adequate for the complex scientific issues involved in EPA rulemaking.' Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d506, 518 (D.C. Cir. 1983). Moreover, EPA is obligated to follow the procedures strictly, even if it believes it has good reason for not so doing. Id. at 521-23. Although 42 U.S.C. § 7607(d)(9)(D) allows courts to reverse a rule based on procedural errors only when the errors are of 'such central relevance ... that there is a substantial likelihood that the rule would have been significantly changed if such errors had not been made' this is not a carte blanche to EPA to ignore the procedures. Small Refiner Lead Phase-Down Task Force v. EPA, 705 F.2d at 521, 523 ('At a minimum, failure to observe the basic APA procedures, if reversible error under the APA, is reversible error under the Clean Air Act as well.') (emphasis added); Sugar Cane Growers Coop. of Fla. v. Veneman, 289 F.3d 89,96 (D.C. Cir. 2002) ('[A]n utter failure to comply with notice and comment [under the APA] cannot be considered harmless if there is any uncertainty at all as to the effect of that failure.') (emphasis added). Indeed, failure to follow the rulemaking procedures of 42 U.S.C. § 7607(d) is reversible error under the 'central relevance/substantial likelihood' test where the failure raises uncertainty as to whether the rule would have been different had the proper procedure been followed. Kennecott Corp. v. EPA, 684 F.2d 1007, 1018-19 (D.C. Cir. 1982) ('In all the circumstances, EPA's failure to include such documents [as required by 42 U.S.C. § 7607(d)] constitutes reversible error, for the uncertainty that might be clarified by those documents ... indicates a 'substantial likelihood' that the regulations would 'have been significantly changed.") (emphasis added). [EPA-HQ-OAR-2010-0162-1604.1, pp.9-10]

Given these congressional mandates and judicial interpretations, EPA must ensure that both the public and reviewing courts are provided reasonable opportunities to determine the extent to which EPA has complied, or not complied, with the procedural requirements of 42 U.S. C. § 7607(d). Because a regulatory preamble is the mechanism by which administrative agencies detail the reasons supporting, the bases of, and the procedures followed in promulgating a regulation, it is imperative for EPA to set forth clearly in the preamble to the final HDEV rules the precise manner in which EPA has (or has not) complied with the procedural requirements of 42 U.S.C. § 7607(d). [EPA-HQ-OAR-2010-0162-1604.1, p.20]

Response:

Section 307 (d) does not contain any requirement to develop the type of punchlist the commenter suggests. EPA has fully documented throughout the record its compliance with the procedural requirements of section 307 (d) and no other commenter suggested that there were any procedural deficiencies with that record.

Organization: Pacific Legal Foundation

Significantly, many of the procedural requirements at issue here state explicitly that EPA will document in the rule itself the manner in which EPA is complying or will comply with 42 U.S.C. § 7607(d). For example, 42 U.S.C. § 7607(d)(3)(C) requires EPA to include in the proposed rule a 'statement of basis and purpose,' which 'shall ... set forth or summarize and provide a reference to any pertinent findings, recommendations, and comments of the Scientific Review Committee established under section 109(d) ... and, if the proposal differs in any important respect from any of these recommendations, an explanation of the reasons for such differences.' The commenters have not seen any mention in the rule's 'statement of bases and purpose,' which is included in the preamble, of the extent to which the Scientific Review Committee was given the opportunity to review the proposal prior to publication in the Federal Register, let alone whether the proposal differs from any recommendations that may have been made.

Response:

As noted above, this provision applies only to determinations of whether to revise a National Ambient Air Quality Standard and so does not apply here.

Organization: Pacific Legal Foundation

The 'utter failure' of the proposed rule to address the procedural requirement set forth in 42 U.S.C. § 7607(d)(3)(C) constitutes reversible error under Sugar Cane and Kennecott. If for no other reason, then for this reason alone EPA must suspend rulemaking activities until it documents in the preamble its compliance with the requirements of 42 U.S.C. § 7607(d)(3)(C) regarding the Scientific Review Committee and provides the public with opportunity to comment thereon. [EPA-HQ-OAR-2010-0162-1604.1, p.11]

The fact that 42 U.S.C. § 7607(d)(7) provides that the 'record for judicial review shall consist exclusively' of material set forth in 42 U.S.C. § 7607(d) is yet another reason why it is crucial that EPA carefully document in the preamble its compliance with the procedural requirements. Otherwise, neither the public nor courts will have a solid basis upon which to determine the extent to which EPA has complied with the procedural requirements. Accordingly, EPA must devote a section of the preamble to document its compliance with the procedural requirements set forth in 42 U.S.C. § 7607(d), just as it documents its compliance with a variety of other legal requirements in the preamble to the proposed regulations. In this regard, there is no justifiable reason for EPA to treat the requirements of 42 U.S.C. § 7607(d) any differently than the requirements of the National Environmental Policy Act, the Paperwork Reduction Act, the Regulatory Flexibility Act, the Unfunded Mandates Reform Act, the National Technology

Transfer Advancement Act, or a plethora of executive orders, all of which are discussed in detail in seriatim in the preamble to the proposed regulations. See 75 Fed. Reg. at 74,356-62. A reviewing court, as well as the general public, should be provided at least the same opportunity to determine EPA's compliance with the Clean Air Act's requirements set forth in 42 U.S.C. § 7607(d) as they are provided to determine EPA's compliance with statutory and executive order mandates outside of the Clean Air Act that impose obligations on EPA in connection with rulemaking activities. [EPA-HQ-OAR-2010-0162-1604.1, pp.11-12]

Interestingly, EPA has documented extensively in the preamble the extent to which)t has complied with one (and only one) specific provision of 42 U.S.C. § 7607(d), namely, the provision dealing with the National Academy of Sciences. 75 Fed. Reg. at 74,351-56. Why EPA has chosen to document in the preamble its efforts to comply with that solitary provision but fails to document its compliance with any other provision of 42 U.S.C. § 7607(d) is not explained in any way. Even with regard to that solitary provision, however, EPA has substantially departed from the legal requirements, as detailed in a subsequent section of these comments. [EPA-HQ-OAR-2010-0162-1604.1, pp.12-13]

Response:

The commenter incorrectly conflates the report of the National Academy of Sciences with the committee established under section 7409 (d), which is established for purposes of providing advice and recommendations when EPA is deciding whether to revise a National Ambient Air Quality Standard. The two bodies are entirely different. The NAS report on potential heavy duty vehicle and engine standards was developed pursuant to a requirement in 49 USC section 32902 (k) and the preamble section to which the commenter refers simply describes the agencies' tentative decisions vis-à-vis that Report.

Organization: Pacific Legal Foundation

EPA devotes a substantial amount of territory in the preamble trying to justify its departure from the recommendations of the National Academy of Sciences, 75 Fed. Reg. at 74,351-56, but to no avail. [EPA-HQ-OAR-2010-0162-1604.1, p.15]

Response:

EPA is under no legal obligation to adhere to the NAS report or even to explain why it chose not to follow certain of the Report's recommendations. See earlier response to comment of Allison Transmissions.

Organization: Pacific Legal Foundation

The National Academy of Sciences recommended that, before HDEV greenhouse gas rules go into effect, the government should conduct a thorough pilot study to [g]ather data on fuel consumption from several representative fleets of vehicles. This should continue to provide a real-world check on the effectiveness of the regulatory design on the fuel consumption of trucking fleets in various parts of the marketplace and various regions of the country. [EPA-HQ-OAR-2010-0162-1604.1, p.15]

75 Fed. Reg. at 74,354. EPA acknowledges that this concern of the National Academy of Sciences stems from the fact that HDEV fuel consumption has never previously been regulated and, because of the scope of the regulatory program, serious problems could arise if a pilot study does not precede the regulations. Id. In response to this concern, EPA states merely that, even though a pilot study was not conducted, the regulations 'may avoid' the risks identified by the National Academy of Sciences. Id. This is not a legally sufficient response, especially given the fact that EPA admits the compliance testing protocols are 'new' for many types of HDEVs to be covered by the proposed regulations. Id. Indeed, EPA bluntly states its actual reason for moving forward without a pilot study: [EPA-HQ-OAR-2010-0162-1604.1, p.15-16]

[W]aiting for a pilot program to gain additional experience with testing, data gathering, and reporting would delay our ability to get highly cost-effective fuel efficiency and emissions improvements, based on utilization of existing technologies, as soon as possible. [EPA-HQ-OAR-2010-0162-1604.1, p.16]

Id. Thus, a pilot study required to determine the extent to which fuel efficiencies and emissions improvements can be achieved is not being undertaken because it would delay implementation of fuel efficiencies and improvements. Surely Congress could not have had in mind this type of circular justification for not accepting recommendations of the National Academy of Sciences pursuant to 42 U.S.C. § 7607(d)(3). [EPA-HQ-OAR-2010-0162-1604.1, p.16]

The National Academy of Sciences also recommended that EPA conduct studies of certain potential adverse unintended consequences of the rule before making a formal proposal. In response, EPA stated that, while it has begun to conduct the studies, the studies have not been completed 'in time to be incorporated' into the proposed regulations. But this begs the question. A recommendation that the agencies undertake a study of unintended regulatory consequences prior to rule proposal may provide justification for delaying rule proposal until after the studies have been completed. It is not a justification for not completing the studies prior to rule proposal. Once again, United States Environmental Protection Agency Office of Information and Regulatory Affairs January 28,2011 Page 17 Congress could not have intended for EPA to escape scrutiny when it provides this type of nonsensical 'justification' for disagreeing with the National Academy of Sciences recommendations pursuant to 42 U.S.C. § 7607(d)(3). Therefore, EPA must provide better, legally sufficient justification for its refusal to follow the recommendations of the National Academy of Sciences. [EPA-HQ-OAR-2010-0162-1604.1, pp.16-17]

Response:

As noted above, this entire comment is misplaced, so the suggestion that the NAS Report creates some type of presumptive norm against which the section 202 (a)(1) standards are measured is simply incorrect. In addition, and curiously, most commenters (for example CBD,) in referring to the NAS Report, argued that the Report made clear that more aggressive control measures were warranted. EPA continues to believe that the final standards are appropriate under section 202 (a)(1) and that if controls are available which are feasible, affordable, and cost effective in the available lead time, then it is appropriate to adopt standards pursuant to 202 (a)(1). The NAS report does not amend or otherwise countermand those statutory requirements.

Organization: Pacific Legal Foundation

Pacific Legal Foundation also maintains that EPA afforded insufficient notice and opportunity for public hearings, since the hearings were held two weeks before publication of the proposed rule in the Federal Register.

Response:

EPA believes that the agency afforded sufficient time for public hearings. As the commenter acknowledges, the proposed rule was signed and posted electronically on October 25, weeks before the public hearings. Public participation at the hearings was robust. Curiously, given its professed interest, the commenter did not participate at either public hearing and also did not avail itself of its right (pursuant to section 307 (d)(5)(iv) to submit rebuttal or other supplemental information to the hearing record, which was held open for 30 days after those hearings. EPA thus disagrees with the commenter that there was inadequate opportunity for participation in the public hearings, and in any case, cannot ascertain any prejudice to the commenter given its lack of participation.

Organization: Plass, B.

The gradual timeline contained in this rule appears sufficient to allow manufacturers enough time to develop technologies that will comport with the proposed rules while at the same time allowing enough time for such technology to develop in a cost effective manner. [EPA-HQ-OAR-2010-0162-1324-cp, p.1]

Response:

The agencies appreciate the commenter’s support.

Organization: Recreation Vehicle Industry Association (RVIA)

Per the January 18, 2011, White House Executive Order' on improving regulation and regulatory review, President Obama has directed EPA and other regulatory agencies to write regulations that promote economic growth and create jobs while at the same time protecting public health and welfare, safety and the environment. If finalized as proposed, this regulation will likely have a negative impact on RV industry jobs and thus contradict the most important tenant of the President's recent directive. If finalized as proposed, the regulation will also violate the provision within the Executive Order that calls for greater coordination across agencies through the simplification and harmonization of requirements. Given the fact that EPA has decided to apply its standards to non-commercial vehicles while NHTSA has decided to do exactly the opposite, the proposal is clearly not in keeping with the President's directive that federal agencies harmonize their requirements. If the agencies are going to comply with the Executive Order, they must have a common position with respect to the treatment of non-commercial vehicles. [EPA-HQ-OAR-2010-0162-3300, pp.6-7]

The issue of non-commercial vehicles was addressed by Congress when it created the Energy and Independence Security Act of 2007 (EISA). By limiting the medium- and heavy-duty vehicle fuel consumption mandate to commercial trucks, EISA reflected and appropriately dealt with the important distinctions that exist between commercial and non-commercial vehicles. We recognize that EPA is not bound by the EISA mandate, however, for the reasons discussed previously, we believe that the rule will impact private individuals (purchasers of non-commercial vehicles) in a manner that is very different from the way in which it will impact commercial businesses and that it would therefore be inappropriate to extend the applicability of the requirements to non-commercial vehicles. [EPA-HQ-OAR-2010-0162-3300, p.7]

EPA must be consistent with the EISA mandate and the January 18, 2010, Executive Order which calls for regulatory harmonization and eliminate the proposal to include non-commercial vehicles in this rulemaking. [EPA-HQ-OAR-2010-0162-3300, p.11]

Response:

NHTSA notes that EISA does not rely on the word "commercial" in defining "commercial medium- and heavy-duty on-highway vehicle," but rather defines the category by weight only.[6] NHTSA has reconsidered its interpretation that effectively read words into the statutory definition. Given the very wide variety of vehicles contained in the HD fleet, reading

[6] 49 U.S.C. 32902(k)(2). "Commercial medium- and heavy-duty on-highway vehicles" are defined as on-highway vehicles with a gross vehicle weight rating of 10,000 pounds or more, while "work trucks" are defined as vehicles rated between 8,500 and 10,000 pounds gross vehicle weight that are not MDPVs. *See* 49 U.S.C. §§ 32901(a)(7) and (a)(19).

those words into the definition and thereby excluding certain types of vehicles could create illogical results, i.e., treating similar vehicles differently. Therefore, NHTSA will adhere to the statutory definition contained in EISA for this rulemaking. However, as RVs were not included by NHTSA in the proposed regulation in the NPRM, they are not within the scope and must be excluded in NHTSA's portion of the final program. Accordingly, NHTSA will address this issue in the next rulemaking.

As proposed, the GHG rules for vocational vehicles do apply to recreational vehicles.

Organization: Robert Bosch LLC

Bosch questions NHTSA's interpretation that the five-year maximum period for average fuel economy standards, set forth in 49 U.S.C. section 32902(b)(3)(B), would not apply to the proposed fuel consumption standards once they are finalized. This statutory provision, which hails from section 102(a)(2) of the Energy Independence and Security Act of 2007, expressly requires NHTSA to "issue regulations under this title prescribing average fuel economy standards for at least 1, but not more than 5, model years." NHTSA opines that "one permissible reading of the statute is that Congress did not intend for the 5-year maximum limit to apply to standards promulgated in accordance with 49 U.S.C. section 32902(k) [i.e., the subject proposed fuel consumption standards], given the language in 32902(b)(1)." [69] NHTSA goes on to state that "[b]ased on this interpretation, NHTSA proposes that the [fuel consumption] standards ultimately finalized for HD vehicles and engines would remain in effect indefinitely at their 2018 or 2019 model year levels until amended by a future rulemaking action."[EPA-HQ-OAR-2010-0162-1630.1, pp.39-40]

It cannot be denied that the proposed fuel consumption standards for the HD sector, when promulgated, will constitute "regulations under . . . title [49] prescribing average fuel economy standards." There is nothing in section 32902(b)(1) to suggest otherwise. More important, there is no apparent conflict between the five-year maximum period in section 32902(b)(3)(B) and the three-year regulatory stability requirement in section 32902(k)(3). The two provisions can and should be read together, such that the proposed fuel consumption standards for the HD sector, when finalized, must (i) provide for at least four full model years of regulatory lead-time, and (ii) apply for at least three but not more than five model years. In other words, the three-year regulatory stability requirement in section 32902(k)(3) overrides the one-year minimum period in section 32902(b)(3)(B) but not the five-year maximum period. [EPA-HQ-OAR-2010-0162-1630.1, p.40]

Bosch believes the better legal view is that the final fuel consumption standards cannot remain in effect indefinitely at their model year 2018 or 2019 levels until NHTSA amends them. Instead, NHTSA will have to take steps to ensure that amended (or even the same) fuel consumption standards for HD engines and vehicles are in place before the five-year period dictated by section 32902(b)(3)(B) expires (i.e., the end of MY 2021 for HD diesel engines and the end of MY 2020 for HD gasoline engines and all three vehicle categories). Thus, similar to the fuel economy standards in what EPA and NHTSA refer to as the LDV National Program's "first phase," which cover LDVs in model years 2012-2016 (i.e., precisely five model years), the final fuel consumption standards in proposed section 535.5(a)-(d) should specify the precise five model years to which they apply and exclude references to "later" model years. [EPA-HQ-OAR-2010-0162-1630.1, pp.40-41]

---

[69] Section 32902(b)(1)(C) directs NHTSA to prescribe separate average fuel economy standards for "work trucks and commercial medium-duty or heavy-duty on-highway vehicles in accordance with [section 32902(k)]." Id. § 32902(b)(1)(C). Under section 32902(k)(3), the standards must provide at least four full model years of regulatory lead-time and three full model years of regulatory stability. Id. § 32902(k)(3). [EPA-HQ-OAR-2010-0162-1630.1, pp.39-40]

<u>NHTSA Response:</u>

NHTSA has revisited this issue and continues to believe that it is reasonable to assume that if Congress intended for the HD/MD regulatory program to be limited by the timeline prescribed in Subsection (b)(3)(B), it would have either mentioned HD/MD vehicles in that subsection or included the same timeline in Subsection (k).[7] In addition, in order for Subsection (b)(3)(B) to be interpreted to apply to Subsection (k), the agency would need to give less than full weight to the earlier phrase in the statute directing the Secretary to prescribe standards for "work trucks and commercial medium-duty or heavy-duty on-highway vehicles in accordance with Subsection (k)." 49 U.S.C. 32902(b)(1)(C). Instead, this direction would need to be read to mean "in accordance with Subsection (k) and the remainder of Subsection (b)." NHTSA believes this interpretation would be inappropriate. Interpreting "in accordance with Subsection (k)" to mean something indistinct from "in accordance with this Subsection" goes against the canon that statutes should not be interpreted in a way that "render[s] language superfluous." *Dobrova v. Holder*, 607 F.3d 297, 302 (2d Cir. 2010), quoting *Mendez v. Holder*, 566 F. 3d 316, 321-22 (2d Cir. 2009). Based on this reasoning, NHTSA believes the more reasonable and appropriate approach is reflected in the proposal, and the final rules therefore follow this approach.

Organization: Sierra Club

[7] "[W]here Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion." *Russello v. United States*, 464 U.S. 16, 23 (1983), quoting *U.S. v. Wong Kim Bo*, 472 F.2d 720, 722 (5th Cir 1972)., *See also Mayo v. Questech, Inc.*, 727 F.Supp. 1007, 1014 (E.D.Va. 1989) (conspicuous absence of provision from section where inclusion would be most logical signals Congress did not intend for it to be implied).

Both EPA and NHTSA have clear authority to promulgate rules ensuring increases in heavy duty truck efficiency. NHTSA is mandated to "prescribe separate average fuel economy standards for . . . work trucks and commercial medium-duty or heavy-duty on-highway vehicles." 49 U.S.C.A. § 32902(b)(1). Such standards must be "designed to achieve the maximum feasible improvement," and shall "implement appropriate test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols." Accordingly, Congress has made it plain that NHTSA can and indeed, must, regulate heavy trucks. [EPA-HQ-OAR-2010-0162-1889.1, p. 4]

Congress has even more forcefully authorized EPA to regulate in this area. Section 202(a) of the Clean Air Act states that the EPA "shall by regulation prescribe . . . standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines," and in fact specifically contemplates the regulation of heavy duty trucks such as proposed here: the EPA "may promulgate regulations . . . applicable to classes or categories of heavy-duty vehicles or engines." 42 U.S.C.A. § 7521(a); id. at § 7521(a)(3)(B); see also id. at § 7522(a)(4) and § 7541 (requiring vehicles sold in the U.S. to comply with § 7521(a) regulations); id. at § 7524 (authorizing the EPA to collect civil penalties for violation of § 7521(a) regulations); id. at 7525 (authorizing the EPA to conduct test to assure compliance with § 7521(a) regulations); id at § 7601 (conferring general authority on the EPA to promulgate regulations). [EPA-HQ-OAR-2010-0162-1889.1, p. 4]

Indeed, the Supreme Court has observed that the Clean Air Act "is unambiguous" in its "sweeping definition of 'air pollutant'"; that the statute "embraces all airborne compounds of whatever stripe," including the greenhouse gasses "[c]arbon dioxide, methane, nitrous oxide, and hydrofluorocarbons." Massachusetts v. E.P.A, 549 U.S. 497, 528-29 (2007). [EPA-HQ-OAR-2010-0162-1889.1, p. 4]

Further, EPA is authorized to take the lead on heavy truck and set rigorous pollution control standards. Unlike NHTSA, EPA is not constrained as to the timeline for implementing such regulations—while NHTSA is required to provide four model years of regulatory lead time, EPA is not. Compare 49 U.S.C.A. § 32902(k)(3)(A) (specifying lead time) with 42 U.S.C.A. § 7521(a) (specifying no lead time). Likewise, EPA is directed to regulate pollutants from heavy trucks to protect health and the environment; as such, the impetus on EPA to act vigorously in this area is even greater than it is for NHTSA. Compare 42 U.S.C.A. § 7521(a) (providing that regulations are to control pollutants that "endanger public health or welfare") with 49 U.S.C.A. § 32902(k)(2) (requiring efficiency standards incorporating the "maximum feasible improvement" in fuel economy). Accordingly, EPA can and should promulgate immediate, aggressive rules for heavy truck greenhouse gas pollution control. [EPA-HQ-OAR-2010-0162-1889.1, p. 4]

<u>Response:</u>

EPA agrees that it has a mandatory duty to issue GHG standards for new heavy duty vehicles and engines, consistent with the requirements of section 202 (a)(1). The Supreme

Court's decision in State of Massachusetts v. EPA, of course, does not dictate the substantive contents of such regulations.

Organization: Volvo Group

As noted in the NPRM preamble, the National Academy of Sciences (NAS) committee recommended that the regulatory Agencies consider a number of effects in the development of any proposals to regulate heavy-duty (HD) fuel consumption. Specifically, these are fleet turnover impacts and prebuy effects; the rebound effect; vehicle class shifting effects; environmental co-benefits and costs; congestion; safety; and incremental weight impacts. See 75 FR 74152, 74355. [EPA-HQ-OAR-2010-0162-1812.2, p.3]

The Agencies also note:

"In response, while the Agencies have initiated analyses of these unintended consequences, they have not all been completed in time to be incorporated into this NPRM. The NAS committee itself noted the lack of available information on these effects, especially as compared to the wealth of information available for light-duty fuel economy and GHG regulatory analysis. Much of this work must simply be done from scratch. The Agencies have included estimates of the rebound effect in this NPRM and draft RIA, but we hope to have analyses of other effects available for the final rule." [EPA-HQ-OAR-2010-0162-1812.2, p.3]

These crucial analyses will not be available in time to properly consider or comment on their accuracy or impact. [EPA-HQ-OAR-2010-0162-1812.2, p.3]

The most important NAS committee recommendation (pgs 190-191 of the NAS report) is:

Recommendation 8-6. NHTSA should conduct a pilot program to "test drive" the certification process and validate the regulatory instrument proof of concept. It should have these elements:

• Gain experience with certification testing, data gathering, compiling, and reporting. There needs to be a concerted effort to determine the accuracy and repeatability of all the test methods and simulation strategies that will be used with any proposed regulatory standards and a willingness to fix issues that are found. (emphasis added) [EPA-HQ-OAR-2010-0162-1812.2, pp.3-4]

• Gather data on fuel consumption from several representative fleets of vehicles. This should continue to provide a real-world check on the effectiveness of the regulatory design on the fuel consumption of trucking fleets in various parts of the marketplace and in various regions of the country. [EPA-HQ-OAR-2010-0162-1812.2, p.4]

In light of the numerous potential issues we note in the comments below, a pilot program is advisable, and can be easily established by waiving fines and penalties for the first two (2) model years of the regulation. [EPA-HQ-OAR-2010-0162-1812.2, p.4]

Response:

The agencies addressed turnover impacts and prebuy effects; the rebound effect; vehicle class shifting effects; environmental co-benefits and costs; congestion; safety; and incremental weight impacts in Section VIII of the preamble to the final rules and RIA Chapter 9.

The agencies disagree with the comment that NHTSA should conduct a pilot program. The agencies aligned the fuel consumption and GHG emissions test procedures with existing EPA test procedures for HD engines and HD pickup trucks and vans. In areas where new test procedures were required, such as with combination tractors and vocational vehicles, the agencies carefully developed the program around existing technologies and simplified compliance approaches. In addition, the agencies have harmonized their respective compliance approaches into a single process.

Organization: Volvo Group

Except in limited circumstances, the statutes authorizing EPA to adopt emissions standards and NHTSA to adopt fuel efficiency standards preempt states from adopting regulations governing the same. As the GHG-emissions and fuel-economy standards are adopted pursuant to these authorities, the regulation should specify that it preempts all states from adopting similar measures unless they qualify to do so under the relevant federal authority. [EPA-HQ-OAR-2010-0162-1812.2, p.18]

In the case of emissions standards, the Clean Air Act prohibits states from adopting or enforcing "any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines" subject to the statute. 42 U.S.C. § 209(a). The statute does authorize EPA to waive preemption for the state of California where the state demonstrates its own regulations are needed to meet "compelling and extraordinary conditions", contain standards and enforcement procedures that are consistence with the Clean Air Act, and are at least as stringent as comparable federal standards. 42 U.S.C. § 209(b). Likewise, other states may opt in to the California standards under certain conditions, but such standards may not be enforced until at least two years after they are adopted. 42 U.S.C. § 177. As such, the regulation should provide that existing and future GHG- emission standards adopted by states are not enforceable unless and until EPA has granted the state of California a waiver following a public notice and comment rulemaking process. [EPA-HQ-OAR-2010-0162-1812.2, p.18]

In the case of fuel economy standards, states also are generally prohibited from adopting or enforcing standards where a federal standard has been promulgated. 49 U.S.C. § 33919(a).

States are permitted to adopt such standards if they demonstrate the standards are "identical" to the federal standards. 49 U.S.C. § 33919(b). In addition, state and political subdivisions may prescribe fuel economy requirements for vehicles obtained for their own use. *See* 49 U.S.C. § 33919(c). The GHG regulation, therefore, should clarity that existing and future fuel economy requirements adopted by states are not enforceable unless and until they are demonstrated to be identical to the federal regulation. [EPA-HQ-OAR-2010-0162-1812.2, p.18]

Response:

Issues of preemption are not within the scope of this rulemaking.

5.2. Endangerment Finding

Organizations Included in this Section:

Utility Air Regulatory Group
National Federation of Independent Business
Chamber of Commerce of the United States
American Petroleum Institute
National Petrochemical and Refiners Association
Western States Petroleum Association
Coalition for Responsible Regulation, Inc.

Organization: Utility Air Regulatory Group

UARG submits these comments solely for the purpose of addressing possible alleged stationary source effects under the Clean Air Act's ("CAA" or "Act") prevention of significant deterioration ("PSD") and Title V permitting programs that might result from promulgation of a final rule in the present rulemaking. UARG is a voluntary, ad hoc, not-for-profit association of electric generating companies and organizations and national trade associations. UARG's purpose is to participate on behalf of its members collectively in EPA rulemakings and other proceedings under the CAA that affect the interests of electric generators and in litigation arising from those proceedings. [EPA-HQ-OAR-2010-0162-1964.1, p.1]

On May 7, 2010, EPA published a final rule establishing greenhouse gas ("GHG") emissions standards for light duty vehicles. 75 Fed. Reg. 25324 (hereinafter the "Light-Duty Vehicle Rule"). EPA has adopted an interpretation of the CAA under which promulgation of the Light-Duty Vehicle Rule made GHGs subject to the CAA's PSD and Title V permitting programs for stationary sources beginning on January 2, 2011. See Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by Clean Air Act Permitting Programs, 75 Fed. Reg. 17004 (Apr. 2, 2010) (hereinafter the "Reconsideration Rule"). EPA's regulation of GHG emissions from stationary sources under the PSD and Title V programs is the subject of considerable controversy, and every major EPA rule related to this program is, in one respect or another, the subject of petitions for review filed in the U.S. Court of Appeals for the District of Columbia Circuit by numerous parties, including UARG. See, e.g., Coalition for Responsible Regulation, et al. v. EPA, No. 09-1322 (and consolidated cases) (D.C. Cir.) (petitions for review of EPA's GHG "endangerment" and "cause or contribute" findings for motor vehicles under CAA section 202(a)); Coalition for Responsible Regulation, et al. v. EPA, No. 10-1073 (and consolidated cases) (D.C. Cir.) (petitions for review of the Reconsideration Rule); Coalition for Responsible Regulation, et al. v. EPA, No. 10-1092 (and consolidated cases) (D.C. Cir.) (petitions for review of the Light-Duty Vehicle Rule); Southeastern Legal Foundation, et al. v. EPA, No. 10-1131 (and consolidated cases) (D.C. Cir.) (petitions for review of EPA's Tailoring Rule for GHGs under the PSD and Title V programs). [EPA-HQ-OAR-2010-0162-1964.1, p.1]

Depending on the outcome of these pending cases, it is possible that the current PSD and Title V permitting programs as they are deemed by EPA to apply to stationary sources' GHG emissions may be vacated in whole or in part or otherwise changed significantly as a result of judicial review. If that occurs, it is possible that the proposed Heavy-Duty Rule, if made final by EPA at the conclusion of the present rulemaking, could be interpreted by the Agency to be the rule that makes GHGs subject to the PSD and Title V permitting programs. To protect its interests in the event that occurs, UARG submits the following comments to the docket for the present rulemaking: [EPA-HQ-OAR-2010-0162-1964.1, p.2]

• The proposed Heavy-Duty Rule relies on EPA's final endangerment and cause or contribute findings for GHGs under section 202(a) of the Act, which EPA published in the Federal Register at 74 Fed. Reg. 66496 (Dec. 15, 2009); see 75 Fed. Reg. at 74170. UARG filed three sets of comments on EPA's proposed endangerment and "cause or contribute" findings under section 202(a): (1) Comments of the Utility Air Regulatory Group on the Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, EPA Docket ID No. EPA-HQ-OAR-2009-0171-3394.1 (Attachment 1 to these comments); (2) Supplemental Comments of the Utility Air Regulatory Group on the Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, EPA Docket ID No. EPA-HQ-OAR-2009- 0171-4932.1 (Attachment 2 to these comments); and (3) the Utility Air Regulatory Group's Additional Supplemental Comments on the Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, EPA Docket ID No. EPA-HQ-OAR-2009-0171-11491.1 (Attachment 3 to these comments). UARG incorporates all of these comments herein by reference. [EPA-HQ-OAR-2010-0162-1964.1, pp.1-2]

• As discussed in UARG's previous comments incorporated herein, the proper purpose of any EPA endangerment finding under the CAA is to avert or prevent the danger the Agency concludes is presented by the emissions that are the subject of the finding, or at least to significantly mitigate that danger. This principle is reflected in the CAA's legislative history and the decision in Ethyl Corp. v. EPA, 541 F.2d 1 (D.C. Cir. 1976) (en banc). As the legislative history and Ethyl make clear, the fundamental purpose of the CAA provisions that incorporate the endangerment criterion, such as section 202(a)(1), is to authorize regulation of emissions when and to the extent such regulation will be effective in fruitfully attacking the cause of the endangerment, and not to impose “regulation for regulation’s sake.” The proposed Heavy-Duty Rule does not meet this standard. EPA analyzed the reductions in GHG emissions that would result from the proposed Heavy-Duty Rule by the year 2100 and projected the effects those reductions would have on atmospheric carbon dioxide concentrations, global mean surface temperature, sea-level rise, and ocean-water acidity. 75 Fed. Reg. at 74287-89. As EPA acknowledges, “the projected reductions and improvements are small in overall magnitude.” Id. at 74287. EPA makes the following projections for 2100 as a result of the proposed Heavy-Duty Rule: (1) atmospheric carbon dioxide concentrations will be reduced by 0.693 to 0.784 part per million by volume; (2) global mean surface temperature will be reduced by 0.002°C to 0.004°C; (3) sea-level rise will be reduced by about 0.012 to 0.048 centimeter; and (4) ocean pH will increase by 0.0003 ph unit. Id. These amounts constitute a minuscule fraction of changes projected by the Intergovernmental Panel on Climate Change, on whose reports EPA relies. See, e.g., id. at 74288 & n.236, 74289. Even assuming EPA’s proposed Heavy-Duty Rule would achieve the maximum EPA-projected reductions, these reductions are vanishingly small, to the point of being all but unquantifiable and, in any event, imperceptible on any human scale. Thus, the proposed Heavy-Duty Rule does not meet the Ethyl standard. See Comments of the Utility Air Regulatory Group on the Proposed Rulemaking To Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, EPA Docket ID No. EPA-HQ-OAR-2009-0472-7262 (Attachment 4 to these comments; incorporated herein by reference). [EPA-HQ-OAR-2010-0162-1964.1, p.2]

Organization: National Federation of Independent Business (NFIB)

Many of our small business members stand to be substantially affected by this rulemaking and previous GHG rulemakings — a collection of four rules imposing GHG standards on small businesses. NFIB is presently part of litigation in coalition with several industry groups led by the National Association of Manufacturers (NAM) that challenges the following four rules because of their impact on small businesses: the Endangerment Rule, the Car Rule2, the PSD Interpretive Rule, and the Tailoring Rule. [EPA-HQ-OAR-2010-0162-1527.1, p.2]

These rules, and the Truck Rule, have the effect of triggering GHG permitting requirements under the Clean Air Act (CAA) that NFIB believes is outside the scope of the U.S. Supreme Court decision, Massachusetts v. EPA, that the EPA used as the basis for the four previous rules. In addition, the Truck Rule is mistakenly certified as a proposal that “will not have a significant economic impact on a substantial number of small entities,” and therefore has not gone through the required processes of the Regulatory Flexibility Act (RFA). We will detail these concerns further, below. [EPA-HQ-OAR-2010-0162-1527.1, p.2]

Similar to the Car Rule, the Truck Rule establishes limits on the amount of GHGs emitted from vehicles over a given distance. In its Car Rule, the EPA drew the conclusion that the rule itself triggered GHG permitting requirements for stationary sources. NFIB believes this conclusion is illegal. Congress created a means under the CAA for the EPA to address harmful pollutants from stationary sources — the Prevention of Significant Deterioration (PSD) preconstruction permit program. This program identifies specific pollutants in the air that have the potential to harm the public's health. Congress did not intend for unconventional pollutants, like GHGs, to be part of this program. [EPA-HQ-OAR-2010-0162-1527.1, p.2]

The EPA has incorrectly used its finding that GHGs from cars (mobile sources) endanger the public health to open a door that all GHG emissions are to be regulated— including stationary sources under PSD program. The ruling in Massachusetts v. EPA specifically gave the EPA the authority to regulate GHGs from cars and mobile sources, not stationary sources. While trucks are a mobile source, the EPA has once again used a mobile source as the impetus to effect stationary source GHG regulation. [EPA-HQ-OAR-2010-0162-1527.1, p.2]

Therefore, NFIB asserts that the Truck Rule would be arbitrary and capricious because the EPA has not corrected its interpretation of the CAA to provide that vehicle emission standards do not trigger GHG stationary source permitting requirements. The EPA should delay finalizing the Truck Rule until it has corrected its interpretation of the CAA. [EPA-HQ-OAR-2010-0162-1527.1, pp.2-3]

In the NPRM, the EPA certified that the Truck Rule "will not have a significant economic impact on a substantial number of small entities." The EPA cites that the rule will only significantly affect some manufacturers and that ".035 percent" of these manufacturers are small entities. However, the EPA also maintains that mobile source GHG rules trigger PSD requirements for stationary sources. Inherent with any PSD program are the costs of permits and control technologies, which stand to affect virtually every stationary source of GHGs in the United States. [EPA-HQ-OAR-2010-0162-1527.1, p.3]

These two conclusions do not fit together. The EPA is trying to implement a broad, complicated, and expensive regulatory scheme while at the same time alleging that such a scheme will not impose significant costs of a significant number of small entities. [EPA-HQ-OAR-2010-0162-1527.1, p.3]

NFIB argues that the EPA should conduct a proper regulatory flexibility analysis given the extraordinary impact the rule will have on stationary sources. The EPA failed to consider the compliance costs while considering the impact of the rule. [EPA-HQ-OAR-2010-0162-1527.1, p.3]

The Truck Rule, like the four previous GHG rules mentioned earlier, wrongly drags stationary sources into the EPA's GHG regulatory scheme. The EPA has authority under a Supreme Court decision to regulate GHG emissions from cars and mobile sources. The agency does not have authority to use mobile sources as an impetus to regulate stationary sources.

Furthermore, since it is the EPA's aim to regulate stationary sources under that authority, the agency should then follow its legal requirement to conduct a regulatory flexibility analysis and other RFA procedures so the agency can identify how broad of an impact this rule, and the four previous GHG rules, will have on small businesses. [EPA-HQ-OAR-2010-0162-1527.1, p.3]

Organization: Chamber of Commerce of the United States

By writing its own rule—and by specifically relying on Title II and EPA's endangerment finding for mobile sources—EPA is further embedding the Clean Air Act as the nation's primary policy for addressing greenhouse gas emissions from all sources. The consequences of EPA's actions are stark: GHG New Source Review and Title V permitting requirements are forecasted to have a negative impact on U.S. investment, job growth and economic competitiveness during the next several years and beyond, and EPA may not be able to control the regulatory cascade of New Source Performance Standards, National Ambient Air Quality Standards, and other stationary source requirements for which environmental groups have already submitted petitions for rulemaking. [EPA-HQ-OAR-2010-0162-2152.1, p.2]

Moreover, nothing in Massachusetts v. EPA requires EPA to issue the current regulation using Title II of the Clean Air Act. In Massachusetts, the Supreme Court required EPA to make a determination on endangerment—nothing more. In fact, the Court explicitly stated that if EPA did answer "yes" on endangerment, "EPA no doubt has significant latitude as to the manner, timing, content, and coordination of its regulations with those of other agencies." [EPA-HQ-OAR-2010-0162-2152.1, pp.2-3]

As is the case with light-duty vehicles, EPA admits that the Clean Air Act is not necessary to accomplish its GHG emissions reductions, since increased fuel economy will accomplish the same goal. EPA states: "The more efficient a heavy-duty truck is in completing its work, the lower its environmental impact will be, because the less fuel consumed to move cargo a given distance, the less CO2 emitted into the air." EPA implies throughout the rule that achieving its GHG emissions standards can be done by meeting NHTSA's fuel economy regulations, and vice-versa. [EPA-HQ-OAR-2010-0162-2152.1, p.3]

Under EPA's current interpretation of the law, this rulemaking, once finalized and implemented, will be the second time EPA has made GHGs "subject to regulation" under the Clean Air Act. GHGs first became subject to regulation on January 2, 2011, when the light-duty GHG rule took effect. That rule is currently the subject of several legal challenges. If the light-duty GHG rule were to be struck down, the stationary source GHG permitting chaos currently in effect would cease, except the fact that EPA has made GHGs subject to regulation again by this medium- and heavy-duty truck GHG rule. [EPA-HQ-OAR-2010-0162-2152.1, p.3]

As was the case with the light-duty rule, there appears to be no legitimate reason for EPA to invoke Title II of the Clean Air Act except as a catalyst to regulating GHG emissions from stationary sources. For this reason, the Chamber urges EPA and NHTSA to redraft the joint rule to avoid using Title II of the Clean Air Act or relying on EPA's Section 202(a) endangerment finding for mobile sources. [EPA-HQ-OAR-2010-0162-2152.1, p.3]

To the extent that the Clean Air Act is used, EPA must comply with provisions requiring employment and economic impact analyses and with applicable executive orders. [EPA-HQ-OAR-2010-0162-2152.1, p.4]

If EPA proceeds with a rule under Title II of the Clean Air Act, it must perform a Clean Air Act-required employment impact analysis under Section 321 and an economic impact assessment under Section 317. It also must meet the requirements of the Unfunded Mandate Reform Act (UMRA), the Regulatory Flexibility Act, and the recent Executive Order on government regulations. Each requirement is discussed below. [EPA-HQ-OAR-2010-0162-2152.1, p.4]

[See pp.4-7 of this comment summary for additional comments pertaining to the CAA: Section 321 & 317, UMBRA, the Regulatory Flexibility Act, and Executive Order on Government Regulations]

Organization: American Petroleum Institute, National Petrochemical and Refiners Association, and Western States Petroleum Association

EPA has also explained that, in its view, the Car Rule regulations, "when they take effect on January 2, 2011, . . . subject GHGs emitted from stationary sources to" permitting requirements. Proposed SIP Call, 75 Fed. Reg. at 53,892. [EPA-HQ-OAR-2010-0162-1820.1, p.3]

As explained in the Associations' comments on each of these four actions, EPA's decision to impose greenhouse gas permitting requirements on stationary sources as a result of the implementation of mobile source standards is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law" as well as being adopted "without observance of procedure required by law." 42 U.S.C. § 9607(d)(9)(A),(D). Consequently, the Associations, as part of a coalition including the National Association of Manufacturers, have petitioned the United States Court of Appeals for the District of Columbia Circuit to review each of the four related actions, that, in EPA's view, trigger GHG permitting requirements. See National Association of Manufacturers et al v. EPA, D.C. Cir Nos. 10-1044, 10-1127, 10-1166, 10-1218. The Associations have also challenged other EPA regulations that EPA has suggested could have a role in triggering GHG permitting requirements. See National Association of Manufacturers et al v. EPA, D.C. Cir. Nos. 10-1177, 10-1178, 10-1179, 10-1180. [EPA-HQ-OAR-2010-0162-1820.1, p.3]

The GHG Truck Rule is analogous to the Car Rule in that it sets standards for the quantity of greenhouse gases that a vehicle may emit for a given amount of distance covered or work performed. GHG Truck Rule, 75 Fed. Reg. at 74160–61. In the context of the car rule, EPA inappropriately and illegally has taken the position that the Car Rule triggers GHG permitting requirements for stationary sources. Proposed SIP call, 75 Fed. Reg. at 53,892. Consequently, as it did in the Car Rule docket, the Associations submit these comments explaining why it is arbitrary and capricious for EPA to adopt the GHG Truck Rule while maintaining its illegal interpretation that Clean Air Act permitting requirements for stationary sources are triggered by vehicle emissions standards such as those proposed here or adopted in the Car Rule. [EPA-HQ-OAR-2010-0162-1820.1, p.3]

As explained below, finalizing the GHG Truck Rule would be arbitrary and capricious because EPA has not corrected its interpretation of the Clean Air Act to provide that vehicle emission standards do not trigger GHG stationary source permitting requirements. Thus, EPA should delay finalizing the GHG Truck Rule until it has corrected its interpretation of the Clean Air Act while allowing the NHTSA standards to proceed which will realize equivalent GHG reductions without Clean Air Act stationary source ramifications. Further, EPA has not considered the costs or ramifications that the GHG Truck Rule will impose on stationary sources by triggering GHG permitting requirements in violation of numerous laws and Executive Orders, as well as the Administrative Procedure Act. Lastly, finalizing the GHG Truck Rule would also be arbitrary and capricious because the rule is predicated on an invalid endangerment finding. [EPA-HQ-OAR-2010-0162-1820.1, p.4]

The Associations further elaborate on these issues below. However, they also incorporate by reference here each of the comments that they submitted on the four actions that comprise EPA's regulatory scheme to impose PSD permitting requirements as a result of mobile source standards. Because EPA is relying on a similar flawed approach in the context of the GHG Truck Rule, the Associations' positions in those comments are germane here and are incorporated herein in their entirety. These comments, hereby submitted as comments to the GHG Truck Rule docket, are attached as Exhibits A through I, and should be considered as part of the Associations' submission of comments to the GHG Truck Rule. Below, the Associations summarize key positions but do not waive the more complete set of arguments made in the comments in the four rulemakings and attached herein. [EPA-HQ-OAR-2010-0162-1820.1, p.4]

EPA Must Correct Its Mistaken View That Mobile Source Emission Standards Trigger GHG Permitting Requirements EPA has stated that, in its view, the Car Rule's vehicle emission standards took effect on January 2, 2011, and triggered GHG permitting requirements for stationary sources as of that date under two programs: the Title V operating permit program; and the Prevention of Significant Deterioration (PSD) pre-construction permit program. PSD Interpretive Rule, 75 Fed. Reg. at 17,019–20. EPA has not announced whether it would take the same position regarding the vehicle emission standards proposed in the GHG Truck Rule. But to the extent EPA believes that regulations of GHGs from trucks trigger stationary source permitting ramifications, such position is inconsistent with the Clean Air Act, as explained below. [EPA-HQ-OAR-2010-0162-1820.1, p.4]

[See pp.5-6 of this comment summary for comments pertaining to The Title V Operating Permit Program and the PSD Preconstruction Permit Program]

[See pp.6-8 of this comment summary for comments pertaining to A Source Triggers PSD Permitting Only if it Emits a NAAQS Pollutant in an Area Designated Attainment for That Pollutant]

[See pp.8-9 of this comment summary for comments pertaining to Greenhouse Gases Are Not Subject to Regulation Under the PSD Program]

[See p.9 of this comment summary for comments pertaining to EPA's Interpretation of the CAA Is Unreasonable]

Lastly, finalizing the GHG Truck Rule would also be arbitrary and capricious because the rule is predicated on an invalid endangerment finding. As the GHG Truck Rule itself explains, EPA's authority to propose the rule flows from the Endangerment Finding for greenhouse gases. 75 Fed. Reg. at 74,170. Thus, if the Endangerment Finding is invalid, EPA has no authority to finalize the GHG Truck Rule. For this reason, the Associations briefly explain some of the reasons why the Endangerment Finding is arbitrary and capricious. A more complete explanation is complained in the Associations' comments, which are also submitted here. Exhs. A–C. [EPA-HQ-OAR-2010-0162-1820.1, p.12]

[See pp.12-13 of this comment summary for additional comments pertaining to The GHG Truck Rule Would Also Be Arbitrary and Capricious Because It Is Based on an Invalid Endangerment Finding]

Given EPA's interpretation that vehicle emissions standards trigger stationary source greenhouse gas permitting requirements, PSD Interpretive Rule, 75 Fed. Reg. at 17,019–20, EPA is required to consider the ramifications on stationary sources subject to those permitting requirements before promulgating the GHG Truck Rule. EPA has entirely failed to perform this duty—the proposed GHG Truck Rule contains no mention of its impacts on stationary sources.

[See p.10-12 of this comment summary for additional comments pertaining to EPA Failed to Assess the Consequences of Its Rule and Alternatives to Its Actions Rendering the Rulemakings Arbitrary and Capricious]

EPA Should Delay Finalizing The GHG Truck Rule Until It Has Corrected Its Mistaken Interpretation of the Clean Air Act, Allowing NHTSA to Move Forward [EPA-HQ-OAR-2010-0162-1820.1, p.9]

EPA has broad discretion to delay finalizing the GHG Truck Rule under the "rule of reason" that courts employ in assessing delay in agency decision-making. Telecommunications Research & Action Center v. FCC, 750 F.2d 70, 80 (D.C. Cir. 1984); see also Massachusetts v. EPA, 549 U.S. 497, 533 (2007) (EPA has "significant latitude as to the manner, timing, content, and coordination of its regulations with those of other agencies"). This discretion is particularly significant because the Massachusetts decision was limited to an endangerment determination for cars only under Section 202(a). Given this discretion, it would be arbitrary and capricious for EPA to finalize the Clean Air Act component of the GHG Truck Rule at this time; instead, it should allow NHTSA to finalize the rule alone. When the D.C. Circuit rejects EPA's Car Rule for the reasons stated in the Associations' Comments, *see* Exhs. A–I, the GHG Truck Rule could cause the same harm that the Car Rule threatened: triggering massive and unwarranted permitting burdens. Tailoring Rule, 75 Fed. Reg. at 31,517. [EPA-HQ-OAR-2010-0162-1820.1, pp.9-10]

These harms entirely outweigh any possible benefit from finalizing the rule, because the rule was jointly proposed by EPA and NHTSA. This means the GHG Truck Rule could be finalized under NHTSA authority, avoiding triggering permitting requirements under the Clean Air Act. Consequently, delaying the rule would not cause any serious disruption to implementing greenhouse gas emission standards for heavy vehicles, but would avoid massive harm to stationary sources. Furthermore, the delay need not be long—if EPA implemented the interpretation offered in Section I, above, it could then finalize the GHG Truck Rule without harming stationary sources. [EPA-HQ-OAR-2010-0162-1820.1, p.10]

Organization: Coalition for Responsible Regulation, Inc.

EPA's Proposed Vehicle Rule relies upon an Endangerment Finding that was reached without a complete supporting administrative record and without adequate consideration of the underlying climate change science, data or literature. In addition, the agency improperly denied petitions to reconsider the Endangerment Finding in light of information that arose after the close of the public comment period and that is of central relevance to the outcome of the Endangerment Finding. [EPA-HQ-OAR-2010-0162-2262, p.1]

Virtually every one of EPA's bold assertions about climate change in the Proposed Vehicle Rule are factually and/or scientifically either demonstrably incorrect or lack supporting scientific basis. EPA's assertions rely entirely upon the Endangerment Finding and the Technical Support Document for that Finding. Some of the Coalition's members, as well as other commenters, have already systematically rebutted all of EPA's assertions, with supporting scientific documentation, in the detailed Comments the Coalition submitted in EPA's Proposed Endangerment Rulemaking ('Endangerment Comments'), which can be found at EPA's Proposed Endangerment Finding Docket (Docket ID No. EPA-HQ-OAR-20090171) at http://www.regulations.gov/fdmspublic/component/main?main=DocketDetail&d=EPA-HQ-OAR-2009-0171, by referencing document identification numbers 3722, 4041,5158, 11454, 11455, 11536, 11686, and their associated exhibits. The Coalition submitted a Petition for Reconsideration of the Endangerment Finding on February 11, 2010. We hereby incorporate by reference in their entirety as part of these Comments the Endangerment Comments filed on June 23,2009, the addenda and supplementations to same filed on June 30, 2009, August 31,2009, November 20, 2009, and December 4, 2009, and the Petition for Reconsideration filed on February 11, 2010, as well as all associated exhibits, as part of this record and docket in this separate rulemaking proceeding. Complete copies of the Endangerment Comments, addenda and supplementations are contained in the enclosed CDs, except for certain hardcopy books and other materials already in EPA's possession. The enclosed exhibit list identifies all materials that are submitted with or incorporated into today's Comments. [EPA-HQ-OAR-2010-0162-2262, pp.1-2]

Accordingly, the Coalition submits these Comments opposing the Proposed Vehicle Rule and incorporating by reference herein the Coalition's Endangerment Comments, Petition for Reconsideration, and all supporting materials filed in the Endangerment Finding. The Endangerment Comments and Petition thoroughly demonstrate that EPA lacks a sound or adequate basis to make an endangerment finding to public health or welfare from anthropogenic greenhouse gases, given the substantial contradictory scientific data, opinion and literature that EPA has failed to consider. The Endangerment Comments and Petition establish with detailed scientific documentation that EPA's supposed 'scientific consensus' regarding climate change is, in fact, an illusion: Many of the world's top climate scientists have the view that climate change (to the extent currently occurring) is well within the range of natural variation, and have critiqued the climate data and modeling which EPA relies upon as incapable of accurately establishing or predicting increased temperatures or CO2 levels. The Endangerment Comments describe EPA's failure to conduct a balanced, scientifically-based evaluation of the net effects on public health and welfare -positive as well as negative -from climate change. They conclude by noting that regulation of greenhouse gases under the Clean Air Act -an unsuitable vehicle for such regulation will have severe economic consequences through a regulatory cascade, with no or de minimis environmental benefit. Finally, the Petition for Reconsideration presents information that surfaced after the Endangerment Finding that undermines the credibility and reliability of the foreign bodies, such as the Intergovernmental Panel on Climate Change, whose reports formed the principal basis of the Endangerment Finding. [EPA-HQ-OAR-2010-0162-2262, p.2]

In addition, by making its Proposed Endangerment Finding in a separate rulemaking, EPA fails to follow the purpose of Section 101 of the Clean Air Act; namely, to consider the effects of Clean Air Act action on the economy, and to weigh the profound uncertainties and lack of benefits from controlling GHGs from motor vehicle emissions. See 42 U.S.C. § 7401. Under Section 101, EPA must carefully weigh and balance not only the effects of air pollution, but also the impact of this Proposed Vehicle Rule on the economy. Because EPA made this calculation separately and in the abstract, however, rather than in an integrated proceeding, EPA failed to consider the wholly disproportionate economic effects when measured against the lack of benefit predicted to accrue from the control standards in the Proposed Vehicle Rule. [EPA-HQ-OAR-2010-0162-2262, p.2]

EPA's proposed Truck Rule is expressly predicated on the validity of the December 2009 Endangerment Finding and the Technical Support Document for that Finding. See 75 Fed. Reg. at 74,170, 74,283. As EPA is aware, the Endangerment Finding-and EPA's subsequent denial of reconsideration notwithstanding the 'Climategate' disclosures involving the University of East

Anglia's Climactic Research Unit-are currently subject to dozens of petitions for review in the United States Court of Appeals for the D.C. Circuit, consolidated under the caption Coalition for Responsible Regulation v. EPA, No. 091322. EPA should await the resolution of these petitions for review before rushing to promulgate additional regulations that are predicated on the challenged decisions. As EPA effectively concedes, if the Truck Rule takes effect, it will need to be rolled back if the D.C. Circuit sustains any of the petitions for review of the Endangerment Finding. The disruption and cost imposed on regulated entities by this premature implementation and revocation of the Rule would be substantial. EPA itself acknowledges that truck manufacturers are constrained by product development cycles and that the proposed emissions controls are 'very aggressive' and give regulated entities only 'limited lead time' to comply. 75 Fed. Reg. at 74,172, 74,214. Such a rush to judgment falls well short of the requirements for reasoned administrative decision making in Section 307(d) of the Act, 42 U.S.C. § 7607(d). [EPA-HQ-OAR-2010-0162-2262.1, pp.1-2]

Insofar as the proposed Truck Rule purports to contain its own endangerment finding, see 75 Fed. Reg. 74,156-57, 74,283-87, that finding is infirm for the same reasons. In conclusory and unsubstantiated fashion, EPA asserts in the proposed Truck Rule that 'anthropogenic emissions of GHGs are very likely (a 90 to 99 percent probability) the cause of most of the observed global warming over the last 50 years.' Id. at 74,282, 74,156. EPA's discussion lacks the supporting administrative record required by Section 307 of the Act, 42 U.S.C. § 7607, and fails adequately to consider the underlying climate change science, data, or literature or provide a reasoned basis for its decision. As CRR exhaustively explained in its comments on the Endangerment Finding and in its January 27, 2011 comments on the proposed Truck Rule, virtually everyone of EPA's bold assertions about climate change in the proposed Truck Rule is factually and scientifically either demonstrably incorrect or lacks a supporting scientific basis. [EPA-HQ-OAR-2010-0162-2262.1, p.2]

The Truck Rule's proposed emissions standards are arbitrary, capricious, an abuse of discretion, and in excess of EPA's statutory authority because they fail to accomplish any tangible result beyond what NHSTA's proposed fuel consumption standards will achieve anyway under separate statutory authority. CRR and other commenters have raised this same concern with respect to EPA's Proposed Rulemaking to Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 74 Fed. Reg. 49,454 (Sept. 28, 2009) ('Tailpipe Rule'). It is irrational for EPA to regulate GHG emissions from an entire segment of an industry knowing that its regulations will have no tangible benefits beyond those obtained by another agency acting under different statutory authority. Indeed, the proposed Truck Rule all but concedes this point: EPA acknowledges the 'close' and 'direct' connection between 'improving the fuel efficiency of these vehicles' (as NHTSA's fuel consumption standards will do anyway) and 'reducing their CO2 tailpipe emissions' (as EPA's Truck Rule seeks to do). 75 Fed. Reg. at 74,157. This is so, EPA explains, because CO2 emissions are 'essentially constant' per gallon of fuel consumed, and the applicable emission-reducing technologies are 'one and the same.' !d. [1] [EPA-HQ-OAR-2010-0162-2262.1, pp.2-3]

The proposed Truck Rule is also arbitrary, capricious, and an abuse of discretion because its CO_2 emissions standards do not achieve any non-trivial improvement with respect to global warming and its purported climactic and ecological effects-even assuming (without basis) the accuracy of EPA's projections of those effects. An administrative agency's regulatory actions must 'fruitfully ... attac[k]' the problem being addressed. Ethyl Corp. v. EPA, 541 F.2d 1,31 n.62 (D.C. Cir. 1976). EPA cannot hide the proposed Truck Rule's shortcomings, acknowledging that the expected benefits are 'small.' 75 Fed. Reg. at 74,287. 'Meaningless' is a better term. By EPA's own calculations, under the Truck Rule 'projected atmospheric CO_2 concentrations will be reduced by 0.693 to 0.784 parts per million by volume (ppmv) (average of 0.732 ppmv)'; global mean temperature reduced by '0.002 to 0.004°C'; sea-level rise reduced by '0.012-0.048 cm based on a range of climate sensitivities,' and ocean pH increased by '0.0003 pH units by 2100.' 75 Fed. Reg. at 74,287. These 'reductions' are meaningless not only in absolute terms, but even relative to their overall share of the 'IPCC's 2100 'best estimates' for global mean temperature increases (1.1-6.4 °C) and sea level rise (0.18-0.59m) for all global GHG emissions sources for a range of emissions scenarios.' 75 Fed. Reg. 74,287, 74,289. Even under EPA's baselessly aggressive projections, the proposed Truck Rule will forestall only one-third of one percent of expected global mean temperature change, and one-quarter of one percent of anticipated sea level rise. [EPA-HQ-OAR-2010-0162-2262.1, p.3]

The Truck Rule is arbitrary, capricious, and an abuse of discretion because EPA has expressly refused to conduct any 'forma[l] estimat[e]' of the effect of the proposed emissions standards on the 'adverse risks associated with climate change.' 75 Fed. Reg., at 74,289. Remarkably, EPA asserts in the very same sentence that the reduction in CO_2 from the proposed Truck Rule will 'represent a reduction in the adverse risks associated with climate change.' ld. This non-sequitur represents the paradigm of unreasoned decision making and reflects the Agency's failure to 'consider the relevant factors,' Citizens to Preserve Overton Park v. Volpe, 401 U.S. 402, 416 (1971). EPA may not justify an economically burdensome regulatory regime on the grounds that it will reduce risks to public health or welfare resulting from climate change, while simultaneously refusing even the attempt to measure or quantify those allegedly reduced risks. [EPA-HQ-OAR-2010-0162-2262.1, pp.3-4]

The Truck Rule is arbitrary, capricious, an abuse of discretion, and contrary to statutory authority because EPA has failed to consider the costs of stationary source regulation that, under EPA's reading of the Act, will be triggered by the Truck Rule. In April 2010, EPA concluded that regulation of stationary source emissions of GHGs under Titles I and V of the Act (involving Prevention of Significant Deterioration regulations and operating permits, respectively) starts when when [sic] such emissions are subject to controls under the mobile source provisions of the Act. See Reconsideration of Interpretation of Regulations That Determine Pollutants Covered by Clean Air Act Permitting Programs, 75 Fed. Reg. 17,004 (Apr. 2, 2010) ('Timing Rule'). In May 2010, EPA promulgated GHG emissions standards for light-duty vehicles. See Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324 (May 7, 2010) ('Tailpipe Rule'). CRR and dozens of other petitioners have challenged the Tailpipe Rule in petitions now pending before the D.C. Circuit. Even if these petitions are successful in vacating the Tailpipe Rule, the proposed Truck Rule would, under the

Timing Rule's interpretation of the Act, trigger stationary source regulation. EPA cannot assert that mobile source regulations such as the proposed Truck Rule will require it to regulate stationary sources, and at the same time refuse to consider the costs of stationary source regulation. As EPA concedes, see 75 Fed. Reg. at 74,170, the Act requires it to consider the costs of compliance when making an endangerment finding and promulgating mobile source emissions standards under Section 202(a). See 42 U.S.C. § 7512(a)(2) ('appropriate consideration to the cost of compliance'); see also id. § 7521(b)(1)(C) ('costs, energy, and safety'). But the proposed Truck Rule does not consider or even mention the likely costs of stationary source regulation, and EPA has denied the public the opportunity to comment on those aspects of the Truck Rule, in violation of the Clean Air Act, 42 U.S.C. § 7607(d), and the Administrative Procedure Act, 5 U.S.C. § 553(b)(3). [EPA-HQ-OAR-2010-0162-2262.1, p.4]

The proposed Truck Rule improperly abdicates statutory responsibilities that Congress assigned to EPA. On May 26, 2010, President Obama issued a memorandum 'request[ing]' that the EPA and NHTSA Administrators 'immediately begin work on a joint rulemaking under the Clean Air Act (CAA) and the Energy Independence and Security Act of 2007 (EISA) to establish fuel efficiency and greenhouse gas emissions standards for commercial medium- and heavy-duty vehicles beginning with model year 2014.' See 75 Fed. Reg. 29,399 (May 26,2010). The preamble to EPA's proposed Truck Rule makes clear, however, that EPA misunderstood the memorandum as a 'directive' from the President. 75 Fed. Reg. at 74,152. The Act vests authority in the EPA Administrator, not the President, to promulgate mobile source emissions standards, and requires the Administrator to delay the effective date for any such regulation for 'such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.' 42 U.S.C. § 7521(a)(2). EPA's characterization of the Memorandum as a 'directive,' and its blind adoption of the '2014 model year' (as stated in the President's Memorandum) as the effective date for its GHG emissions limitations, 75 Fed. Reg. at 74,152, show that the agency was not exercising its discretion but acting under presidential 'directive.' EPA thus improperly preordained the result of its rulemaking. Cf. Myers v. United States, 272 U.S. 52, 135 (1926). [EPA-HQ-OAR-2010-0162-2262.1, pp.4-5]

In conclusion, CRR urges the Administrator not to finalize the proposed Truck Rule until the petitions for review of EPA's Endangerment Finding, denial of reconsideration, and related GHG rules have been fully and finally resolved by the courts. Because the Endangerment Finding is a legal predicate for the proposed Truck Rule, and because the two actions are necessarily and inextricably intertwined, it would be premature and wasteful for EPA to press forward at this time. CRR separately urges EPA to refrain from finalizing the Truck Rule in light of the legal and policy concerns identified above. [EPA-HQ-OAR-2010-0162-2262.1, p.5]

---

[1] We acknowledge that EPA's proposed rule, unlike NHTSA's fuel consumption standards, also regulates emissions from nitrous oxide, methane, and air conditioning refrigerants. But EPA itself concedes the insignificance of these gases to the overall concern,

observing that '[f]or heavy-duty vehicles ... CO2 emissions represented more than 99 percent of all GHG emissions (including HFCs).' 75 Fed. Reg. 74,157 (emphasis added). Moreover, EPA's proposed emissions restrictions for nitrous oxide and methane simply duplicate the effect of existing controls. EPA explains that regulated vehicles will meet the proposed emissions standards by virtue of controls already in place for other pollutants (specifically, NOx and nonmethane hydrocarbons), see 75 Fed. Reg. at 74,207-74,210. Thus, these regulations will provide no additional benefit [EPA-HQ-OAR-2010-0162-2262, p.2]

Response:

Section 202 (a)(1) creates a mandatory duty for EPA to regulate emissions of the GHGs emitted by heavy duty vehicles and engines. This result is mandated due to EPA's finding that emissions of six greenhouse gases taken in combination endanger both the public health and the public welfare, and the further finding that the combined emissions of these greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas air pollution that endangers public health and welfare. The rules provide for two model years of GHG emission reductions that could not be obtained under the EISA authority, so the commenters' assertion that the rules are purely duplicative is incorrect.

The commenters are mistaken that any costs to stationary sources due to GHG control under the PSD program are attributable to this rule (or any other Title II GHG rule). Costs for PSD permitting result from application of section 165 of the CAA, and are therefore imposed by statute, not by this rule or any other. See Light Duty Vehicle GHG RTC at 5-454. In any case, it is the light duty rule, not this rule, which initially resulted in the GHGs at issue being 'regulated pollutants' for purposes of the CAA.

Organization: Texas Department of Agriculture

Just as in previous comments submitted to your agency on the proposed endangerment finding and the many subsequent GHG reporting and permitting rules, I remain concerned about the harmful effects the regulation of GHG emissions under the Clean Air Act could have on the Texas farmers, ranchers and consumers. As you know, the affordable food and fiber American consumers enjoy is produced in remote rural areas that are often long distances from those very consumers, which creates a significant demand for transportation services, including the use of medium- and heavy-duty vehicles. For example, according to a 2006 U.S. Department of Agriculture study, Americans spent approximately $43.4 billion for the transportation of their food from the farm to consumption. [EPA-HQ-OAR-2010-0162-1898.1, p.1]

While thoughtfully promoting efforts to encourage increased fuel efficiency may eventually produce a positive financial benefit and is a function of the U.S. Department of Transportation. EPA's continued efforts to control GHG emissions from mobile sources under the Clean Air Act will produce certain costs but obscure benefits. Greater benefits from increased fuel efficiency will be best found by understanding and leveraging consumer demand while considering long-term technical capabilities of medium- and heavy-duty vehicle manufacturers. [EPA-HQ-OAR-2010-0162-1898.1, p.1]

Response:

As documented in the record to the proposed and final rules, these rules are enormously cost beneficial and are estimated to cost $30 per ton of CO_2eq reduced without considering fuel savings, and cost approximately negative $340 per ton of CO_2eq reduced (i.e. a benefit of $340 per ton of CO_2eq reduced) when fuel savings are considered. Indeed, due to the associated fuel savings, the entire cost of these rules is negative. By adopting rules pursuant to the CAA, these standards commence with MY 2014 (in most instances) so that the benefits of the rule accrue two model years earlier than if the EISA authority were used exclusively.

6. GHG and Fuel Consumption Standards

6.1. General Comments on the Standards Framework

6.1.1. General Support of Regulatory Categories

Organizations Included in this Section:

Odyne Systems, LLC
Robert Bosch, LLC
American Chemistry Council
Cummins, Inc.
Ford Motor Company (Ford)
Edison Electric Institute
Engine Manufacturers and Truck Manufacturers Associations
Heavy-Duty Fuel Efficiency Leadership Group
National Truck Equipment Association (NTEA)

Organization: Odyne Systems, LLC

Odyne agrees with the approach taken "to divide the industry into three distinct -
regulatory categories for purposes of setting our respective standards – combination tractors, 1
heavy-duty pickups and vans, and vocational vehicles -- based on the relative degree of homogeneity among trucks within each category." (P. 21 of 673). Odyne also commends the EPA and NHTSA for recognizing the diversity of the medium and heavy duty vehicle manufacturing base and market. [EPA-HQ-OAR-2010-0162-1853.1, p.2]

Organization: Robert Bosch, LLC

Bosch concurs with the division of the broad and diverse HD vehicle sector into three distinct regulatory categories – combination tractors, HD pickup trucks and vans (PUVs), and vocational vehicles; Bosch's specific comments in section III below are organized along these lines. (As explained more fully in section III.C, though, Bosch believes that additional work needs to be done to subcategorize more accurately the vocational vehicle category.)

- strongly encourages EPA and NHTSA, in their future efforts to amend the standards that result from this rulemaking, to establish performance-based GHG emissions and fuel consumption standards for PUVs and HD engines, as was done in the Light-Duty National Program, which will foster a level playing field for all technologies; [EPA-HQ-OAR-2010-0162-1630.1, pp.2-3]

Organization: American Chemistry Council

ACC agrees with EPA and NHTSA conclusions that rather than only focusing on engine performance, increasing fuel efficiency in the future increasingly requires a whole vehicle approach. We agree that making changes to reduce the amount of work a vehicle engine needs to do per mile traveled is essential to fuel efficiency.2 In these comments ACC will address opportunities for lightweighting vehicles and improving aerodynamics to increase fuel efficiency using a whole vehicle approach as discussed in the proposed regulations. [EPA-HQ-OAR-2010-0162-1631.1, p.2]

Organization: Cummins Inc.

The division of vehicles between combination tractors, vocational and pickups and vans also recognizes the different uses of these vehicles. This helps deploy the right technologies that will meet the standards and match how the vehicle will be used. [EPA-HQ-OAR-2010-0162-1765.1, p.9]

Organization: Ford Motor Company (Ford)

Ford supports the manner in which the agencies have proposed to harmonize the greenhouse gas emissions and fuel consumption regulatory framework for over 8,500 pound vehicles. [EPA-HQ-OAR-2010-0162-1761.1, p.2]

Organization: Edison Electric Institute

The HD Program appropriately recognizes the diversity among the different vehicles and vehicle uses in the medium- and heavy-duty vehicle sector and, accordingly, proposes different standards and regulations to reflect this diversity. [EPA-HQ-OAR-2010-0162-2114.1, p.3]

Organization: Engine Manufacturers and Truck Manufacturers Associations

Because of the great diversity that exists in the HD vehicle sector, it is necessary in implementing a HD National Program to divide that sector into a manageable number of categories and subcategories that have common attributes relevant to achieving reductions in GHG emissions and improvements in fuel economy. In that regard, and consistent with input that the Associations and other stakeholders have provided to the Agencies, the Proposed GHG/FE Standards establish a reasonable number and assortment of HD vehicle categories (i.e., heavy-duty pickup trucks and vans, vocational vehicles, and combination tractors) and subcategories (i.e., nine subcategories of Class 7 and 8 combination tractors, assorted based on cab type and roof height) for regulatory purposes. That allocation scheme, which EMA and TMA support, is one of the main cornerstones for a manageable and workable HD National Program, and it is critically important that the Agencies retain the proposed regulatory groupings in the finalized GHG/FE Standards. [EPA-HQ-OAR-2010-0162-1940.1, p.3]

Organization: Heavy-Duty Fuel Efficiency Leadership Group

Recognize Fleet Diversity: The rule should align any standards with the technology needed for different applications. Fleets are diverse in terms of weights, sizes and capabilities in order to perform the wide range of tasks required of these vehicles. The rule should maximize achievable gains in medium- and heavy-duty vehicle fuel efficiency and GHG emission reductions by taking advantage of the technology improvement opportunities across the entire vehicle and its operation. [EPA-HQ-OAR-2010-0162-1620.1, p.4]

The Group feels that the structure and design of the EPA/NHTSA proposal should largely preserve a fleet's ability to "spec" the truck necessary to perform a specific task. The Agencies emphasis on recognition of fleet diversity – particularly in the vocational categories – is an important tenant of these proposed standards, and the Group urges both Agencies to closely monitor the rule's implementation to ensure that these "fleet diversity" considerations are not compromised. [EPA-HQ-OAR-2010-0162-1620.1, p.4]

Organization: National Truck Equipment Association (NTEA)

As the core membership of the NTEA distributes and manufactures what are known as vocational trucks we would like to start by addressing their unique concerns. The agencies appropriately recognize the value creating a regulatory category for vocational trucks apart from heavy duty tractor combinations and more standardized Class 2b – 3 pickup trucks and vans. Vocational trucks are built in a very wide variety of vehicle configurations to accomplish specific work tasks. Unlike tractors, vocational trucks tend to be used in work applications that often require much shorter distances of travel and at lower speeds. Also, unlike pickup trucks and vans, the OEM does not have control over the final stage manufacture of the truck, at which point the body and/or work equipment is installed, based on the end user's vocational needs. [EPA-HQ-OAR-2010-0162-1608.1, p.3]

Response:

The agencies are finalizing, as proposed, to separate a very diverse group of heavy-duty vehicles into three regulatory categories, which in some instances are then further subcategorized.

6.1.2. **Clearly Define Commercial Vehicles**

Organization: Oshkosh Corporation

Under the heading of "Does This Action Apply to Me", the NPRM provides the following description of applicability: [EPA-HQ-OAR-2010-0162-1589.1, p.2]

"This action would affect companies that manufacture, sell, or import into the United States new heavy-duty engines and new Class 2b through 8 trucks, including combination tractors, school and transit buses, vocational vehicles such as utility service trucks, as well as ¾-ton and 1-ton pickup trucks and vans. The heavy-duty category incorporates all motor vehicles with a gross vehicle weight rating of 8,500 pounds or greater, and the engines that power them, except for medium-duty passenger vehicles already covered by the greenhouse gas standards and corporate average fuel economy standards issued for light-duty model year 2012-2016 vehicles." [EPA-HQ-OAR-2010-0162-1589.1, p.2]

Although the preamble appears to single out "commercial" vehicles for regulation, the only noncommercial vehicle mentioned as an example are recreational vehicles. In addition, many of the requirements in the rule refer to terms such as "heavy duty vehicle", with is defined by its weight and size, not by its function as a tool of commerce. [EPA-HQ-OAR-2010-0162-1589.1, p.2]

The NPRM proposes the following definition: Commercial medium- and heavy-duty on-highway vehicle means an on-highway vehicle with a gross vehicle weight rating of 10,000 pounds or more as defined in 49 U.S.C. 32901(a)(7). [EPA-HQ-OAR-2010-0162-1589.1, p.2]

These words define commercial vehicles by their GVW only. The aspect of commercial as a vehicle used in commerce is not addressed. The definition as written would encompass recreational vehicles even though the NPRM specifically excludes RVs as being non-commercial. [EPA-HQ-OAR-2010-0162-1589.1, p.2]

We searched all the definition sections of 40 CFR Part 86 for the word "commercial" and found only four occurrences in two sections, none of which provided a definition. [EPA-HQ-OAR-2010-0162-1589.1, p.3]

§ 86.085–2 Definitions. The term "commercial" is used in the context of describing engine categories but it is not defined itself.

§ 86.090–2 Definitions. The term “commercial” is used in the context of describing engine categories but it is not defined itself. [EPA-HQ-OAR-2010-0162-1589.1, p.3]

Since the term “commercial” implies activity of “commerce”, we believe we can look to the government agency responsible for over-seeing trucks operating in commerce. The Federal Motor Carrier Safety Administration provides the following definitions in 49 CFR PART 202— MOTOR CARRIERS ENGAGED IN INTERSTATE COMMERCE: [EPA-HQ-OAR-2010-0162-1589.1, p.3]

(k) Interstate commerce means the commerce between any place in a State and any place in another State or between places in the same State through another State, whether such commerce moves wholly by motor vehicle or partly by motor vehicle and partly by rail, express, water or air. This definition of ‘‘interstate commerce’’ for purposes of these regulations is the same as the definition of ‘‘interstate commerce’’ in section 203(a) of the Interstate Commerce Act. [49 U.S.C. 303(a)] (l) Motor carrier means a common carrier by motor vehicle, a contract carrier by motor vehicle, or a private carrier of property by motor vehicle as those terms are defined by paragraphs (14), (15), and (17) of section 203(a) of the Interstate Commerce Act [49 U.S.C. 303(a)]. [EPA-HQ-OAR-2010-0162-1589.1, p.3]

Response:

EPA had proposed and is adopting this program for new heavy duty vehicles and engines under the Clean Air Act which does not distinguish applicability based on commercial applications. See CAA section 202 (b)(3)(C) which defines heavy-duty vehicle” as “a truck, bus, or other vehicle manufactured primarily for use on the public streets, roads, and highways … which has a gross vehicle weight … in excess of 6,000 pounds.” The final rule applies to a subset of these vehicles, and to engines installed in them, namely on-highway vehicles with a gross vehicle weight rating above 8,500 pounds, except medium-duty passenger vehicles, and engines installed in these vehicles.

NHTSA’s response to this comment for purposes of EPCA/EISA can be found in Section I.A of the preamble.

6.1.3. Support for Separate Engine and Vehicle Standards

Organizations Included in this Section:

Cummins, Inc.
International Council on Clean Transportation
Truck Renting and Leasing Association

Union of Concerned Scientists
Robert Bosch, LLC
Autocar, LLC
Oshkosh Corporation
American Council for an Energy-Efficient Economy

Organization: Cummins, Inc.

Build upon and align with the existing criteria pollutants program – The GHG/FC regulations should utilize the existing structures and procedures of the proven and robust criteria pollutants program. This will enable effective and efficient control of GHG/FC and criteria pollutants concurrently. [EPA-HQ-OAR-2010-0162-1765.1, p.8]

Cummins supports the proposed regulatory framework The EPA and NHTSA proposal divides the commercial vehicle industry into three categories (combination tractors, vocational vehicles and HD pickups and vans) and establishes separate engine and vehicle programs for combination tractors and vocational vehicles. As stated in our November 2010 public testimony for this rulemaking, separate engine standards are important for several reasons: [EPA-HQ-OAR-2010-0162-1765.1, p.8]

Commercial vehicles vary greatly in size, configuration and application. When the regulations for criteria emissions were first established, EPA faced the same diversity of medium- and heavy-duty applications and duty cycles as confronted today for greenhouse gases and fuel efficiency. The Agency addressed this diversity very effectively by establishing a broadly representative engine-based regulatory program that ensured emission reductions across all engine applications. EPA and NHTSA are right to use this solid foundation for the new regulation by reusing existing engine test procedures, test equipment and compliance and enforcement measures. [EPA-HQ-OAR-2010-0162-1765.1, pp.8-9]

Separate engine standards not only facilitate the implementation of the program in 2014 but also keep intact the existing market structure. Today, engine and vehicle divisions compete with other engine and vehicle divisions, whether in an independent or integrated company. Independent engine and vehicle manufacturers could be seriously disadvantaged without these distinct standards. [EPA-HQ-OAR-2010-0162-1765.1, p.9]

Separate engine standards also allow customers to continue to buy a common certified engine and use it in a wide range of vehicles and applications. This ensures emission reductions across the various vehicles without sacrificing the diversity of configurations needed in the marketplace. [EPA-HQ-OAR-2010-0162-1765.1, p.9]

Additionally, separate engine standards will provide the certainty needed for the cost-effective development and deployment of advanced and breakthrough technologies. Because the engine uses the fuel and is the source of the emissions, it should be addressed directly with standards that give businesses and engineers the clarity to invest and innovate. The independent regulation of the engine will not compromise the system engineering that is done between engine and vehicle manufacturers in the normal course of business. The optimization for engine performance, size, weight, heat rejection, cost and other factors will continue as is done today. [EPA-HQ-OAR-2010-0162-1765.1, p.9]

For vehicles, this is the first time that they will be regulated so a completely new regulatory scheme will need to be developed and implemented. While these protocols are being created and tested, separate engine performance standards in this phase of the regulation allow for the use of existing engine certification and compliance mechanisms in which regulatory Agencies, industry and the American public have gained confidence through the years. [EPA-HQ-OAR-2010-0162-1765.1, p.9]

Organization: International Council on Clean Transportation (ICCT)

Establishing separate standards for the engine and the vehicle. The agencies choice of establishing engine standards for all medium- and heavy-duty vehicles is consistent with the NAS panel’s recommendation to cover the whole medium- and heavy-duty vehicle sector at the outset of the program. There are multiple advantages of setting an engine-only standard. First, setting an engine standard based on existing test procedures allows the agencies to start collecting baseline data on all engines, and gain improvements, while piggybacking off of existing test procedures. Second, one of the important findings of the NAS panel was the substantial potential from improvements in heavy-duty engines over the 2015 – 2020 time frame. A separate engine standard will ensure that many of these potential improvements are captured and implemented in the marketplace. Third, setting an engine-only standard allowed the agencies to capture benefits from the full sector while allowing for more detailed focus on the two largest subsectors: tractors and Class 2B and 3 pickup trucks and vans. [EPA-HQ-OAR-2010-0162-1945.1, p.2]

Organization: Truck Renting and Leasing Association (TRALA)

For Combination Tractors and Class 2b-8 Vocational Vehicles, TRALA Supports A Regulatory Focus At This Time On The Engine/Cab As Opposed To The Entire Vehicle [EPA-HQ-OAR-2010-0162-1816.1, p.5]

EPA and NHTSA 'have concluded that achieving reductions in GHG emissions and fuel consumption from combination tractors requires addressing both the cab and the engine' (75 Fed. Reg. at 74161). EPA and NHTSA 'considered developing alternative standards based on the direct testing of the emissions and fuel consumption of the entire vehicle, as measured using a chassis test procedure,' but elected not to proceed with that approach at this time for a variety of reasons, including the limited number of available test facilities' (id. at 74162). The agencies noted that the 'entire vehicle' regulatory approach remains under consideration. The agencies reached similar conclusions regarding Class 2b-8 vocational vehicles (75 Fed. Reg. at 74166). [EPA-HQ-OAR-2010-0162-1816.1, p.5]

TRALA believes that EPA and NHTSA have set forth a prudent regulatory approach by focusing on the cab/engine at this time while holding out the possibility of an 'entire vehicle' regulatory approach in a follow-up phase of the regulatory program. We concur that there may be an inadequate number of chassis-based test facilities to support the roll-out of 'entire vehicle' standards. We also believe that the significantly large number of 'entire vehicle' combinations would make issuance of such standards challenging in the absence of more definitive real-world data and reliable models. [EPA-HQ-OAR-2010-0162-1816.1, p.5]

Organization: Union of Concerned Scientists (UCS)

We support establishing engine standards for vocational and tractor vehicles. While we have indicated our support for moving towards a compliance program that captures full vehicle performance, engine standards are complimentary to this effort. Setting specific engine standards will provide more certainty to engine manufacturers as they make investments in next generation technologies. The NAS estimates that engine technologies available by 2020 could reduce fuel consumption from tractors by 15 percent from 2010 levels. The technology to achieve this level of reduction will require significant research, development, and deployment investments over the next 5 to 10 years. Establishing separate engine standards in this rulemaking will ensure progress towards meeting the greater levels of reductions possible from engine technology. [EPA-HQ-OAR-2010-0162-1764.1, p.10]

Organization: Robert Bosch, LLC

Bosch supports the agencies' expression of the proposed GHG emissions and fuel consumption standards (i.e., g/mile and gallons/100 miles for PUVs; g/ton-mile and gallons/1,000 ton-miles for combination tractors and vocational vehicles), and agrees that while whole-vehicle standards make sense for PUVs, separate vehicle and engine standards are warranted for combination tractors and vocational vehicles. Bosch further agrees that whole-vehicle (i.e., chassis-test based) standards for the latter two categories merit continued consideration going forward, but that such standards are not yet appropriate due mainly to "the very small number of chassis-test facilities that currently exist." [EPA-HQ-OAR-2010-0162-1630.1, pp.4-5]

Organization: Autocar, LLC

The Proposed Regulations put forth separate engine and vehicle standards. This structure is critical to the effectiveness of the regulations. Vocational vehicles vary greatly in size, configuration and application. In the refuse market, body builders play a significant role in production. Body builders assemble complete refuse vehicles out of incomplete chassis. For traditional (non-hybrid- or electric-powered) refuse vehicles, the engine offers the greatest potential for addressing GHG and fuel consumption, with much less opportunity from the chassis and body. Refuse vehicles operate at low average speeds in and around urban areas. They have high rolling resistance, high accessory loads and low annual mileage. [EPA-HQ-OAR-2010-0162-1617.1, p.2]

EPA and NHTSA have rightly proposed a regulatory structure that recognizes these aspects by creating separate engine and vehicle standards. A separate engine standard allows improvements to be achieved across a broad range of vehicles and applications. It is infeasible to regulate at the body builder level due to the overwhelming number of configurations. Standards at the engine level also align well with the existing procedures and practices for criteria emissions used today. This allows the large number of previously unregulated vocational chassis and body manufacturers, many of which are small businesses and not equipped to handle extensive regulatory requirements, to buy engines certified for all emissions and use them in a wide range of vehicles and applications. [EPA-HQ-OAR-2010-0162-1617.1, p.2]

Organization: Oshkosh Corporation

Oshkosh Corporation supports whole-heartedly the improvements in emissions and fuel efficiency regulations proposed by the NPRM. [EPA-HQ-OAR-2010-0162-1588.1, p.2]

- A separate engine standard allows improvements to be achieved across a broad range of vehicles and applications. It is infeasible due to the overwhelming number of configurations to regulate at the body builder level. [EPA-HQ-OAR-2010-0162-1588.1, p.2]

- Standards at the engine level also align well with the existing procedures and practices for criteria emissions used today. [EPA-HQ-OAR-2010-0162-1588.1, p.2]

- Our businesses can procure a common certified engine for all emissions and use it in a wide range of vehicles and applications. [EPA-HQ-OAR-2010-0162-1588.1, p.2]

- For vocational applications, the engine offers the greatest potential for addressing greenhouse gases and fuel consumption with much less opportunity from the vehicle and operations. [EPA-HQ-OAR-2010-0162-1588.1, p.2]

- Vocational vehicles typically operate at lower average speeds in and around urban areas. They have lower rolling resistance with modest accessory loads and considerably lower annual mileage. [EPA-HQ-OAR-2010-0162-1588.1, p.2]

Discussions with engine manufacturers indicate that some are planning to exceed the NPRM fuel economy improvement rules by as much as 100%. This is a natural outcome of competitive pressures where the single most important economic factor in line-haul businesses is the cost of fuel. While fuel costs are generally less important to the customer of vocation vehicles, we look forward to being able to provide better fuel economy on all our products in the future. We see engine advances as the best method of making improvements and applaud the EPA and NHTSA for this aspect of the proposed rule. [EPA-HQ-OAR-2010-0162-1588.1, p.2]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

ACEEE strongly supports the agencies' proposal to regulate engines as well as vehicles. The relatively small number of distinct engines manufactured (p.74159) is one reason for this; the fuel price signal filtered through multiple truck manufacturers and/or models using a given engine will necessarily be more dilute than a direct signal to the engine manufacturer. There are other reasons as well for regulating engines directly for fuel efficiency and emissions, which are discussed below. [EPA-HQ-OAR-2010-0162-1894.1, p.8]

Response:

These comments provided by stakeholders in general support the agency's position on proposing and adopting separate engine and vehicle standards for this HD program. As discussed in the proposal, we believe this approach allows the program to drive improvements in both areas.

6.1.4. Do Not Support Separate Engine and Vehicle Standards

Organizations Included in this Section:

Navistar, Inc.
Volvo Group

Organization: Navistar, Inc.

Navistar, as well as other commenters, supports an approach to GHG and fuel economy regulation that looks at the total vehicle. We believe that such an approach captures the synergistic benefits of various technologies as they work together on a vehicle and allows optimization and tuning of the components to enhance overall vehicle performance. [EPA-HQ-OAR-2010-0162-1871.1, p.6]

Some commenters perceive an economic advantage, but not an environmental advantage, in advocating regulation of engines separately from the vehicles in which the engines are installed. This approach arbitrarily disadvantages integrated truck/engine manufacturers and, therefore, is invalid. Further, an arbitrary "engine-separate" focus misses key opportunities for reductions and likely will lead to reduced performance in the vehicle, a concern echoed by the National Academy of Sciences ("NAS"). There is no factual support for the conclusion that engine-only manufacturers will be left at an impermissible disadvantage. In fact, we believe that a total-vehicle approach will bring greater efficiencies for all manufacturers. [EPA-HQ-OAR-2010-0162-1871.1, p.7]

Organization: Volvo Group

Absent from the proposed alternatives outlined in the NPRM preamble (Section IX, 75 FR 74152, 74338- 74341) or the Draft Regulatory Impact Analysis (DRIA) (Section 6.1, pgs. 6-1 to 6-14) is a complete vehicle with integrated engine and powertrain. Instead, all options start with a separate engine regulation, which gives rise to a number of significant issues. [EPA-HQ-OAR-2010-0162-1812.2, p.12]

As such, Volvo Group opposes the separate vehicle and engine standards and proposes that the standards include, at a minimum, an alternative integrated standard, as well as complete vehicle modeling and testing approach, beginning in 2017. [EPA-HQ-OAR-2010-0162-1812.2, p.12]

Engine efficiency depends heavily on being matched properly to the vehicle and other vehicle components (e.g. transmissions). The engine duty cycle is greatly dependent on vehicle size, weight, transmission, and driveline, even if the vehicle drive cycle is held constant. Engine efficiency varies tremendously depending on the engine speed and loading. A large engine running at light load will typically be less efficient than a small engine running at higher load in the same vehicle. A vehicle with an appropriately sized engine, geared to operate at the optimal engine speed and load zone (sweet spot) will deliver much better fuel efficiency. In fact, considerable effort goes into development of vehicle systems to keep heavy-duty engines operating within their peak efficiency range. These important factors are not considered in this context unless the engine and vehicle are evaluated as an integrated system. There is clear precedent for complete vehicle regulation in the light-duty car and truck GHG and efficiency regulations. As NHTSA noted in the NPRM preamble, the EISA requires the program to be “appropriate, cost-effective, and technologically feasible for commercial medium-duty and heavy-duty on-highway *vehicles* and work trucks.” 75 FR 74152, 74158 (emphasis added).2 EISA calls for regulation of vehicles, not engines. *See* 49 U.S.C. §32902(k). In fact, nowhere in this section of the EISA does Congress mention the potential regulation of subsystems, including engines. [EPA-HQ-OAR-2010-0162-1812.2, pp.12-13]

A separate engine regulation also fails to consider the impact of engine requirements on vehicle design. Such requirements include spatial arrangement, engine system weight, cooling demand with associated fan power and frontal area impact, emissions control equipment impacts, and other considerations. Higher efficiency engines typically are larger (i.e., requiring more space under the hood), heavier and more complex requiring lower temperature cooling systems, all of which will have a negative impact on vehicle installation requirements, offsetting engine efficiency. There will also be increased costs associated with additional components, increased reliability and durability concerns resulting from increased complexity, as well as maintenance cost increases due more components requiring service and increased service time due more complex packaging. An engine standard that does not account for installation impacts can result in distorted actual performance in the vehicle when compared to the engine's tested performance apart from the vehicle. An example of this effect is an engine which meets or exceeds the engine standard, but requires greater cooling capacity which could increase vehicle drag due to a larger cooling package. [EPA-HQ-OAR-2010-0162-1812.2, p.13]

In addition, separate standards can have a detrimental effect on overall vehicle performance since the engine is optimized to perform apart from the vehicle and to work on duty cycles which may not be representative of actual operation. [EPA-HQ-OAR-2010-0162-1812.2, p.13]

Finally, a separate engine regulation does not allow for optimal cost/benefit optimization by vehicle manufacturers. Manufacturers should have the flexibility to choose to develop and deploy the most effective vehicle efficiency systems, taking into consideration costs, risks, and customer acceptance. Engine efficiency can be an important contributor, but should not be singled out with specific targets. Instead, just as with light-duty vehicles, manufacturers should have the flexibility to choose whether to focus on the engine or other vehicle systems in achieving efficiency objectives. Such design freedom will enhance competition, allow for greater innovation, and increase the availability of cost-effective technologies with potential for a faster rate of efficiency gains. [EPA-HQ-OAR-2010-0162-1812.2, p.13]

Response:

We agree with the commenters' general position that it would be ultimately preferable to set standards based on a complete vehicle test that incorporates all aspects of real world operation. As a practical matter, it is not possible to match the huge variation present in the real world to a single repeatable test procedure. Instead a number of simplifying assumptions need to be made including selecting only one or two drive cycles, selecting a single test weight based on an assumed average or worst case payload, and selecting a reasonably narrow band of ambient conditions. If those selections are made to represent the operation of vehicles on whole across the country, we can be confident that vehicles that comply with the fuel consumption and GHG standards will also achieve significant real world improvements in performance.

For this first phase of regulation, the agencies chose to set separate engine and vehicle standards for several reasons. First, we do not have and are unable to develop in the timeframe of this final action a test procedure to evaluate complete vehicle performance on a chassis test for the largest Class 8 tractors as we have for the lighter pickups and vans. As the commenter notes, the cooling systems on these vehicles are fundamental to their overall performance and absent a means to test the cooling system in a representative manner as part of a complete vehicle test it is not possible to truly reflect in-use performance. Further, there are only a handful of laboratories in the country that can even accommodate vehicles of this size for testing. The agencies agree that such an approach has the potential for better control, and we fully intend to investigate such a solution in the next phase of regulation.

In addition to the practical constraints of test procedures and facilities highlighted above, we also are concerned that a combined engine and vehicle standard could potential increase in-use fuel consumption and GHG emissions. As the commenter notes, the selection of engine size and vehicle gear ratios plays a critical role in creating a vehicle with the best in-use performance. For this reason, the major truck and engine manufacturers provide software to their dealers to help customers choose the most efficient combination of engine power, transmission, final drive ratio and tire size for their particular application giving consideration to the expected payload for the vehicle (hauling steel bars or potato chips), the expected average speed (highways or secondary roads) and even the expected elevation changes over the intended routes. In this way, the best vehicle setup is selected for the customer's specific needs. Were the agencies to set a complete vehicle standard as a practical matter we would need to pick a single average payload, a single typical drive cycle and a single assumption for the grade changes over the drive cycle to represent the country on average. A vehicle setup to perform best over these national average conditions may in fact not be setup to perform best in any particular fleets operation given their specific payload and routes. The agencies want to be extremely cautious to ensure that we do not create a regulatory program that penalizes trucking fleets for purchasing the vehicle best suited to their operations. Not only would this be unfair, but it could well lead to higher in-use fuel consumption and GHG emissions. The commenters provide no suggested mechanism to address this issue.

While it may be possible that truck manufacturers could comply more cheaply to a combined standard, we do not believe that these speculative savings would be significant enough for us to accept an approach that could lead to suboptimal performance for truck purchasers in the real world. We are confident that is not the goal of the commenters either. We fully expect to work with these commenters and others in the future to evaluate approaches for complete vehicle certification that can address the practical and technical issues we have highlighted here.

In future regulations, the agencies expect to fully evaluate the potential to expand the use of vehicle compliance models to reflect engine and drivetrain performance. Similarly, we intend to consider the potential for complete vehicle testing using a chassis dynamometer, not only as a means for compliance, but also as a complementary tool for the development of more complex vehicle modeling approaches. In considering these more comprehensive regulatory approaches, the agencies will also reevaluate whether separate regulation of trucks and engines remains necessary.

6.2. Engine, Vocational Vehicle and Tractor Standards

6.2.1. Form of the Standards

6.2.1.1. Engine Subcategories

Organizations Included in this Section:

Cummins Inc.
Daimler Trucks North America
Engine Manufacturers and Truck Manufacturers Associations

Organization: Cummins Inc.

Cummins agrees with the Agencies' intent that the primary intended service class designations and flexibilities for the proposed GHG/FC standards should be the same as those for the criteria pollutant standards. For example, an engine classified as MHD should be allowed in some cases to be used in vehicles above 33,000 lb gross vehicle weight rating (GVWR). [EPA-HQ-OAR-2010-0162-1765.1, p.30]

Organization: Daimler Trucks North America

DDC Supports That The Existing Service Class Designations, Definitions, And Associated Flexibilities Remain Unaltered. [EPA-HQ-OAR-2010-0162-1818.1, p.30]

Section 1036.140 requires that manufacturers identify a single primary intended service class for each compression-ignition engine family and that selection be made of the class that best describes the majority of engines from the engine family and that are subsequently used to distinguish averaging sets. The agencies requested comment on updating the service class definitions. We believe that the existing descriptions adequately serve their intended purpose of providing guidelines for designating a service class. We understand that designation of the primary intended service class does not imply strict bounding of the subject engine family to only that service class. In other words, the intent of designating a "primary" intended service class allows flexibility to apply the engine family in small volumes to non-primary service classes. For example, a medium heavy-duty engine family certified as Vocational may be installed in low volume fifth wheel equipped class 8 beverage haulers whose GVW exceeds 33,000 pounds and that operate primarily in urban environments. In addition, in light of the existing flexibilities, Daimler believes there is no need to expand the number of heavy-duty diesel service classes. [EPA-HQ-OAR-2010-0162-1818.1, p.30]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The proposed definitions for primary intended service classes in §1036.140 (i.e., light heavy-duty, medium heavy-duty, and heavy heavy-duty) are very similar, but not identical, to the primary intended service class definitions used for the purposes of criteria pollutant emissions. (See 40 C.F.R. §86.090-2.) However, the Preamble states that 'EPA's existing criteria pollutant emissions regulations for heavy-duty highway engines establish... regulatory categories that represent the engine's intended and primary truck application ... [and for] the purposes of the GHG engine emissions and engine fuel consumption standards that EPA and NHTSA are proposing, the agencies intend to maintain these same ... regulatory subcategories.' (See 75 FR at 74177.) Considering the explanation in the Preamble, and notwithstanding the minor differences in regulatory language, the Associations agree with the Agencies' intent that the primary intended service class designations for the Proposed GHG/FE Standards should be the same - including the same flexibilities -- as those for the criteria pollutant standards (e.g., an engine classified as medium heavy-duty may in some cases be used in vehicles above 33,000 lbs. GVWR). [EPA-HQ-OAR-2010-0162-1940.1, p.12]

Response:

These comments provided by stakeholders generally support EPA's position on proposing and adopting engine subcategories using primary intended service class for this HD program that mirror the approach used by the agency for criteria pollutant standards. As discussed in the proposal, we believe this approach allows the program to set standards that appropriately reflect the technology available for engines for use in each type of vehicle. We have also slightly realigned these service categories for purposes of ABT and other flexibilities again to mirror the existing classification scheme for criteria pollutants, consistent with the suggestion in the public comments.

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Regarding the proposed ·standards for Class 7 and 8 combination trucks, we note the agencies' observation that '[t]he importance of the engine design is that it determines the basic GHG emissions and fuel consumption performance of the engine for the variety of demands placed on the engine, regardless of the characteristics of the cab in which it is placed' (p.74161). This suggests in particular that inappropriate application of an engine could result in excess fuel consumption, a problem that the rule may aggravate inadvertently, as discussed below. [EPA-HQ-OAR-2010-0162-1894.1, p.8]

Recommendation (engine rated power): Specify a range of engine rated power for each subcategory. Require any engine certified in a given subcategory and having a rated power exceeding the range for that subcategory to meet the engine standards using a test with speed-torque points appropriate to a lower horsepower engine. [EPA-HQ-OAR-2010-0162-1894.1, p.8]

EPA's existing criteria pollutants regulations for heavy-duty highway engines establish four regulatory categories based on their intended and primary truck application as listed in Table 1. [EPA-HQ-OAR-2010-0162-1894.1, p.8]

[Table 1 can be found on page 9 of this comment.]

EPA regulations also discuss a range of typical horsepower levels for engines in each of these subcategories, as shown in Table 1. The proposed engine standards would be based on the intended application of an engine, however, and ·not its rated power (p.74166). At the same time, the test protocol reflects rated power, rather than intended use. This standard structure could have adverse consequences, including the promotion of oversized engines and higher fuel consumption and GHG emissions. [EPA-HQ-OAR-2010-0162-1894.1, p.9]

The problem arises from the fact that the standards would be set on a brake-specific basis. In general, a higher horsepower engine will achieve lower brake-specific fuel consumption (gallons per bhp-hr) and GHG emissions (grams per bhp-hr) over a fixed engine test cycle. This general trend is evident from 2009 EPA engine certification data, shown in Figure 1. Hence a higher horsepower engine will more easily meet the fuel consumption and GHG emissions standard for a given application. [EPA-HQ-OAR-2010-0162-1894.1, p.9]

[Figure 1 can be found on page 10 of this comment.]

Response:

We agree with the commenter that in general lower horsepower engines will have lower in-use GHG emissions and fuel consumption due to their lower acceleration rates, lower average speeds and likely lower top speeds as discussed in the preamble. However, we disagree with the contention that our standards will inadvertently promote "oversized engines and higher fuel consumption." The brake specific structure of the program encourages high power density engine designs (i.e. engine downsizing) by rewarding engines that produce greater power with lower parasitic losses. We believe to the degree that the standard structure leads to such high power density engines, we will realize a reduction in fuel consumption not only due to the lower parasitic losses of the smaller engines but also due to the resulting mass reductions resulting from the use of a physically smaller engine. In this regard, we note the recommendation of the NAS Report that the appropriate metric for regulating HD vehicle GHG emissions should be tied to the work done by the vehicle – consistent with the agencies' approach in the final rule.

We appreciate the commenter's suggestion regarding the creation of horsepower bands related to vehicle applications in an attempt to better align customer horsepower needs, but we do not believe such an approach is necessary and we are concerned that the approach could inadvertently lead to vehicles with lower utility. Manufacturers already provide tools for customers to use in selecting engine ratings appropriately matched to their expected operating routes and payloads. In general, we believe that customers largely follow these recommendations. In the context of this first ever regulation, the small hypothetical added benefit that could be had from trying to force such matching is likely offset by the added complexity that any such solution would entail. However, we fully intend to revisit this question in the next phase of regulations for heavy-duty trucks, and we look forward to working with this commenter and others on this matter.

6.2.1.2. FTP and SET Certified Engines

Organizations Included in this Section:

Daimler Trucks North America
Engine Manufacturers and Truck Manufacturers Associations
Volvo Group
Cummins Inc.
American Trucking Association

Organization: Daimler Trucks North America

Tractors Should Be Able To Get FTP-Certified Engines, And Similarly Vocational Vehicles Should Be Able To Get SET-Certified Engines, Because It Allows Optimizing Engines And Vehicles For Fuel Efficiency. [EPA-HQ-OAR-2010-0162-1818.1, p.25]

Certain vocational vehicles tend to operate like line-haul combination tractors (for example, a motorcoach). Additionally, there are certain line-haul tractors that tend to operate in pick-up and delivery applications (for example, a beverage tractor-trailer unit). Because of this potential “conflict” between design and operation, the Agencies should establish a process whereby a SET-certified engine could be installed in a vocational vehicle, and a FTP-certified engine could be installed in a combination tractor where supported by the expected operation of the vehicle in-use. [EPA-HQ-OAR-2010-0162-1818.1, p.25]

More specifically, Daimler recommends a three-tiered approach for dealing with this potential “conflict” between design and operation. First, any SET-certified engine should be permitted to be installed in a vocational vehicle. This should not concern the Agencies because the engine standards for combination tractors are more stringent, and the technologies required to meet the GHG standards under the SET will be more complicated and expensive. As a result, manufacturers will only be motivated to install SET-certified engines in vocational vehicles when it is appropriate to reduce fuel use in the specific application. Second, for specific applications, like beverage tractors, where combination tractors operate more like vocational vehicles, FTP-certified engines could be installed in combination tractors. Third, the remainder of any cross-over “conflict” situations would be addressed by utilizing engines dual-certified for use as both tractor and vocational engines. [EPA-HQ-OAR-2010-0162-1818.1, p.25]

Organization: Engine Manufacturers and Truck Manufacturers Associations

Certain vocational vehicles tend to operate like combination tractors (for example, a motorcoach). Additionally, there are certain combination tractors that tend to operate in pick-up and delivery or other vocational applications (e.g., a beverage tractor-trailer unit or a logging tractor). Because of this potential 'conflict' between design and operation, the Agencies should establish a process whereby a SET-certified engine could be installed in a vocational vehicle, and a FTP-certified engine could be installed in a combination tractor, where supported by the expected operation of the vehicle in-use. [EPA-HQ-OAR-2010-0162-1940.1, p.19]

More specifically, the Associations recommend a three-tiered approach for dealing with this potential 'conflict' between design and operation. As the first tier, any SET-certified engine should be permitted to be installed in a vocational vehicle. Since the engine standards for combination tractors are more stringent, and the technologies required to meet the GHG standards under the SET will be more complicated and expensive, manufacturers will only install (and customers will only request) SET-certified engines in vocational vehicles when it is truly necessary for the specific application. As the second tier, where a manufacturer believes that a specific combination tractor is designed to operate more like a vocational vehicle, the manufacturer would have the burden of establishing that a FTP-certified engine is more appropriate. The burden could be met by application of the manufacturer's good engineering judgment. Finally, as the third tier, any potential cross-over 'conflict' situation would be addressed by utilizing engines dual-certified to both the FTP and SET standards. [EPA-HQ-OAR-2010-0162-1940.1, p.19]

Organization: Volvo Group

Finally, it is inappropriate to require a tractor to have a highway engine, while requiring vocational vehicles to have vocational engines. It is necessary to allow manufacturers to install an engine in a vehicle that is optimized for its intended application instead of a dual certified engine (as EPA suggests) that may be optimized to one, the other, or neither duty cycle. Examples include a logging tractor for which a vocational engine is appropriate, or a motor coach for which a highway engine is appropriate. [EPA-HQ-OAR-2010-0162-1812.2, p.15]

Organization: Cummins, Inc.

Under the proposal, there is the potential for a mismatch between the engine and its intended operation in a vehicle. For example, a motor coach would be required to use a FTP-certified engine that is designed for vocational vehicles. However, the motor coach operates more like a tractor and should be paired with a SET-certified engine. Flexibility is needed within reason for a vehicle manufacturer to select the most appropriate engine for the application. Cummins commits to work with the Agencies and industry to develop such flexibility provisions. [EPA-HQ-OAR-2010-0162-1765.1, p.29]

Organization: American Trucking Association

ATA does not believe that it is appropriate to require a tractor to have a highway engine while requiring vocational vehicle to have vocational engines. It would be more appropriate to allow manufacturers to install an engine in a vehicle that is optimized for its intended application instead of a dual-certified engine that may be optimized to one, the other, or neither duty cycle. [EPA-HQ-OAR-2010-0162-2263.1, p.14]

Response:

While the agencies recognize the value to manufacturers of having additional flexibility that allows them to meet the standards in a way most consistent with how their vehicles and engines will ultimately be used, we remain concerned about increasing flexibility in ways that might impair fuel consumption improvements and CO_2 emissions reductions. The agencies are therefore providing the option in these final rules for some vocational vehicles, but not others, to have SET certified engines. Heavy heavy-duty vocational engines will be allowed to be SET certified for vocational vehicles, since SET certified HHD engines must meet more stringent GHG and fuel consumption standards than FTP certified HHD engines. Thus, a motor coach as in the example provided by Cummins, would be able to have a SET certified engine. We believe this will provide manufacturers additional flexibility while still achieving the expected fuel consumption and CO_2 emissions reductions. However, medium heavy-duty vocational engines will not be allowed to be SET-certified, because medium heavy-duty engines certified on the FTP must meet a more stringent standard than engines certified on the SET, and the agencies are not confident that fuel consumption and CO_2 emissions reduction levels would necessarily be maintained.

The agencies are also adopting new provisions in the final rulemaking to address the commenters' concerns which stated that some tractors could benefit from the use of a FTP-certified engine. The agencies have decided to allow manufacturers to exclude certain vocational-type tractors from the combination tractor standards. Such vocational tractors will now be subject to the vocational vehicle standards, not the tractor standards, and therefore will be required to install a FTP-certified engine.

6.2.1.3. Vocational Vehicle Categories and Subcategories

Organizations Included in this Section:

Daimler Trucks North America
Robert Bosch LLC
Clean Air Task Force (CATF)
National Solid Wastes Management Association (NSWMA)
National Truck Equipment Association (NTEA)
Allison Transmission
Odyne Systems, LLC

Organization: Daimler Trucks North America

The Agencies propose to divide the vocational vehicle segment into three broad regulatory categories - Light Heavy-Duty (Class 2b through 5), Medium Heavy-Duty (Class 6 and 7), and Heavy Heavy-Duty (Class 8), which is consistent with the nomenclature used in the diesel engine classification. The Agencies are interested in comment on this segmentation strategy. (75 Fed. Reg. 74198) Daimler agrees that the proposed segmentation for vocational vehicles is appropriate. [EPA-HQ-OAR-2010-0162-1818.1, p.46]

The Agencies propose that standards in the vocational vehicle category would apply to the chassis manufacturers of all HDVs not otherwise covered by the HD pickup and van standards or Class 7 and 8 combination tractor standards. The agencies request comment on our proposed focus on chassis manufacturers. (75 Fed. Reg 74165) Daimler agrees that the chassis manufacturers are the appropriate regulated entity for vocational vehicle standards. [EPA-HQ-OAR-2010-0162-1818.1, p.48]

Organization: Robert Bosch, LLC

- believes the agencies should subcategorize the vocational vehicle sector more accurately into at least nine distinct segments based on gross vehicle weight rating and vocational vehicle operational characteristics; [EPA-HQ-OAR-2010-0162-1630.1, p.3]

As indicated above, Bosch agrees with EPA and NHTSA that separate standards for tractors and the engines installed in them are justified. [EPA-HQ-OAR-2010-0162-1630.1, p.6]

As noted above, Bosch agrees with EPA and NHTSA that separate standards for vocational vehicles and the engines installed in them are logical. Bosch strongly believes, though, that a much better effort needs to be made at subcategorizing this complex and diverse HD vehicle segment. Unlike the combination tractor and PUV categories, there is not a "relative degree of homogeneity among trucks within" the vocational vehicle category, particularly when the category is defined to include all HD vehicles not encompassed within the PUV and combination tractor segments. [EPA-HQ-OAR-2010-0162-1630.1, pp.13-14]

EPA and NHTSA state that they "face difficulties in establishing the baseline CO2 and fuel consumption performance for the wide variety of vocational vehicles which makes it difficult to try and set different standards for a large number of potential regulatory categories." Bosch acknowledges these difficulties, but emphasizes that dividing the segment into three broad subcategories based solely on gross vehicle weight rating (GVWR) is overly simplistic, unfair, and perplexing. It is especially perplexing given that the agencies, as discussed above, have proposed to subdivide the far less diverse combination tractor category into no less than nine separate regulatory subcategories. Bosch applauds the agencies' intent "to gather GHG and fuel consumption data for specific vocational applications which could be used to establish application-specific standards in . . . future [rulemakings]," but is adamant in its belief that a better and more accurate effort at subcategorizing the vocational vehicle segment can and should be made by EPA and NHTSA in this rulemaking. [EPA-HQ-OAR-2010-0162-1630.1, pp.14-15]

Bosch believes that vocational vehicles are more accurately subcategorized by using GVWR (i.e., Light HD, Medium HD, and Heavy HD) together with the type of operation for which the vehicles are designed/the drive cycle(s) in which they typically operate. At this juncture, the subcategories should be application neutral (given the agencies' "lack of baseline information from the different vehicle applications"), so besides GVWR, subcategorization should be based on vehicle operating characteristics (e.g., average speed, distance between stops, percentage of idling time, etc.). A breakdown of generalized vocational vehicle operation/drive cycle types that, in Bosch's view, captures the full breadth of vocational vehicle operational characteristics is shown below: [EPA-HQ-OAR-2010-0162-1630.1, p.15]

(1) Urban Stop-and-Go: characterized by frequent stops and short distances between stops. Examples include (but are not limited to) urban transit buses, school buses, refuse trucks, and package delivery vehicles (e.g., U.S. Postal Service, FedEx, United Parcel Service, etc.). [EPA-HQ-OAR-2010-0162-1630.1, p.15]

(2) Intermediate Distance Stop-and-Go: characterized by frequent stops, but less frequent than Urban Stop-and-Go operation. Examples include non-urban package delivery vehicles, transit buses, school buses, shuttle buses, paratransit buses, and similar applications. [EPA-HQ-OAR-2010-0162-1630.1, p.15]

(3) Point-to-Point: characterized by much longer daily driving distances and higher average speed driving. Examples include (but are not limited to) regional food and/or package distribution/delivery using straight trucks, concrete delivery, and large dump trucks. [EPA-HQ-OAR-2010-0162-1630.1, p.15]

Thus, a more detailed, but still manageable approach to vocational vehicle segmentation, one that is based both on weight classification and the above operational characteristics, would result in the following nine subcategories: [EPA-HQ-OAR-2010-0162-1630.1, p.16]

[Table can be found on page 16 of this comment.]

In Bosch's view, such a subcategorization of the vocational vehicle category would be more accurate and appropriate than the GVWR-alone approach proposed by the agencies. In addition, it would be more equitable because it would represent and reward better the adoption of beneficial technologies aimed at reducing GHG emissions and fuel consumption (see section III.C.2.b immediately below). Finally, and importantly, this nine-subcategory regulatory structure at least would be consistent with the proposed approach for the less diverse, more homogeneous combination tractor sector. [EPA-HQ-OAR-2010-0162-1630.1, p.16]

Bosch generally agrees with the agencies' focus, for purposes of the vehicle standards, on the chassis manufacturers of vocational vehicles. The build process for these vehicles is indeed "organized in a more complex way than that of the other [HD] categories," and Bosch concurs with EPA and NHTSA that body manufacturers should not be subject to the proposed GHG emissions and fuel consumption standards. [EPA-HQ-OAR-2010-0162-1630.1, pp.24-25]

Organization: Clean Air Task Force (CATF)

While we support the basic structure of EPA's regulatory approach for combination trucks and heavy-duty pickups and vans, we do not believe that EPA has adequately addressed the diversity of the vocational truck fleet. Although EPA stresses the diverse nature of these vocational trucks, it segments them only by weight class, and does not further distinguish them by use or duty cycle. While we understand EPA's desire to treat this sector in a simplified manner for the instant rulemaking, we believe that in order to capture the full potential benefits of hybridization and other advanced technologies in a meaningful and accurate way in future rule-makings for MY2019 and later trucks, EPA must sub-divide vocational trucks by expected use, with separate test cycles and numerical standards for each sub-group. [EPA-HQ-OAR-2010-0162-2734.1, pp.10-11]

Organization: National Solid Wastes Management Association (NSWMA)

We understand the rationale behind dividing the universe of heavy duty trucks into three categories. However, we are concerned about the decision to shoehorn the highly diverse universe of vocational trucks into three weight-based subcategories. We are even more concerned with the proposed use of a computer simulation model to establish fuel consumption standards. The proposal creates a procrustean "one size fits all" model for the highly diverse universe of heavy heavy-duty vocational vehicles. The proposed model does not resemble any of the trucks used by the solid waste industry. As a result, it will not produce results that reflect real world operating conditions in our industry, nor will it produce results that provide accurate or meaningful measures of fuel consumption or emission reduction. [EPA-HQ-OAR-2010-0162-1870.1, p.2]

The theoretical models proposed by the agencies are particularly frustrating because the NAS study is clear about the regulatory importance of the significant differences among the universe of vocational vehicles. Even in its press release announcing the release of its study, the NAS specifically noted that "NHTSA will need to establish standards tied to the task associated with a particular type of vehicle; garbage trucks might be held to a different standard than transit buses, for example". Instead, NHTSA and EPA have chosen to write a standard that assumes all vocational vehicles are exactly alike in all respects. Even though the agencies note the pre-assigned values in the GEM will remain in force until they chose to amend them through a rulemaking, we believe a far better approach would be to wait until the agencies can work on this unique universe of vehicles and avoid the serious unintended results discussed in these comments. [EPA-HQ-OAR-2010-0162-1870.1, p.9]

Organization: National Truck Equipment Association (NTEA)

Clearly, as the agencies have concluded, the chassis and the engine are the components of a vocational truck that offer the greatest opportunities for fuel efficiency increases and greenhouse gas reductions. We support this conclusion. This method of regulation creates a level playing field and provides fuel efficiency benefits to every vocational truck built, regardless of use. [EPA-HQ-OAR-2010-0162-1608.1, p.10]

Organization: Allison Transmission

In addition to the categories proposed, EPA and NHTSA should consider the establishment of a separate category for buses. Such vehicles constitute a major subsector of Class 2-8 vehicles. According to available information, school buses alone constitute 30,710 units out of a total 125,110 units for Classes 5_749 Other transit buses, shuttle buses, and motor coaches may add up to an additional 10,000 units per year to this total. [EPA-HQ-OAR-2010-0162-2735.1, p.25]

In particular, EPA and NHTSA should consider different drive cycle testing for buses to reflect their different operational profiles. While buses, like any category of vehicles subject to this rulemaking vary within the category, it would appear facially implausible to project that school buses spend either 86% or 58% of their operational time at speeds over 55 mph as presumed within the drive cycles utilized in Class 7-8 tractor cabs and Class 2-8 vocational vehicles. Instead, given the relative large and distinct vehicle group presented by buses, different drive cycles reflecting operation in urban environments, transient operations associated with multiple stops and starts and normal routes driven by such vehicles should be considered. [EPA-HQ-OAR-2010-0162-2735.1, p.25]

Organization: Odyne Systems, LLC

Odyne recommends that the EPA broaden the regulatory approach to include solutions outside of the chassis OEM. The EPA should include solutions that are developed from intermediate and final stage manufacturers. Medium and heavy-duty trucks are typically manufactured and marketed to customers much differently than cars and light-duty trucks. Due to lower volumes of trucks sold (vs. passenger cars) and the high level of specialized applications, the truck manufacturing industry has evolved to enable a high degree of customization. Most medium and heavy-duty trucks are typically built in multiple stages. During the first stage, an original equipment manufacturer builds an incomplete vehicle, commonly known as a chassis. The vehicle is then often completed by a different company, known as a final stage manufacturer. Final stage manufacturers typically evaluate the intended application of the vehicle, perform engineering analysis, and then install an appropriate body, equipment and interface components with chassis systems in a manufacturing operation. As stated in the overview, the application may not be know at the time the chassis is manufactured, so it is highly desirable to included hybrid solutions that can be installed in later stages of manufacturing to better match the actual application. [EPA-HQ-OAR-2010-0162-1853.1, p.8]

Response:

The agencies are adopting vocational vehicle fuel consumption and CO_2 emissions standards premised on the use of low rolling resistance tires. The fuel consumption and GHG emissions impact of tire rolling resistance is impacted by the mass of the vehicle. However, the impact of mass on rolling resistance is relatively small so the agencies proposed to aggregate several vehicle weight categories under a single category for setting the standards. The agencies proposed to divide the vocational vehicle segment into three broad regulatory subcategories - Light Heavy-Duty (Class 2b through 5), Medium Heavy-Duty (Class 6 and 7), and Heavy Heavy-Duty (Class 8) which is consistent with the nomenclature used in the diesel engine classification. As noted above, the agencies received comments supporting the division of vocational vehicles into three regulatory categories from DTNA. The agencies also received comments from Bosch, Clean Air Task Force, and National Solid Waste Management Association supporting a finer resolution of vocational vehicle subcategories. Their concerns include that the agencies' truck configuration in GEM is not representative of a particular vocational application, such as refuse trucks. Another recommendation was to divide the category by both GVWR and by operational characteristics. Upon further consideration, the agencies are finalizing as proposed three vocational vehicle subcategories because we feel this adequately balances simplicity while still obtaining reductions in this diverse segment. Finer distinctions in regulatory subcategories would not change the technologies or reductions expected from the vocational vehicle category under the final standard, and so would add regulatory complexity to no purpose. As the agencies move towards future heavy-duty fuel consumption and GHG regulations for post-2017 model years, we intend to gather GHG and fuel consumption data for specific vocational applications which could be used to establish application-specific standards in the future.

6.2.1.3.1. Class 4 Vehicle Category

Organizations Included in this Section:

Engine Manufacturers and Truck Manufacturers Associations
Navistar, Inc.
Cummins, Inc.
National Truck Equipment Association

Organization: Engine Manufacturers and Truck Manufacturers Associations

Any vehicle that does not meet either of the foregoing definitions is presumptively a 'vocational vehicle' for the purposes of the GHG/FE Standards. If the Agencies believe that such a vehicle should nonetheless be classified as a 'combination tractor' or a 'heavy-duty pickup truck or van,' the Agencies would have the burden of demonstrating that fact. [EPA-HQ-OAR-2010-0162-1940.1, p.18]

EMA and TMA recommend that all Class 4 vehicles (i.e., with GVWRs from 14,001 - 16,000 pounds) be classified as 'vocational vehicles.' No Class 4 vehicles should be categorized as a HD pick-up truck or van. Consequently, all Class 4 vehicles should be subject to engine-dynamometer (not chassis-dynamometer) certification testing for CO2 emission. There are many reasons justifying the Associations' recommendation. [EPA-HQ-OAR-2010-0162-1940.1, p.18]

First, Class 4 vehicles are specifically designed for and sold to vehicle body-builders in the vocational market, which then tailor the Class 4 vehicles to vocational purposes that are far more diverse than those pertaining to HD pickup trucks. Second, Class 4 vehicles (unlike smaller commercial vehicles) have higher numeric axle ratios, and may utilize transmissions with a PTO for running hydraulic equipment. Third, the Agencies would need to develop a distinct work factor, baseline and standard to account for the greater amount of work performed by Class 4 vehicles in comparison with HD pickup trucks and vans. Fourth, the test weight for Class 4 vehicles, if tested without a body (which is the only way they could be tested if they were classified as pickups and vans), would not be consistent with the intended operation or the expected GVWR of the vehicle, which can include options ranging from drilling rigs to ambulance bodies. Finally, treating Class 4 vehicles as pick-up trucks or vans would cause a misalignment of the process for testing and certifying compliance with the standards for criteria pollutants (assessed on an engine dynamometer) versus GHGs/FE (assessed on a chassis-dynamometer). That type of misalignment would engender unworkable and unreasonable results. [EPA-HQ-OAR-2010-0162-1940.1, p.18]

Accordingly, Class 4 vehicles should be classified as 'vocational vehicles' under the Proposed GHG/FE Standards. [EPA-HQ-OAR-2010-0162-1940.1, p.18]

Organization: Navistar, Inc.

As noted above and in the NAS report, the heavy-duty vehicle industry produces a diverse product. This diversity does not lend itself to easy classification of vehicles. In creating the various vehicle classifications, EPA has tried to tame this diversity. However, EPA’s vehicle classifications only compound and, more importantly, constrain the necessary product diversity needed in this industry. Instead, EPA must adopt a broad categorization for vehicle categories. [EPA-HQ-OAR-2010-0162-1871.1, p.31]

Any vehicle that does not meet either of the foregoing definitions is presumptively a “vocational vehicle” for the purposes of the standards. If EPA believes that such a vehicle should nonetheless be classified as a “combination tractor” or a “heavy-duty pickup truck or van,” EPA would have the burden of demonstrating that fact. [EPA-HQ-OAR-2010-0162-1871.1, p.34]

All Class 4 vehicles (with GVWRs from 14,000-16,000 pounds) must be classified as “vocational vehicles.” No Class 4 vehicle should be categorized as a HD pickup or van. Consequently, all Class 4 vehicles must have the option to be subject to engine-dynamometer (not chassis-dynamometer) certification testing for CO2 emissions. [EPA-HQ-OAR-2010-0162-1871.1, p.35]

First, Class 4 vehicles are specifically designed for and sold to vehicle body-builders in the vocational market, who then tailor the Class 4 vehicles to vocational purposes that are far more diverse than those pertaining to heavy-duty pickups and vans. Second, Class 4 vehicles (unlike smaller commercial vehicles) have higher numeric axle ratios, and utilize transmissions with a PTO for running hydraulic equipment. Third, the Agencies would need to develop a distinct work factor, baseline and standard to account for the greater amount of work performed by Class 4 vehicles in comparison with heavy-duty pickups and vans. Fourth, the test weight for Class 4 vehicles, if tested without a body (which is the only way they could be tested if they were classified as pickups and vans), would not be consistent with the intended operation or the expected GVWR of the vehicle, which can include options ranging from drilling rigs to ambulance bodies. Finally, treating Class 4 vehicles as pickups or vans would cause a misalignment of the process for testing and certifying compliance with the standards under part 86 (assessed on an engine dynamometer) versus GHGs (assessed on a chassis-dynamometer). That type of misalignment would engender unworkable and unreasonable results. [EPA-HQ-OAR-2010-0162-1871.1, p.35]

Accordingly, Class 4 vehicles must be classified as “vocational vehicles” under the Proposed GHG Rule. And, in order to promote greater flexibility, EPA must permit optional certification of Class 4 vehicles as chassis certified similar to Class 2b/3, with appropriate criteria and GHG pollutant standards to their operations and ratings. [EPA-HQ-OAR-2010-0162-1871.1, p.35]

Organization: Cummins, Inc.

Class 4 vehicles should remain in the vocational engine and vehicle programs, not part of the HD pickups and vans program. Class 4 vehicles (14,001 to 16,000 lb GVWR) are specifically engineered and marketed to meet vocational requirements. Many of the vehicles in this class are not sold as complete, ready to be placed into service, vehicles. The common sales path to the end-user is through a specialty body or utility function builder. While the vehicle OEM can communicate parameters such as aerodynamic design standards to which the finish builders must comply, the finish body may exceed the frontal projection and/or may affect air flow quite differently than on a complete pickup truck or even on the bare “cab-complete” vehicle. [EPA-HQ-OAR-2010-0162-1765.1, p.32]

Vehicles in this market, while having a similar look to their smaller counterparts in Class 2b and 3, are engineered quite differently. For high volume products, these trucks will use the same cab as the Class 2b and 3 vehicles, but the frame, axles, engines, transmissions and tires are configured specifically to support a wide range of utility uses for the end-users. If the intent of including Class 4 vehicles in the HD pickups and vans category would be to gain efficiency via aerodynamic body features, accessories or through the use of lightweight interior or body hardware, this is already achieved by virtue of the OEM’s need to stay common with the lighter class of vehicles. [EPA-HQ-OAR-2010-0162-1765.1, p.32]

Quite often the options for the transmission and axles are not common with Class 2b and 3 vehicles. Transmissions may have power take-off (PTO) options and equipment such as supplemental hydraulic pumps to suit the needs of the application. The range of drive axle ratios typically includes numeric values greater than five. Of course, the effect of such high axle ratios could have a negative effect on GHG/FC given the drive cycles being proposed, but these options exist to satisfy the needs of the end- user's application. [EPA-HQ-OAR-2010-0162-1765.1, p.32]

Additionally, chassis certification for Class 4 vehicles would require considerable capital investment for the facilities that would be needed to test and develop such heavy vehicles. Dynamometer ratings, combustion air conditioning, cooling and braking capacity and physical size of the test chamber would all need to be considered. In addition to this investment, the additional testing would add significant cost to the final product. This could have the unintended consequences of leading manufacturers to exit the market and driving end-users to buy either larger vehicles with higher GHG/FC or lighter, less capable vehicles. [EPA-HQ-OAR-2010-0162-1765.1, pp.32-33]

The baseline for setting HD pickups and vans standards did not include vehicles in Class 4 and is therefore not valid for vehicles other than Class 2b and 3. For this reason and the ones previously stated, Cummins does not support regulating Class 4 vehicles along with HD pickups and vans on a chassis certification basis. [EPA-HQ-OAR-2010-0162-1765.1, p.33]

Organization: National Truck Equipment Association (NTEA)

We do not believe it would be appropriate to include class 4 vehicles in the heavy duty pickup and van category. While some small number of Class 4 trucks exhibiting pickup or van traits are used for the final manufacture of trucks in the RV, School Bus and Fire Apparatus industry, to the best of our knowledge, the only class 4 complete vehicle an OEM makes of this nature is the F450 SuperDuty Pickup – typically sold in limited numbers for recreational towing purposes. The vast majority of class 4 trucks are used in vocational purposes and produced by a second stage manufacturer adding a vocational body and/or equipment to an OEM produced chassis. [EPA-HQ-OAR-2010-0162-1608.1, p.7]

<u>Response:</u>

The agencies proposed that Class 4 pickup trucks, although similar to Class 2b and 3 vehicles, be included in the vocational vehicle category, but requested comment on including them with HD pickups and vans. Comments from EMA, Cummins, NTEA and Navistar supported the premise that Class 4 vehicles belong as part of the vocational vehicle program because they are specifically designed and engineered to meet vocational requirements. They stated correctly that components such as transmissions, axles, frames, and tires differ from the similar pickup truck and vans in the Class 2b and 3 market. Given the consensus on this issue, the agencies are finalizing the proposed approach to classify Class 4 pickup trucks in the vocational vehicle category. Consistent with suggestions in a number of these comments, the agencies are also providing a provision in the final rulemaking to allow manufacturers the option to chassis certify Class 4 and 5 vehicles, in which case these vehicles would be subject to the standards for heavy duty pickups and vans. See section V.B.1.e of the preamble to the final rules.

6.2.1.4. Additional Comments

Organizations Included in this Section:

Green Truck Association (GTA)
Waste Management

Organization: Green Truck Association (GTA)

The majority of our comments concern the vocational truck category. These trucks serve a much different purpose than do passenger cars and also are built in a much different process than are passenger cars. A vocational truck begins when an OEM builds a chassis that includes the engine and transmission, then one or more companies (known as intermediate or final stage manufacturers depending on their place in the manufacturing process) install a work-related body and/or equipment specific to the needs of the customer. Trucks of this type include, but are not limited to, aerial bucket trucks, digger derricks, step vans, ambulances, snow removal trucks, dump trucks, utility trucks and tow trucks. The number of buildable chassis, body and equipment configurations is enormous. [EPA-HQ-OAR-2010-0162-1596.1, p.2]

The marketplace demands such a wide variety of configurations for reasons of efficiency. Unlike passenger cars, commercial trucks are purchased to work. The more efficient a truck is in performing its intended function and the less costly it is to operate, the better. Efficiency is created by matching the proper chassis to the proper body and work-related equipment for a particular set of work tasks. [EPA-HQ-OAR-2010-0162-1596.1, p.2]

Not uncommonly when the chassis for a vocational truck is built the OEM will not know the truck's final application. Once known, additional components may be added by intermediate or final stage manufacturers to enhance fuel efficiency based on the vehicle's expected use. It is of benefit to the owners of such trucks and the public that any such fuel saving devices be promoted. [EPA-HQ-OAR-2010-0162-1596.1, p.4]

Organization: Waste Management

Emphasis on Existing Technologies to Promote Improvements in Chassis and Engines: We support the emphasis on developing standards for the final stage vehicle manufacturers since they have the greatest control over the design of the vehicle and its major subsystems that affect fuel consumption. As a major vehicle purchaser we work closely with our suppliers and continually challenge them to provide improved reliability, emissions performance and enhanced fuel efficiency. [EPA-HQ-OAR-2010-0162-1854.1, pp.2-3]

Recognition of Fleet Diversity: WM appreciates the recognition that 'all trucks are not created equal' and that there are few areas for truck body improvements that will have significant impacts on vocational truck emissions. It is critical that fuel consumption metrics be tied to the task associated with a particular type of vocational vehicle. [EPA-HQ-OAR-2010-0162-1854.1, p.3]

Response:

The agencies recognize the vast diversity in the vocational vehicle segment. To establish standards for a complete vocational vehicle, it would be necessary to assess the potential for fuel consumption and GHG emissions improvement for each of these vehicle types and to establish standards for each vehicle type. Because of the size and complexity of this task, the agencies judged it was not practical to regulate complete vocational vehicles for this first fuel consumption and GHG emissions program and these comments provide support for that conclusion. To overcome the lack of information as to baselines from the different vehicle types and to still achieve improvements in fuel consumption and reductions of GHG emissions, the agencies proposed to set standards for the chassis manufacturers of vocational vehicles (instead of the body builders) and the engine manufacturers. Chassis manufacturers represent a limited number of companies as compared to body manufacturers, which are made up of a diverse set of companies that are typically small businesses. These companies would need to be regulated if whole vehicle standards were established.

Organization: National Solid Wastes Management Association (NSWMA)

Under Federal law (see U.S. Code Title 23, chapter 1, subchapter 1, Section 127) commercial motor vehicles are subject to Federal size and weight regulations. Long haul tractor trailers, for instance, can have a gross weight of 80,000 pounds on the national highway system. Solid waste industry vehicles, however, have a much lower weight limit because of their shorter wheelbase and a need to avoid excessive flexural effects on bridges caused by heavy, clustered, concentrated axle loads. The shorter wheelbase is an absolute necessity in order to meet the level of maneuverability demanded by waste collection operations. These trucks must negotiate narrow alleys, residential cul-de-sacs and tight areas within commercial and industrial sites. They must be able to place large containers in very precise locations. In some cases such as compactor/containers, the placement tolerance is as little as several inches. Yet this short wheelbase also leads to the very strict truck weight requirements of Federal law. [EPA-HQ-OAR-2010-0162-1870.1, p.3]

Under the Federal Bridge Formula B, 51,000 pounds is the legal weight limit on the national highway system for 3 axle waste industry collection vehicles. While some states have higher weight limits that were "grandfathered" into the Federal law when it was first enacted in 1956, they are the exception, not the rule. The practical reality is that the national highway system is so extensive and grandfathers so limited, that the legal weight limit for the vast majority of the solid waste fleet is 51,000 pounds. As a result, whenever additional weight is added to the curb weight of a solid waste collection truck, whether as a result of additional emission control equipment, a hybrid power train to improve fuel efficiency, tanks and other unique equipment necessary to use alternative fuels such as compressed or liquid natural gas in place of diesel fuel, or equipment such as brake retarders used to improve braking performance, the curb weight of the truck is increased and the payload weight of the truck is decreased. Additional collection trucks will be needed, more fuel will be consumed and more emissions created. [EPA-HQ-OAR-2010-0162-1870.1, pp.3-4]

Meeting truck weight laws is an operational and legal imperative for the solid waste industry. We realize that neither EPA nor NHTSA have regulatory authority over truck weight limits. Nonetheless, the two agencies must accept the reality that their proposal, combined with the impact of truck weight laws, will have the completely unintended consequence of higher levels of fuel consumption and increased emissions. We do not believe this is what EPA and NHTSA wish to accomplish. [EPA-HQ-OAR-2010-0162-1870.1, p.4]

Response:

The agencies have developed a HD program while being sensitive about unintended consequences. We are adopting provisions in the final rulemaking that allows tractors which operate in vocational applications and may be adversely impacted by aerodynamic devices which add weight to a vehicle, to be regulated as a vocational vehicle in our program. As such, these vehicles could demonstrate compliance with the fuel consumption and CO_2 emissions standards using a certified engine and low rolling resistance tires. Tires designed to have lower rolling resistance do not weigh more than standard tires since the overall size of the tire remains the same. Therefore, the agencies do not believe that we are adversely impacting sanitation vehicles in terms of payload capability.

6.2.1.5. Tractor Definition

Organizations Included in this Section:

Daimler Trucks North America
Navistar, Inc.
National Truck Equipment Associations
Engine Manufacturers and Truck Manufacturers Associations

Organization: Daimler Trucks North America

Differences Between The EPA And NHTSA Programs Must Be Addressed. This rulemaking will not result in a unified program unless there is only one set of procedures a manufacturer need follow. First and foremost, any differences in the regulations should be rectified. One example difference is that all sleepers are tractors to NHTSA while not all are tractors to EPA. (Compare (a) the definition proposed on 75 Fed. Reg. 74175 and in 49 Code Fed. Reg. §523.9 with (b) that proposed in 40 CFR §1037.801. The former, (a), includes all sleeper-equipped vehicles, while the latter, (b), does not include those with cargo carrying features, like on expediter vehicles or vehicles with dromedary boxes.) [EPA-HQ-OAR-2010-0162-1818.1, p.17]

Another example is that NHTSA and EPA have different definitions of tractor. The mere difference in language between the Agencies' regulatory provisions creates the possibility of divergent substantive requirements. In turn, divergent requirements such as these force separate tracking of GHG and FE credits, of vehicle families, and so on. This is unnecessary and must be rectified. [EPA-HQ-OAR-2010-0162-1818.1, p.17]

The Agencies' Definitions Of "Sleeper" Are Inconsistent. This And Other Inconsistencies Need To Be Resolved In Order To Have A Common Regulatory Program. [EPA-HQ-OAR-2010-0162-1818.1, p.55]

On page 75 Fed. Reg. 74175, the Agencies state that they propose "to classify all vehicles with sleeper cabs as tractors." NHTSA's proposed regulations do. EPA's do not. Rather, the EPA's definition of "tractor" in §1037.801 at 75 Fed. Reg. 74402 contains several other defining characteristics but no mention of the qualifier that all vehicles with sleepers are tractors. The definition of "sleeper cab" does contain a reference to "tractor" (Id.), but it does not explicitly say that all vehicles containing what manufacturers would call a sleeper are in the tractor categories. If this was the implication that the EPA intended, the Agency should clarify. But better yet, the Agencies should use the exact same language, so that there are no implications in one Agency's regulations and not in the other's. [EPA-HQ-OAR-2010-0162-1818.1, p.55]

The same recommendation applies for all sections of the Agencies' proposed regulations: wherever the two Agencies use different regulatory language and different definitions, they create the possibility of divergent programs. Rather, they should resolve their differences, or else they run the risk of not taking the "coordinated" regulatory steps that they promised on page 75 Fed. Reg. 74152. [EPA-HQ-OAR-2010-0162-1818.1, p.55]

Some Vehicles, Like Expediter Vehicles, Which Have Sleepers And Thus Are Tractors Under NHTSA Regulations And May Be Tractors Under EPA Regulations, Do Not Have Trailers Nor Underbody Treatments. These Vehicles Should Be Classified As Vocational Vehicles. Some vehicles may not be properly classified. For example, "expediter" vehicles, straight trucks with sleeper cabs, are not well covered by the regulation. As we noted above, the Agencies treat sleeper-equipped vehicles in divergent manners. Moreover, because we do not offer trucks with underbody or chassis side fairings, which are important for compliance with tractor regulations, these vehicles may not fit well into tractor categories. Developing these fairings and bringing them to full production, if the Agencies' rule keeps such vehicles in the tractor category, will take time (for design, testing, part tooling, etc.). In turn, the lack of lead time (noted above) for these regulations may be problematic with expediters. As stated elsewhere, with the premise of the Agencies' program being use of existing technologies, and with us not having technologies to meet the Agencies' presumed Cd on such vehicles, we recommend that the Agencies define such vehicles to be vocational vehicles. [EPA-HQ-OAR-2010-0162-1818.1, pp.74-75]

Organization: Navistar, Inc.

As proposed, the vehicle classifications and engine application requirements are not flexible enough to account for significant segments of the market. The Proposed GHG Rule separates heavy-duty vehicles into three groups: (1) heavy-duty pickup trucks and vans; (2) combination tractors; and (3) vocational vehicles. The proposed rules, however, provide confusing, unnecessarily complicated and, in some cases, conflicting definitions of which vehicles are included in each category. For example, NHTSA defines "combination tractors" as including "truck tractors" above 26,000 lbs. GVWR, using the simple definition of truck tractor that has been in effect for NHTSA's safety regulations since 1968 (i.e., "a truck designed primarily for drawing other motor vehicles"). See 49 CFR § 571.3. However, EPA proposes to define the same group with a new "tractor" definition, which curiously includes an undefined fifth wheel and adds specifications for the rear portion of the vehicle's frame. The two definitions clearly are different and undoubtedly will lead to differing applications of EPA's and NHTSA's requirements. That is not acceptable and, presumably, not intended. [EPA-HQ-OAR-2010-0162-1871.1, pp.31-32]

EPA and NHTSA both provide that any truck with a sleeper cab automatically is considered a tractor or truck tractor. The preamble states that such categorization is intended to "prevent the initial manufacturers of straight truck vocational vehicles with sleeper cabs that, soon after introduction into commerce, would be converted to combination tractors, as a means to circumvent the Class 8 sleeper cab regulations." There is no factual basis for EPA's unsubstantiated concern. More important, EPA's proposed definition overlooks the fact that often, and for valid reasons, straight trucks are built and sold with sleeper cabs. The Agencies also overlook the fact that the potential circumvention they seek to prevent would actually require expensive and complicated changes to the vehicle (e.g., to the air brake systems, and recertification to NHTSA safety standards). Thus, not only would the hypothetical actions be considered illegal tampering, they would be cost-prohibitive to undertake in the first place. Thus, the automatic assumption regarding sleeper cabs should be deleted. [EPA-HQ-OAR-2010-0162-1871.1, p.32]

EPA and NHTSA must have clear and consistent regulations establishing vehicle groupings based on clear and consistent criteria. Accordingly, both Agencies must adopt uniform criteria for presumptively determining those vehicles that qualify as "combination tractors" and those vehicles that qualify as "heavy-duty pickups and vans." Further, the Agencies must explicitly establish that those vehicles that do not meet the clearly defined criteria for either grouping will be presumed to be "vocational vehicles." Finally, the Agencies must allow manufacturers that believe a vehicle is improperly categorized to have the opportunity to overcome the presumptive criteria-based categorization. [EPA-HQ-OAR-2010-0162-1871.1, p.32]

The following definitions must be applied:

Combination Tractors: This category should only include vehicles with a GVWR above 26,000 lbs. that meet the DOT definition for truck tractor, i.e., “a truck designed primarily for drawing other motor vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and the load so drawn.” See 49 CFR § 571.3. [EPA-HQ-OAR-2010-0162-1871.1, pp.32-33]

“Combination tractors” should have a front axle GVWR of 14,600 lbs. or less, and a single rear drive axle GVWR of 23,000 lbs. or less, or two rear drive axles with a combined GVWR of 45,000 lbs. or less. They may have additional non-driven axles, but a total GVWR of 85,000 lbs. or less. [EPA-HQ-OAR-2010-0162-1871.1, p.33]

“Combination tractors” are intended exclusively for on-highway applications and typically accumulate more than 50,000 miles annually. They are designed to operate within federal size and weight limits, which may include operation as part of a long combination vehicle. They are not intended for use that would require a special size or weight permit. [EPA-HQ-OAR-2010-0162-1871.1, p.33]

Organization: National Truck Equipment Association (NTEA)

The NTEA supports the Agencies’ regulatory approach to this complex issue. Recognizing the diversity of the medium and heavy truck market and applying different regulatory approaches to differing segments of the industry is appropriate and reasonable. We would like to address three issues with regard to the proposed vehicle categories. [EPA-HQ-OAR-2010-0162-1608.1, p.5]

The proposed rules defines tractor for the purposes of the Class 7 – 8 Combination Tractors category. The proposal calls for all vehicles with sleeper cabs to be classified as tractors. [EPA-HQ-OAR-2010-0162-1608.1, p.7]

‘‘Tractor’’ is defined in proposed section 1037.801 to mean ‘‘a vehicle capable of pulling trailers that is not intended to carry significant cargo other than cargo in the trailer, or any other vehicle intended for the primary purpose of pulling a trailer.’’ [EPA-HQ-OAR-2010-0162-1608.1, p.7]

Included as part of the proposed definition – “(2) The following vehicles are not tractors: (i) Any vehicle sold to an ultimate purchaser with an installed cargo-carrying feature. For example, this would include dump trucks and cement trucks.” [EPA-HQ-OAR-2010-0162-1608.1, p.7]

At 75 CFR 74175 the Agencies state:

The proposed rules would not allow vehicles with sleeper cabs to be classified as vocational vehicles. This provision is intended prevent the initial manufacture of straight truck vocational vehicles with sleeper cabs that, soon after introduction into commerce, would be converted to combination tractors, as a means to circumvent the Class 8 sleeper cab regulations. The agencies welcome comments on the likelihood of manufacturers using such an approach to circumvent the regulations and the appropriate regulatory provisions the agencies should consider to prevent such actions. [EPA-HQ-OAR-2010-0162-1608.1, p.8]

A vocational truck known as an Expediter Cab could incorrectly be regulated as a combination tractor under these proposed definitions. An Expediter Cab has a cargo-carrying van body permanently attached by a second stage manufacturer but can be optioned to have a sleeper cab. Typically, expediter trucks of this nature are class 6 trucks although some can be larger. We are concerned that by virtue of having a sleeper cab, even though it is built from a cab-chassis with a permanently attached cargo carrying body attached by a final stage manufacturer, it could be arguably defined as a tractor within this proposed rule. [EPA-HQ-OAR-2010-0162-1608.1, p.8]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The Proposed GHG/FE Standards separate HD vehicles into three groups: (1) heavy-duty pickup trucks and vans; (2) combination tractors; and (3) vocational vehicles. However, the EPA and NHTSA regulations provide confusing, unnecessarily complicated, and, in some cases, conflicting definitions of which vehicles are included in each category. For example, the NHTSA regulations define the 'combination tractors' group as including 'truck tractors' above 26,000 lbs. GVWR, using the simple definition of truck tractor that has been in effect for NHTSA's safety regulations since 1968 (i.e., 'a truck designed primarily for drawing other motor vehicles ... '). (See 49 CFR §571.3) However, EPA proposes to define the same group with a new definition of 'tractor,' which includes an undefined 'fifth wheel coupling' and adds specifications for the rear portion of the vehicle's frame. (See 75 FR at 74402.) The two definitions clearly are different and undoubtedly will lead to differing applications of EPA's and NHTSA's requirements. That is not acceptable and, presumably, not intended. EPA and NHTSA need to adopt identical definitions of 'combination tractors.' [EPA-HQ-OAR-2010-0162-1940.1, p.16]

EPA and NHTSA both provide that any truck with a sleeper cab automatically is considered a tractor or truck tractor. The Preamble states that such categorization is intended to 'prevent the initial manufacturers of straight truck vocational vehicles with sleeper cabs that, soon after introduction into commerce, would be converted to combination tractors, as a means to circumvent the Class 8 sleeper cab regulations.' (See 75 FR at 74175.) There is no basis for the Agencies' unsubstantiated concern. More important, the proposed definition overlooks the fact that often, and for valid reasons, straight trucks are built and sold with sleeper cabs. The Agencies also overlook the fact that the potential circumvention they seek to prevent would actually require expensive and complicated changes to the vehicle (e.g., to the air brake systems, and recertification to NHTSA safety standards). Thus, not only would the hypothetical actions be considered illegal tampering, they would be cost-prohibitive to undertake in the first place. Thus, the automatic assumption regarding sleeper cabs should be deleted. [EPA-HQ-OAR-2010-0162-1940.1, p.16]

EPA and NHTSA must have clear and consistent regulations establishing HD vehicle groupings based on clear and consistent criteria. Accordingly, both Agencies should adopt uniform criteria for presumptively determining those vehicles that qualify as 'combination tractors' and those vehicles that qualify as 'heavy-duty pickups and vans.' Further, the Agencies should explicitly establish that those vehicles that do not meet the clearly defined criteria for either grouping will be presumed to be 'vocational vehicles.' Finally, the Agencies should allow manufacturers that believe a vehicle is improperly categorized to have the opportunity to overcome the presumptive criteria-based categorization. [EPA-HQ-OAR-2010-0162-1940.1, p.17]

Specifically, the Associations recommend the adoption of the following definitions: [EPA-HQ-OAR-2010-0162-1940.1, pp.17]

This category should only include vehicles with a GVWR above 26,000 lbs. that meet the DOT definition for truck tractor, i.e., 'a truck designed primarily for drawing other motor vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and the load so drawn.' (See 49 CFR §571.3.) [EPA-HQ-OAR-2010-0162-1940.1, p.17]

'Combination tractors' should have a front axle GA WR of 14,600 lbs. or less, and a single rear drive axle GA WR of 23,000 lbs. or less, or two rear drive axles with a combined GA WR of 45,000 lbs. or less. They may have additional non-driven axles, but a total GVWR of 85,000 lbs. or less. [EPA-HQ-OAR-2010-0162-1940.1, p.17]

'Combination tractors' are intended exclusively for on-highway applications and typically accumulate more than 50,000 miles annually. They are designed to operate within federal size and weight limits, which may include operation as part of a long combination vehicle. They are not intended for use that would require a special size or weight permit. [EPA-HQ-OAR-2010-0162-1940.1, p.17]

If a vehicle meets the foregoing requirements, it will be presumed to be a 'combination tractor' for the purposes of the GHG/FE Standards. If a manufacturer believes that a vehicle that meets the 'combination tractor' definition is nonetheless a 'vocational vehicle,' the manufacturer would have the burden of establishing that fact to the Agencies' reasonable satisfaction. Factors that would satisfy the manufacturer's burden of establishing that a vehicle is actually a 'vocational vehicle' include, without limitation: a vehicle speed limiter set at 55 mph or less; power take-off ('PTO') controls; extended front frame; ground clearance greater than 14 in.; approach angle greater than 200 ; frame RBM greater than 2,000,000 in.-lbs.; total gear reduction in low gear greater than 57; or total gear reduction in top gear greater than three. [EPA-HQ-OAR-2010-0162-1940.1, p.17]

Response:

Consistent with these commenters' suggestion, the agencies have decided to standardize the definition of tractor by using the long-standing NHTSA definition of "truck tractor" established in 49 CFR 571.3. That definition states that a "truck tractor means a truck designed primarily for drawing other motor vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and the load so drawn." EPA's proposed definition for "tractor" in the NPRM was similar to the NHTSA definition, but included some additional language to require a fifth wheel coupling and an exposed frame in the rear of the vehicle where the length of the exposed portion is 5.0 meters or less. EMA and Navistar argued that these two different definitions could lead to confusion if the agencies applied their requirements for truck tractors differently from each other. The commenters suggested that the EPA definition was more complicated than necessary, and that the simpler NHTSA definition should be used by both agencies as the base definition of truck tractor.

The agencies agree that the definitions should be standardized and that the NHTSA definition is sufficient and includes the essential requirement that a truck tractor is a truck designed "primarily for drawing other motor vehicles and not so constructed as to carry a load other than a part of the weight of the vehicle and the load so drawn." EPA's proposed tractor definition was intended to be functionally equivalent to NHTSA's definition based on design, but to be more objective by including the criteria related to "fifth wheels" and exposed rear frame. However, EPA no longer believes that such additional criteria are needed for implementation. NHTSA established the definition for truck tractor in 49 CFR 571.3(b) years ago,[8] and has not encountered any notable problems with its application. Nevertheless, because the NHTSA definition relies more on design intent than EPA's proposed definition, we recognize that there may be some questions regarding how the agencies would apply the NHTSA definition being finalized to certain unique vehicles. For example, many of the common automobile and boat transport trucks may look similar to tractors, but the agencies would not consider them to meet the definition, because they have the capability to carry one or several vehicles as cargo *with or without* a trailer attached, and therefore are not "constructed as to carry a load other than a part of the weight of the vehicle and the load so drawn." Similarly, a "dromedary"[9] style truck that has the capability to carry a large load of cargo with or without drawing a trailer would also not qualify as a tractor. Even though these particular vehicles identified could potentially draw other motor vehicles like a trailer, they have also been designed to carry cargo with or without the trailer attached. NHTSA has previously interpreted its definition for "truck tractor" as excluding these specific vehicles like the Dromedary and automobile/boat transport vehicles. Tow trucks have also been excluded from the category of truck tractor. On the other hand, it is worth clarifying that designs that allow cargo to be carried in the passenger compartment, the sleeper compartment, or external toolboxes would not exclude a vehicle from the tractor category. The agencies plan to continue with this approach for the HD fuel efficiency and GHG standards, which means that these particular vehicles will be subject to the vocational vehicle standards and

[8] 33 FR 19703, December 25, 1968.
[9] A dromedary is a box, deck or plate mounted behind the cab to carry freight or cargo.

not the tractor standards, but vehicles that did meet the definition above for "tractor" will be subject to the combination tractor standards.

In response to the second comment, the agencies have decided not to classify vocational vehicles with sleeper cabs as tractors. In the NPRM, the agencies proposed that vocational vehicles with sleeper cabs be classified as tractors out of concern that a vehicle could initially be manufactured as a straight truck vocational vehicle with a sleeper cab and, soon after introduction into commerce, be converted to a combination tractor as a means to circumvent the Class 8 sleeper cab regulations. Commenters who addressed this issue generally disagreed that the agencies' expressed concern was merited. EMA/TMA, for example, argued that it is expensive and difficult for a manufacturer to change a vehicle from a straight truck to a tractor, because of modifications required to the vehicle, such as to the vehicle's air brake system, and also because of the manufacturers ultimate responsibility for recertification to NHTSA's safety standards. EMA/TMA also argued that straight trucks are often built with sleeper cabs to perform the functions of a vocational type vehicle and not the functions of a line-haul tractor. NTEA also provided an example of a straight truck (Expediter Cab) that can be built with a sleeper cab and a cargo-carrying body, which it argued should be classified as a vocational vehicle and not a tractor.

Upon further consideration, the agencies agree that vocational vehicles with sleeper cabs would more appropriately be classified as vocational vehicles than as tractors. The comments discussed above help to illustrate the reasons for building a vocational vehicle with a sleeper cab and the difficulties of converting a straight truck to a tractor. Moreover, 49 U.S.C. Chapter 301 requires any service organization making such modifications to be responsible for recertification to all applicable Federal motor vehicle safety standards, which should act as a further deterrent to anyone contemplating making such a conversion. Together these two items address the agencies' primary reason for proposing the requirement that all vehicles with sleeper cabs be treated as tractors – the concern of circumvention of the tractor standards. However, the agencies will continue to monitor whether it appears that the definitions are creating unintended consequences, and may consider revising the definitions in a future rulemaking to address such issues. NHTSA and EPA concluded that the engine and tire improvements required in the vocational category are appropriate for this set of vehicles based on the typical operation of these vehicles. The agencies did not intend to include vocational vehicles with sleeper cabs, such as an Expediter vehicle, into the tractor category in either the NPRM or in this final action, therefore the agencies did not make any adjustments to the program costs and benefits due to this classification change.

6.2.1.5.1. Vocational Tractor

<u>Organizations Included in this Section:</u>

National Automobile Dealers Association
American Trucking Associations, Inc.
National Solid Wastes Management Association

Rubber Manufacturers Association
Volvo Group
Navistar, Inc.
Hybrid Truck Action Group
Motor & Equipment Manufacturers Association
Eaton Corporation
Allison Transmission
Bendix Commercial Vehicle Systems, LLC
CALSTART
Daimler Trucks North America

Organization: National Automobile Dealers Association (NADA)

The rule should avoid imposing unnecessary costs (without commensurate benefits) on Class 7 and 8 tractors that are essentially used for vocational purposes. Consequently, the "vocational truck" group definition should be revised and expanded to include an appropriately defined universe of "vocational tractors." In no event should combination tractors include tractors significantly used off-road or at low speeds. [EPA-HQ-OAR-2010-0162-2705, p.7]

The proposal effectively defines "vocational trucks" to include everything the other two vehicle groupings do not. Consequently, the range of covered Class 2b through Class 8 trucks, tractors, and buses is very wide, as is the scope of work functions and duty-cycles they engage in. The proposal focuses on phasing-in engine and tire standards in MY 2014-18 aimed at achieving 7- 10 percent reductions in fuel consumption and GHGs over a MY 2010 baseline. Two targets each are laid out for three classes of vocational trucks (Class 2b-5, Class 6-7, and Class 8). Approximately $400 per unit cost is associated with the vocational truck standards. NADA/ATD supports the proposed exemption for small vocational vehicle OEMs. [EPA-HQ-OAR-2010-0162-2705, p.8]

Vocational trucks very often involve multi-stage manufacturing involving one manufacturer which makes the chassis or cab chassis and (at least) one other which adds a body or other equipment to it. In other words, vocational truck and tractor purchasers often do not spec and purchase completed vehicles directly from truck and tractor chassis manufacturers (and their dealers), but rather from tractor and truck chassis manufacturers (and their dealers) and body and equipment manufacturers (and their installers). The contractual arrangements involved are many although typically, but not always, customers take delivery of completed vehicles from a truck/tractor dealership. Moreover, vocational purchasers, like combination tractor purchasers, often specify engines and other major components from a variety of manufacturers with no single manufacturer having complete dominion over the finished product. Dealerships often alter or up-fit vocational vehicles prior to delivery. [EPA-HQ-OAR-2010-0162-2705, p.8]

Vocational vehicle production can be both commercial (read “for stock”), or “custom” in nature. Regarding the latter, it is not at all unusual for “production” runs to involve just one vehicle. So, unlike for most on-highway combination tractors, there are literally thousands of unique and distinct potential vehicle combinations being produced by thousands of different manufacturers and alterers, which are sold by thousands of dealerships. [EPA-HQ-OAR-2010-0162-2705, p.8]

The duty cycles of vocational vehicles range from significant over-the-road operation, to periodic over-the-road operation, to stop and start low speed operation, to limited over-the-road and significant “at rest” operation, to off-road-operations, and to every combination thereof. Given the complexity of vocational truck design, production, and use, only engine and tire standards are worthy of consideration. The regulation of entire vehicles simply isn’t appropriate. On the other hand, with respect to vocational truck engines it appears that most, if not all, OEMs indicate that they can achieve compliance with the proposed standards in the time frame allowed using existing and potentially available technologies. However, tires are another matter. [EPA-HQ-OAR-2010-0162-2705, p.8]

As mentioned above, the definition of vocational trucks should be revised to include vocational tractors, and to exclude vehicles significantly used off-road. Of course, any vehicle used exclusively off-road should be excluded from the tire mandate. Moreover, several manufacturers appear to correctly suggest that the proposal overestimates in-use speeds for this group, while underestimating stationary work times. Appropriate corrections should be made to address these concerns. [EPA-HQ-OAR-2010-0162-2705, p.9]

Organization: American Trucking Associations, Inc. (ATA)

The Preamble further states that all vehicles with sleeper cabs will be classified as tractors. Many vocational straight trucks use sleeper cabs for operational reasons and to comply with the DOT Hours-of-Service regulations. To address this concern, vocationally-based tractors should be categorized in accordance with the vocational regulatory sub-categories. In fact, it is impossible to treat a straight truck as a tractor within the provisions of the rule, which require a tractor to be coupled with a specific trailer for aerodynamic evaluation. [EPA-HQ-OAR-2010-0162-2263.1, p.13]

Under the rule the agencies classify vehicles as either being on-highway tractors or vocational vehicles. This classification system does not account for tractors that function as vocational vehicles (hauling dump trailers or other limited mileage-type applications) for which high mileage over-the-road technologies will not be appropriate or effective. [EPA-HQ-OAR-2010-0162-2263.1, p.13]

Not all tractors are line-haul in application with high annual mileage or high percentages of operation at constant speed. Nearly 10% of the overall U.S. heavy heavy-duty market and approximately 15% of all combination tractors consist of vocational tractors. This number can be significantly higher based on individual manufacturers' market mix. [EPA-HQ-OAR-2010-0162-2263.1, p.13]

The agencies should consider reclassifying tractors which are vocational in application. These tractors may spend some, or even most of their time on highways, but their design must accommodate their off-road requirements. As such, they would be disadvantaged if required to meet the tractor standards which include a requirement, for instance, for low-slung aerodynamic devices, minimized frontal area with reduced cooling capacity, and anti-idle features. In the event the agencies decline to re-categorize vocational tractors into the vocational sub-categories, then ATA requests that the penetration rate tables that define the current baseline outlined in Table III-4 of the Preamble be re-evaluated. [EPA-HQ-OAR-2010-0162-2263.1, p.13]

Organization: National Solid Wastes Management Association (NSWMA)

The garbage and recycling collection trucks that stop at virtually every American house and business every week are the most recognized part of the solid waste fleet. Most Americans know a garbage truck when they see one. These are unique, highly specialized vehicles, almost all of which are classified in this regulatory proposal as heavy heavy-duty vocational vehicles. They are totally unlike the other trucks in this subcategory in terms of their design, operation and function. Because garbage and recycling trucks are virtually identical in most respects, the generic term "refuse truck" will be used for both vehicles. Yard waste can be collected by either type of truck. [EPA-HQ-OAR-2010-0162-1870.1, p.4]

Fuel consumption is determined by a variety of factors including the truck's total weight, the use of compaction equipment, structural needs, route distance, the extraordinarily high number of stops and starts a truck makes in a day (and a week and a month and a year) and the extensive use of power take-off units while the truck is stopped, but is still working. Virtually all refuse trucks use an automatic transmission. [EPA-HQ-OAR-2010-0162-1870.1, p.4]

Weight: Refuse trucks have an unusually heavy curb weight, 33,000 pounds or more, due to their structural requirements, the unique equipment they need to collect and compact materials, and the new emissions control equipment that has placed on the vehicles over the last decade. Clearly, the heavier a truck is in terms of curb weight, the higher its fuel consumption even when driving "empty". Refuse trucks start the day carrying a great deal of weight even though they are "empty". They then add weight at each stop. To maximize their payload and be as productive as possible, these trucks must compress or compact that material as necessary, while remaining within the limits of weight law requirements. [EPA-HQ-OAR-2010-0162-1870.1, p.4]

Compaction equipment: A refuse truck can be loaded manually or automatically in its front, rear or side, depending on the truck. Automatic loading can be accomplished by the use of an automated arm on side loaders, a cart tipper at the rear or side of a truck or a set of automated forks on its front. In the latter case, the forks go into sleeves on the sides of a container and then lift the container up and over the truck and deposit its contents into the truck's hopper. Fuel is used to power the loading equipment. At some point, the material is compacted by a moving blade that presses against the wall of the hopper. The truck is stopped while the material is being loaded. Compaction can occur while the truck is stopped or moving. [EPA-HQ-OAR-2010-0162-1870.1, pp.4-5]

Garbage is heavily compacted; recyclables and yard waste much less so. In the case of recyclables, so-called “single stream” collection trucks, which collect paper, glass, metal and plastic recyclables that are mixed together, will lightly compact collected recyclables without crushing them in order to increase truck productivity. The lighter compaction rate is necessary to ensure that the recyclables can still be processed for sale to end markets. Yard waste is also less heavily compacted. Finally “dual collection” trucks with separate compartments for garbage and recyclables have compaction equipment. [EPA-HQ-OAR-2010-0162-1870.1, p.5]

The key difference between garbage and recycling trucks is that garbage trucks weigh out and go to a transfer station before they are full. Recycling and yard waste trucks can “cube” out first. That is to say, they can fill up before reaching their legal weight limit. As noted above, this difference is caused by a lower amount of compaction. However, separate collection of food waste from restaurants, commercial kitchens and grocery stores is becoming increasingly popular. Food waste tends to be heavy and contains liquids. As a result, those trucks are more likely to weigh out. Most importantly, all refuse trucks are subject to the Federal bridge formula. They are faced with the dilemma created when heavier curb weight leads to a smaller payload and the corresponding need for a larger truck fleet consuming more fuel and creating more emissions. [EPA-HQ-OAR-2010-0162-1870.1, p.5]

Structural needs: Durability is an essential requirement for refuse trucks. The frame of the truck body must be strong enough to withstand the pressures exerted internally when the compaction unit is operating. In addition, a refuse truck must be durable enough to travel on a wide variety of roads including residential and commercial streets, arterial highways, dirt or gravel roads in rural areas and alleys that may or may not be paved. Roll-off container trucks normally travel on construction site roads to deliver and pickup containers. Road quality can range from newly constructed to badly pot-holed. Roads can be slick or dry depending on weather conditions. Some refuse trucks are even pressed into duty as snow plow trucks when necessary. [EPA-HQ-OAR-2010-0162-1870.1, p.5]

Nonetheless, the truck must be able to travel these roads, collect its material and take it to a transfer station or landfill for garbage, a materials recovery facility for recyclables or a compost facility for yard waste. The heavy weight of a refuse truck is caused in part, by the need to meet these severe and varying operational realities. As a result, refuse trucks have limited opportunities for weight reduction through the use of lighter weight materials. [EPA-HQ-OAR-2010-0162-1870.1, p.5]

Alternate technology and alternate fuel refuse trucks: The solid waste industry is extensively pursuing technologies to lower fuel consumption such as hybrid power trains. Hybrid power trains are being tested in a number of locations. If the tests are successful, this technology may become commonplace in the future. The NAS study listed hybrid technology as having by far the greatest potential to improve fuel consumption by refuse trucks. However, we agree with EPA and NHTSA that at this time the market penetration of hybrid power trains is too low to allow for effective regulatory measures. [EPA-HQ-OAR-2010-0162-1870.1, p.6]

Vehicles powered by alternative fuels such as compressed natural gas (CNG) or liquefied natural gas (LNG) are more commonplace, but still in limited use, with perhaps only as few as 3500 collection vehicles currently in operation. These fuels can lower the fleet's carbon output because they are less carbon-dense fuels. In addition, a very small number of vehicles are powered by methane biofuels produced from landfill gas. Expanded use of these alternative fuels is limited in part by the need to develop a new infrastructure for fuel delivery. All new technologies also face cost considerations. [EPA-HQ-OAR-2010-0162-1870.1, p.7]

Most importantly, new technologies add to the curb weight of the truck. A hybrid power train can add as much as 3000 pounds to the curb weight of a refuse truck. The fuel tanks and other equipment for alternate fuels add a smaller, but still significant amount of weight. In either case, the truck's payload will decrease, additional trucks will be needed, more fuel will be consumed and more emissions produced. [EPA-HQ-OAR-2010-0162-1870.1, p.7]

A roll-off container truck is a heavy heavy-duty vocational vehicle designed to take empty “detachable containers” to waste generator sites. When those containers are full, they will be replaced with an empty container. The full container will be taken to a disposal facility, unloaded, and returned to the fleet yard to be cleaned and placed at another generator's site. These are large containers, usually ranging in size from 10 to 40 cubic yards, primarily used at factories, construction and demolition sites and large commercial accounts such as shopping malls. They can hold a variety of materials, ranging from lightweight pallets generated at a factory to concrete generated at a construction or demolition site. These trucks often go off-road, especially at construction sites. [EPA-HQ-OAR-2010-0162-1870.1, p.7]

The truck will raise its hydraulically operated bed allowing the empty container to roll off the bed and be lowered by means of a cable or hook lift. When the container is full, the process is reversed and the container is placed back on the truck. These trucks are subject to the same weight limits as are refuse trucks. When the truck is stopped and moving a container on or off its bed, the truck is still consuming fuel. [EPA-HQ-OAR-2010-0162-1870.1, p.7]

The solid waste industry also has other specialized equipment such as grapple trucks and container delivery trucks. Grapple trucks use specially mounted grapples to lift bulky waste such as logs, yard waste or debris and place them into a container on the truck. Container delivery trucks are used to deliver small containers to a commercial customer such as a gas station or restaurant, when a container needs to be repaired or when service is terminated. These vehicles are subject to the constraints of truck weight laws. [EPA-HQ-OAR-2010-0162-1870.1, p.7]

These trucks are the only example of a Class 8 tractor trailer used by the solid waste industry. While the majority are owned and operated by third-party contractors, a small number are owned and operated by solid waste companies. These trucks transport solid waste from a transfer station to a disposal facility because they can effectively consolidate loads from several garbage trucks. In some instances, the disposal facility is close enough to the end of the refuse route for the garbage truck to go directly to that facility. However, as America has urbanized, disposal facilities have moved further away from population centers. [EPA-HQ-OAR-2010-0162-1870.1, pp.7-8]

Again, these “transfer trailer” trucks are different from most tractor trailers in their function. At a transfer station, garbage is pushed from overhead or compacted into a specially-designed trailer, with the truck in a narrow bay built at a lower level than the transfer station floor. Garbage can also be loaded into some trucks while they are backed up to a refuse compactor. When the trailer is full, a tarp or other cover is secured to ensure that material remains confined in the body. In a compaction trailer, the back door is closed. At the disposal facility, some trucks use a hydraulically operated lifting mechanism to tilt the trailer and aid in its unloading. In many of the trucks, narrow floor slats in the trailer’s hydraulically driven floor move backward and forward to aid in emptying the solid waste in the trailer. [EPA-HQ-OAR-2010-0162-1870.1, p.8]

We are concerned that these unique trucks will be regulated as Class 8 Combination Tractors. They have a unique and clearly specialized nature. In many cases, they travel a relatively short distance from a transfer station to a disposal facility. They are less likely to benefit from the aerodynamic and other requirements for Class 8 Combination Tractors. Moreover, they need to be able to operate off-road at landfills and could be hindered in that respect by some of the proposed remedies for combination tractors. We would support additional consideration by the agencies as to the appropriate methods to guarantee improved fuel consumption and lowered greenhouse gas emissions for these unique trucks. [EPA-HQ-OAR-2010-0162-1870.1, p.8]

Organization: Rubber Manufacturers Association (RMA)

The definition of vocational vehicles needs to be clarified along with the GEM modeling constraints for these types of vehicles. For example, NHTSA and the EPA identify pickup and delivery and waste as vocational vehicles. These vehicles can be tractor and trailer, not just straight truck chassis, like other waste, emergency vehicles, buses, etc. If a trailer is in use in these vocational applications, does a trailer RRC of 8.1 need to be utilized in the GEM model or the trailer overall RRC of 6.0? We consider vocational vehicles to be those that are short regional haul operations in delivery, construction, mining, oil field work, grain haul, emergency vehicles and on/off highway operations. [EPA-HQ-OAR-2010-0162-1963.1, p.3]

Organization: Volvo Group

The Agencies classify vehicles over 14,000 lbs. GVWR as either on-highway oriented tractors or vocational vehicles, which only include straight trucks and buses. *See* proposed sections 523.8 and 523.9, 75 FR 74152, 74437. This classification system does not account for tractors that function as vocational vehicles (e.g. hauling dump trailers or other limited mileage-type applications) for which high mileage over-the-road technologies will not be appropriate or effective. *See* proposed section 523.2 for the proper vocational vehicle definition, 75 FR 74152, 74436) [EPA-HQ-OAR-2010-0162-1812.2, p.14]

Not all tractors are line-haul in application with high annual mileage or high percentage of operation at constant speed. Nearly 10 percent of the overall U.S. heavy heavy-duty market and approximately 15 percent of all combination tractors consist of vocational tractors. This number can be significantly higher based on individual manufacturers' market mix. *See* 75 FR 74152, 74161. [EPA-HQ-OAR-2010-0162-1812.2, p.14]

Volvo Group is proposing to reclassify tractors which are vocational in application. These tractors may spend some, or even most of their time on-highway, but their design must accommodate their off-road requirements. As such, they would be disadvantaged if required to meet the tractor standards, which include a requirement, for instance, for low slung aerodynamic devices, minimized frontal area with reduced cooling capacity, and anti-idle features. We therefore request that these vocationally based tractors be placed in the vocational regulatory sub-categories if they have 3 or more of the following five (5) features:

- A frame Resisting Bending Moment (RBM) greater than or equal to 2,000,000 in*lbs per rail, or rail and liner combination.
- An approach angle greater than or equal to 20^{o} nominal design specification to exclude extended front rails/bumpers for additional equipment (e.g. – pumps, winch, front engine PTO).
- Ground clearance greater than or equal to 14 inches as measured unladen from the lowest point of any frame rail or body mounted components, excluding axles and suspension. For HHD and MHD vehicles this is usually considered as the lowest point of the fuel tank/mounting or chassis aerodynamic devices.
- Total reduction in high gear greater than or equal to 3.00:1.
- Total reduction in low gear greater than or equal to 57:1. [EPA-HQ-OAR-2010-0162-1812.2, p.14]

In the event the agencies decline to re-categorize vocational tractors into the vocational sub-categories, then the penetration rate tables that define the current baseline outlined in Table III-4 of the preamble (*see* 75 FR 74152, 74224) must be re-evaluated. Current vocational tractors fall into the Classic category and are primarily low roof day cab and sleeper configurations (hours of service sleepers). However, the penetration rate table shows 0 percent Classic as the target in these categories.) Section III(2)(a)(iii) of the NPRM preamble lists potential justifications for on-/off-road tractors to utilize classic type technologies, such as additional air cleaners (presumably mounted on the vehicle exterior) and the need for increased ground clearances, which severely limit aerodynamic performance. However, this section also infers that on-/off-road tractors fall in the conventional aerodynamic category. *See* 75 FR 74152, 74222. [EPA-HQ-OAR-2010-0162-1812.2, pp.14-15]

Organization: Navistar, Inc.

If a vehicle meets the foregoing requirements, it will be presumed to be a “combination tractor” for the purposes of the standards. If a manufacturer believes that a vehicle that meets the “combination tractor” definition is nonetheless a “vocational vehicle,” the manufacturer would have the burden of establishing that fact to EPA’s reasonable satisfaction. Factors that would satisfy the manufacturer’s burden of establishing that a vehicle is actually a “vocational vehicle” include, without limitation: a vehicle speed limiter set at 55 mph or less; power take-off (“PTO”) controls; extended front frame; ground clearance greater than 14 in.; approach angle greater than 20°; frame RBM greater than 2,000,000 in.-lbs.; total gear reduction in low gear greater than 57; or total gear reduction in top gear greater than three. [EPA-HQ-OAR-2010-0162-1871.1, p.33]

Organization: Hybrid Truck Action Group (HTAG)

While we understand the need for a streamlined approach, we do believe that EPA/NHTSA needs to be cautious in terms of how certain trucks are characterized for inclusion in categories, and also strongly encourage the inclusion of a broader range of duty cycles for fully assessing advanced trucks fuel economy and emission benefits [EPA-HQ-OAR-2010-0162-1817.1, p.4]

On the issue of truck classifications, based on HTUF testing and market development we strongly urge EPA to provide the flexibility to include Class 7 and 8 regional tractors in the vocational truck category, not the line haul category. While similar in look to Line Haul trucks, they normally have smaller engines and lower combined weight ratings. Many are day cabs and many are single axle. However, we have specifically seen this category become critical for hybrid deployment because of their value in vocational delivery, food and beverage service in stop-and-go duty cycles. In California, for instance, more than half of the hybrid trucks receiving purchase vouchers under the Hybrid Truck and Bus Voucher Incentive Project (HVIP) funded by the California Air Resources Board (CARB) were “light” Class 8 hybrid tractors used for depleting load regional and urban service. We would be pleased to assist EPA/NHTSA to further refine the proposed rules to accommodate this application, but its duty cycle and use is clearly vocational and not line haul and placing them in the line haul category would not be fair and limit the applicability of new technology. [EPA-HQ-OAR-2010-0162-1817.1, p.4]

Organization: Motor & Equipment Manufacturers Association (MEMA)

The classification of vehicles as combination tractor trailer versus vocational vehicle in the Class 7 and 8 categories may limit the introduction of hybrid technologies. MEMA believes that the duty cycle – not the vehicle size/weight, axle, tires, etc. – should define the targets and classification of these vehicles. For example, beverage delivery trucks (which fall into these class categories) are leading the way in adoption of hybrid technologies. If classified as a tractor trailer, by weight, instead of vocational, by duty cycle, there would be no way to test the hybrid system for certification. Similarly, intermodal drayage tractor trailer combinations used at or near seaports and railyards, typically operate at low speed, with substantial periods of idling and start/stop operation. Evaluation of this vehicle application using the linehaul simulation duty cycle would totally ignore the benefits of the zero emissions vehicle (ZEV) operating mode available with some hybrid systems that make them well suited for the ports application. [EPA-HQ-OAR-2010-0162-1752.1, p.9]

The potential unintended consequence of this approach could prevent viable technologies from being utilized and/or overlooked for a category where significant improvements can be realized for those Class 7 and 8 vehicles that do not experience the typical “line-haul” duty cycle. [EPA-HQ-OAR-2010-0162-1752.1, p.9]

The agencies ought to reconsider the potential unintended consequence of their approach. Specifically, it is recommended that the agencies classify Class 7 and 8 vehicles according to application and duty cycle rather than strictly by weight and configuration. [EPA-HQ-OAR-2010-0162-1752.1, p.9]

Organization: Eaton Corporation

Class 7 and 8 city delivery tractors are qualified as combination tractors under the NPRM. The intent of the Rule is to drive the efficiency of combination tractors under the assumption that these are used as line-haul trucks. [EPA-HQ-OAR-2010-0162-1649.1, p.9]

Class 7 and 8 city delivery and beverage tractors belong to the vocational category as they execute most of their work cycle in low speed traffic and should be categorized as vocational vehicles to drive the appropriate fuel saving technologies. For example, industry sources and package and delivery fleets quote average speeds in the region of 30-40 mph for heavy-heavy and medium-heavy tractors. The Figure below represents a fleet of beverage tractors in the Miami metropolitan area, both downtown and suburban/freeway routes, with both hybrid and non-hybrid Class 7 tractors. By any metric, these vehicles do not drive like line-haul combination tractors. Another example is the Con-Way fleet that in 10 2008, for the purpose of enhancing the fleet fuel economy, configured differently its 2700 long haul tractors from their 8400 package and delivery tractors. [EPA-HQ-OAR-2010-0162-1649.1, pp.9-10]

[Figures can be found on page 10 of this comment.]

If classified as combination tractors, the rule will drive technologies applicable to highway driving (e.g., improved aerodynamics and steady state engine performance at road cruise conditions) that do not affect city driving. On the contrary, the high engine transients typical of the vehicles’ operations will not be measured. [EPA-HQ-OAR-2010-0162-1649.1, p.10]

Furthermore, city delivery and beverage tractors are in reality the biggest consumers of hybrid technology with significant documented fuel efficiency gains. If classified as combination tractors, the rule will work against the hybrid technology introduction, since in that category there is no recognition of hybrid benefits. [EPA-HQ-OAR-2010-0162-1649.1, p.10]

Organization: Allison Transmission

From Allison's analysis of technical data supporting this rulemaking, it appears that several vehicles have been included within the Class 7 and 8 combination tractor subcategories which more appropriately belong in the vocational vehicle category. These vehicles are: Aircraft refueler; Aircraft service; Construction dry bulk, Construction Equipment Hauler, Construction tanker, Fire aerial; Hauler slag; Hauler logs; Hauler wood chips; Hauler mining; Hauler bottom dump; Oil Field draw works; Oil Field pumping; Oil Field service; Oil Field tubing; Refuse liquid waste, Equipment Hauler,; and Dock Spotter vehicles. Allison's long experience in supplying various vehicle markets indicates that these vehicles are more appropriately considered to be vocational vehicles within the meaning of this proposed rule due to their configuration and utilization. This view is supported by the data contained within Attachment 4. [See docket number 2738.1] These vehicles largely operate in a 'transient mode '(i.e., a mode characterized by the operation of vehicles during multiple periods of acceleration and deceleration, short periods of variable speed, and different levels of speed during a Drive Cycle - as opposed to long periods of 'steady state' operation at one continuous speed). It would therefore be inappropriate to classify such vehicles as combination tractors and model the operation of the vehicles using Drive Cycles with high to very high percentages of steady-state operation at speeds exceeding 55 mph. [EPA-HQ-OAR-2010-0162-2735.1, p.25]

Organization: Bendix Commercial Vehicle Systems LLC (Bendix)

The classification of vehicles as combination tractor trailer versus vocational vehicle in the Class 7 and 8 categories may limit the introduction of many fuel reducing technologies. Bendix believes that the drive cycle – not the vehicle size/weight, axle, tires, etc. – should define the targets and classification of these vehicles. [EPA-HQ-OAR-2010-0162-1888.1, p.7]

The potential unintended consequence of this approach could prevent viable technologies from being utilized and/or overlooked for a category where significant improvements can be realized for those Class 7 and 8 vehicles that do not experience the typical “line-haul” duty cycle. [EPA-HQ-OAR-2010-0162-1888.1, p.7]

The agencies ought to reconsider the potential unintended consequence of their approach. Specifically, it is recommended that the agencies classify Class 7 and 8 vehicles according to application and drive cycle rather than strictly by weight and configuration. [EPA-HQ-OAR-2010-0162-1888.1, p.7]

Organization: CALSTART

Based on HTUF testing and market development, we strongly urge EPA to include Class 7 and 8 regional tractors in the vocational truck category, not the line haul category. While similar in look to line haul trucks, they differ from line haul trucks in several key ways. They normally have smaller engines and lower combined weight ratings, and often carry depleting loads. Many are day cabs and many are single axle. Additionally, they typically operate on surface streets, with stops, starts, and a variety of speeds. Indeed, we have specifically seen this category become critical for hybrid deployment because of its value in vocational delivery, food and beverage service in stop-and-go duty cycles. In California, for instance, more than half of the hybrid trucks receiving purchase vouchers under the Hybrid Truck and Bus Voucher Incentive Project (HVIP) funded by the California Air Resources Board (CARB) were “light” Class 8 hybrid tractors used for depleting load regional and urban service. We would be pleased to assist EPA/NHTSA to further refine the proposed rules to accommodate this application, but its duty cycle and use is clearly vocational and not line haul and placing them in the line haul category would not be fair and limit the applicability of new technology. [EPA-HQ-OAR-2010-0162-2121, p.4]

Organization: Daimler Trucks North America

Off road tractor standard - EPA and NHTSA have concluded that the on-road performance losses and additional costs to develop a truck which meets these specifications will limit the exemption to trucks built for the desired purposes. The agencies welcome comment on the proposed requirements and exemptions. (75 Fed. Reg. 74176) We agree that there should be an off-road tractor definition. In our associated EMA comments, we propose such a definition, which we believe is better than the Agencies’. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

On page 75 Fed. Reg. 74176, the Agencies propose a definition of “off-road” tractor that includes a vehicle speed limiter of 55 mph. We recommend that, for optimal safety and passing ability in the limited times these tractors will be used on roads, off-road tractors should be allowed up to 1 hour of operation at speeds > 55 mph. A VSL with “soft top” controls like this will allow them to pass, if needed, on highways but will still make such vehicles suboptimal for sustained on-road use, so will keep the vehicle within the off-road application. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

The Agencies’ Definition Of Off-Road Tractors Does Not Capture All Of The Tractors That Do Off-Road Travel And Need Exemption From On-Road Requirements Like Aerodynamics, And A Relatively Simple Change To The Proposed Regulations Can Properly Cover These Tractors. [EPA-HQ-OAR-2010-0162-1818.1, p.106]

We recommend that the Agencies improve their definition of off-road tractors and, for tractors that should not be treated as off-road yet cannot have all of the aerodynamic treatments that the Agencies seek for highway tractors, allow for tractors to be moved into the vocational categories. We wish to echo the EMA’s comments on the topic of the off-road tractor definition. [EPA-HQ-OAR-2010-0162-1818.1, p.106]

Response:

As discussed in preamble Section II.B, the agencies agree that the overall operation of these vocational-types of tractors resembles other vocational vehicles' operation: lower average speed and more stop and go activity than line-haul tractors. Due to their operation style, a FTP certified engine is a better match for these tractors than a SET certified engine, because the FTP cycle uses a lower average speed and more stop and go activity than the SET cycle. In addition, the limited high speed operation leads to minimal opportunities for fuel consumption and CO_2 emissions reductions due to aerodynamic improvements. Conversely, the additional weight of the aerodynamic components could cause an unintended consequence of increasing gram per ton-mile emissions by reducing the amount of payload the vehicle can carry in those applications which are weight-limited. Similarly, the vocational tractors typically do not hotel overnight and therefore will have little to no benefit through the installation of an idle reduction technology.

Although the agencies agree that these vocational tractors are operated differently than line-haul tractors and therefore fit more appropriately into the vocational vehicle category, we need to ensure that only tractors that are *truly* vocational tractors are classified as such. Upon further consideration of the comments received the agencies have decided to allow manufacturers to exclude certain vocational-type tractors from the combination tractor standards, and instead be subject to the standards for vocational vehicles. A vehicle determined by the manufacturer to be a HHD vocational tractor would fall into the HHD vocational vehicle subcategory and be regulated as a vocational vehicle. Similarly, MHD vocational tractors will be regulated as a MHD vocational vehicle. Specifically, under the provision being finalized at §1037.630 of today's rules only the following three types of vocational tractors are eligible for reclassification:

(1) Mixed service (onroad and offroad) vehicles often used in construction, logging, dump operation, refuse hauling, and mining.

(2) Heavy haul tractors (i.e., tractors with a GCWR over 120,000 pounds).

(3) Urban delivery vehicles such as beverage trucks.

Because the difference between some vocational tractors and line-haul tractors is potentially somewhat subjective, we are also including a default annual sales limit of 7,000 vocational tractors per manufacturer, based on a three year rolling average, that would apply in most circumstances. It is important to note, however, that we do not expect it to be common for manufacturers to be able to justify classifying 7,000 vehicles as vocational tractors in a given model year.

Vehicles that are classified as vocational tractors are required to meet the vocational vehicle standards and will be treated as a vocational vehicle in the GEM. Therefore, they will be modeled as a straight truck even though they are a tractor and trailer.

The agencies are also providing provisions for vocational tractors used offroad or at low speeds that meet the criteria described in §1037.630 to be exempted from the vehicle CO_2 emissions and fuel consumption standards.

6.2.1.6. Tractor Subcategories

Organizations Included in this Section:

Chew, Yuli
Allison Transmission
Robert Bosch, LLC
Heavy-Duty Fuel Efficiency Leadership Group
International Council on Clean Transportation

Organization: Chew, Yuli

It is also important that tractors be included. Every categories of vehicles have a role to play, no matter how insignificant the end contribution will be. [EPA-HQ-OAR-2010-0162-0558.1, p.2]

Organization: Allison Transmission

Allison has reviewed the nine subcategories that were created for Class 7 and 8 combination tractors. EPA has properly recognized that there are differences in the type and configuration of vehicles within Class 7 and 8 and the vehicle attributes selected for categorization appear to be broadly appropriate. Roof height and cab configuration generally correspond to the use of such vehicles. As cited elsewhere in our comments, however, EPA and NHTSA assumptions regarding the use of Class 7 and 8 vehicles are not as well-grounded. [EPA-HQ-OAR-2010-0162-2735.1, p.24]

Organization: Robert Bosch, LLC

Bosch supports the segmentation approach that the agencies have proposed with regard to combination tractors, specifically subcategorizing them and setting vehicle standards based on the tractor attributes of payload (i.e., Class 7 or 8), roof height (i.e., low, mid, or high), and cab type (i.e., day cab or sleeper cab). This approach, which contrasts sharply with the segmentation strategy proposed for vocational vehicles (see section III.C below), results in the following nine regulatory subcategories: [EPA-HQ-OAR-2010-0162-1630.1, p.8]

[Table can be found on page 8 of this comment.]

In Bosch's view, this subcategorization approach is sensible insofar as it accurately reflects the "variety of functions" that tractors perform. [EPA-HQ-OAR-2010-0162-1630.1, p.8]

Organization: Heavy-Duty Fuel Efficiency Leadership Group

For Semi-Trucks/Combination Tractors, EPA/NHTSA have proposed specific standards for 9 categories based upon cab height, sleeper capacity, typical vehicle weight and typical driving patterns. The standards are phased in over the 2014-2018 period and are projected to achieve 7% - 20% reductions in GHG emissions and fuel consumption from the 2010 baseline. Incremental cost increases for combination tractors are projected to be $5,900 in 2014. [EPA-HQ-OAR-2010-0162-1620.1, p.3]

The Leadership Group supports the EPA/NHTSA proposed standards for these categories and believes the reductions can be achieved through the deployment of currently available technologies at a reasonable cost and return on investment. [EPA-HQ-OAR-2010-0162-1620.1, p.3]

Recognize Fleet Diversity: The rule should align any standards with the technology needed for different applications. Fleets are diverse in terms of weights, sizes and capabilities in order to perform the wide range of tasks required of these vehicles. The rule should maximize achievable gains in medium- and heavy-duty vehicle fuel efficiency and GHG emission reductions by taking advantage of the technology improvement opportunities across the entire vehicle and its operation. [EPA-HQ-OAR-2010-0162-1620.1, p.4]

The Group feels that the structure and design of the EPA/NHTSA proposal should largely preserve a fleet's ability to "spec" the truck necessary to perform a specific task. The Agencies emphasis on recognition of fleet diversity – particularly in the vocational categories – is an important tenant of these proposed standards, and the Group urges both Agencies to closely monitor the rule's implementation to ensure that these "fleet diversity" considerations are not compromised. [EPA-HQ-OAR-2010-0162-1620.1, p.4]

Organization: International Council on Clean Transportation (ICCT)

Setting a suite of seven standards for Class 7 and 8 tractor trucks. The amount of regulatory attention focused on tractor trucks was appropriate given that these trucks account for roughly 60 percent of fuel consumption from the heavy-duty vehicle sector. The choice of setting a suite of seven standards instead of choosing the more traditional single corporate average approach is an example of the agencies' sensitivity to "doing no harm" to existing market incentives. As explained in the rulemaking documents, the agencies discarded the single corporate average approach for Class 7 and 8 tractors with an assumed payload typical of Class 8 tractors for fear of creating a disincentive for Class 7 trucks that are more fuel efficient on regional routes with typically smaller, lighter payloads. [EPA-HQ-OAR-2010-0162-1945.1, pp.2-3]

Response:

As proposed, EPA and NHTSA are adopting nine subcategories of combination tractors with the basis for subcategorization being particular tractor attributes – gross vehicle weight rating, cab configuration, and roof height. We believe this approach allows fleets to continue to spec a truck for specific applications and will also allow for an appropriate match between vehicle types and technologies.

6.2.1.7. Metrics

Organizations Included in this Section:

Autocar, LLC
Volvo Group
Daimler Trucks North America
National Truck Equipment Association
Chamber of Commerce of the United States
Engine Manufacturers and Truck Manufacturers Associations
Allison Transmission
Honeywell

Organization: Autocar, LLC

EPA proposes "gram-per-ton-mile" standards for chassis manufacturers, and NHTSA proposes "gallon-per-1,000-ton-mile" standards. However, the refuse industry appropriately tracks fuel in gallons per hour. The extreme variation in the payload that refuse vehicles carry throughout a day (from zero load to full, one or more cycles per day) and the relatively low number of miles per unit of work for these vehicles makes any ton-mile metric irrelevant and inappropriate for trying to measure fuel efficiency and GHG emissions per unit of work. Refuse vehicles can travel as little as 50 miles in an entire day of work on a collection route, and as much as 40% of the fuel consumed is used while the vehicle is stationary to power compaction and loading mechanisms that are run on engine power from a power-take- off. [EPA-HQ-OAR-2010-0162-1617.1, p.5]

Organization: Volvo Group

Volvo appreciates that the agency has not used a simple miles per gallon or CO2 per mile metric for heavy duty vehicles as is done for light duty passenger cars and light trucks. The proposed metrics (CO2/ton-mile and gallons/ton-mile) do accounting somewhat for the vehicle capacity and the work accomplished in moving freight, which is critical given the variety of vehicles in this market. However, this is not the best or most appropriate metric for all vehicles and needs to be addressed in future rulemakings. Notably, buses and motor coaches should be considered based on their capacity to transport people, so a metric of CO2/person-mile or gallons/person-mile would be appropriate. Also, the bulk of the freight hauled by class 8 vehicles, especially in conventional box-van trailers is low density and limited by volume. As future rules evolve toward a fully integrated vehicle, a volume capacity based metric is appropriate. [EPA-HQ-OAR-2010-0162-1812.2, pp.13-14]

Organization: Daimler Trucks North America

Buses need metric that recognizes their ability to improve efficiency by carrying more passengers. In other words, for buses, the number of passengers should be an input to the model and the fuel consumption metric should reflect passenger carrying efficiency improvements. [EPA-HQ-OAR-2010-0162-1818.1, p.86]

Organization: National Truck Equipment Association (NTEA)

Commercial and vocational trucks are designed and purchased by their users to do specific jobs. If vehicle utilization is not properly taken into account in setting the fuel efficiency metric, the metric could have the counterproductive effect of requiring more trucks to do the same amount of work. [EPA-HQ-OAR-2010-0162-1608.1, p.2]

Organization: Chamber of Commerce of the United States

It is essential that any metric promulgated by EPA and NHTSA under their respective statutory authorities accurately measure the actual productivity of medium-and heavy-duty vehicles. This can only be accomplished if the final regulatory metric includes consideration of the time that a commercial vehicle spends completing any set amount of transport work, which EPA and NHTSA incompletely describe in ton-miles. EPA and NHTSA recognize in the preamble that medium- and heavy-duty truck sector is “extremely diverse in several respects, including the types of manufacturing companies involved, the range of sizes of trucks and engines they produce, the types of work the trucks are designed to perform, and the regulatory history of different subcategories of vehicles and engines.” EPA and NHTSA correctly acknowledge that the metrics used for the light-duty vehicle GHG rule are inappropriate for combination tractors and vocational vehicles, as opposed to heavy-duty pickup trucks and vans. EPA and NHTSA do not fully account for the full extent of such differences in the utilization of combination tractors and vocational vehicles. The analysis is therefore incomplete in this area, resulting in the proposal of a metric which does not properly account for the utilization of medium- and heavy-duty vehicles in the industrial and commercial marketplace. [EPA-HQ-OAR-2010-0162-2152.1, pp.7-8]

Combination tractors and vocational vehicles are not generally owned or operated for personal use. Instead, private businesses and governmental agencies own and operate such vehicles on a near-exclusive basis. In these circumstances, the time it takes to complete a task is highly valued. By accounting for time in the metric, EPA and NHTSA would more directly represent the emissions and fuel consumption associated with the operation of such vehicles. [EPA-HQ-OAR-2010-0162-2152.1, p.8]

This metric also provides for a better measurement of a vehicle's fuel efficiency and greenhouse gas emissions. Vehicles that are able to accomplish more work during a given time period produce greater overall vehicle fuel efficiency. Vehicles that are able to avoid power losses and accelerate more quickly in urban traffic over the course of a day can make more stops, deliver more goods and complete more tasks required of them. Relatively small time savings, when replicated repeatedly over the course of a day or week, greatly enhance the productivity of a vehicle. Therefore, the work needed to be performed by a vehicle can be accomplished with relatively less running time (in the case of a single vehicle) and the work needed to be accomplished by a fleet can be accomplished with relatively fewer vehicles. [EPA-HQ-OAR-2010-0162-2152.1, pp.8-9]

EPA and NHTSA should recognize that if vehicles can accomplish the work dictated by the economy in less time, utilizing fewer vehicles, this will result in an overall increase in fuel efficiency within the medium- and heavy-duty truck sector. The proposed metric above acknowledges this fact and would account for these efficiency and emission benefits. The simple ratio of fuel consumed to 1000 ton-miles, as proposed by EPA and NHTSA, will not. [EPA-HQ-OAR-2010-0162-2152.1, p.9]

Organization: Engine Manufacturers and Truck Manufacturers Associations

One additional and agreed-upon core concept for this rulemaking bears mention at the outset. Specifically, the Associations are in full agreement with the Agencies' conclusion that a miles-per-gallon metric is not appropriate to assess potential increases in the fuel-efficiency (and corollary decreases in GHG emissions) of HD vehicles. HD vehicles are not simply means of travel from point A to point B. Rather, they are instruments of work, work that involves the transport and delivery of goods and equipment. Consequently, the appropriate metric for assessing the relative efficiency of a HD vehicle is work-based, not-mileage based. The Proposed GHG/FE Standards are established in terms that appropriately reflect this core metric of work performed. [EPA-HQ-OAR-2010-0162-1940.1, p.4]

Organization: Allison Transmission

EPA and NHTSA are proposing to establish standards for combination tractors, vocational vehicles, and heavy-duty pickup trucks and vans. As detailed below in section IV. [of Allison's written comments], Allison does not generally object to this segmentation of the MD/HD marketplace.' However, with respect to combination tractors and vocational vehicles, Allison would submit that there are metrics available to measure GHG emissions and the FE2 of MD/HD vehicles which are superior to the incomplete metric that EPA and NHTSA are proposing to adopt for MY 2014-2018 vehicles. [EPA-HQ-OAR-2010-0162-2735.1, pp.1-2]

As outlined in Attachment 1 [See docket number 2736.1], it is essential that any metric promulgated by EPA and NHTSA under their respective statutory authorities accurately measure the actual productivity of MD/HD vehicles. This can only be accomplished if the final regulatory metric includes consideration of the time that a commercial vehicle spends completing any set amount of transport work, which EPA and NHTSA incompletely describe in ton-miles (devoid of time). EPA and NHTSA recognize in the preamble that MD/HD sector is 'extremely diverse in several respects, including the types of manufacturing companies involved, the range of sizes of trucks and engines they produce, the types of work the trucks are designed to perform, and the regulatory history of different subcategories of vehicles and engines.' MD/HD vehicles undoubtedly present a different challenge for GHG/FE regulation than light-duty vehicles. Metrics utilized in the final rule for Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards ('LDV Rule') are properly considered as inappropriate for combination tractors and vocational vehicles, as opposed to heavy-duty pickup trucks and vans, which are used in a manner similar to that of LDVs. EPA and NHTSA, however, do not fully account for the full extent of such differences in the utilization of combination tractors and vocational vehicles. EPA and NHTSA's analysis is incomplete in this area, resulting in the proposal of a metric which does not properly account for the utilization of MD/HD vehicles in the industrial and commercial marketplace. [EPA-HQ-OAR-2010-0162-2735.1, p.2]

Combination tractors and vocational vehicles are not generally owned or operated for personal use. Instead, private businesses and governmental agencies own and operate such vehicles on a near-exclusive basis. In these circumstances, the time it takes to complete a task is highly valued. Moreover, as demonstrated within Attachment I, accounting for time in the metric more directly represents the GHG emissions and FE associated with the operation of such vehicles. While Allison recognizes that the timeframe of this rulemaking makes it difficult for EPA and NHTSA to fully explore new concepts (and hence creates a 'natural' reliance on existing certification systems for engines and a limited computer modeling of non-engine factors affecting FE and GHG emissions), the art of the possible should not prevail over the need to accurately assess vehicle emissions and efficiency. Especially with respect to a regulatory program which is in its initial stages, EPA and NHTSA should strive to 'get it right the first time.' [EPA-HQ-OAR-2010-0162-2735.1, pp.2-3]

The proposed metric is considered by EPA and NHTSA to better represent the work performed by MD/HD vehicles than metrics based on pure calculation of miles per gallon (fuel economy) and/or GHGs emitted. On this point, Allison agrees with each agency. However, the further assessment that the proposed metric best represents FE and the emission of GHGs in the MD/HD sector among available alternatives is not accurate. As indicated below, Allison believes that other metrics provide a much more complete measure of the actual work performed by commercial vehicles, and hence, a better measurement of a vehicle's FE and GHG emissions. [EPA-HQ-OAR-2010-0162-2735.1, p.2]

Allison appreciates the ability to work with EPA and NHTSA on a going-forward basis in this regulatory effort. Allison is supportive of reasonable regulation in this area based on adequate consideration of different MD/HD vehicle types, accurate information concerning vehicle utilization (including derivation of drive cycles based on such utilization) and thorough assessment of the available technologies to improve the FE performance and reduce GHG emissions on a cost-effective basis. Any regulations in this area should also consider the full range of alternatives that may be available to EPA and NHTSA to fulfill their statutory duties under the CAA and EISA and utilize both metrics and compliance protocols based on the 'real world' operation of MD/HD commercial vehicles. In order to accomplish this goal, EPA and NHTSA should adopt a metric which directly incorporates average speed or otherwise provides a correction to the proposed metric which is based upon average speeds (i.e., actual vs. prescribed).

Unfortunately, the proposed rule falls short in several areas including the proposed metric to be used in this rulemaking and the amount of technical information that both agencies reviewed or had access to prior to this proposal. It would therefore appear that the more prudent course for EPA and NHTSA to pursue in this matter would be for each agency to utilize the statutory flexibility afforded by the CAA and EISA, to obtain additional technical information and analysis of the FE and GHG performance of MD/HD vehicles and to further review available technologies (as well as the cost and market impacts of requiring and/or providing incentives and disincentives to the use of such technology) through imposition of a FE/GHG standards. Only with an adequate substantive basis can each agency succeed in promulgating a national program which addresses FE and GHGs from the MD/HD sector in a reasonable manner. Given that this rulemaking represents the first attempt to regulate FE and GHG emissions in the important economic sector represented by MD/HD vehicles, EPA and NHTSA should take the time necessary to promulgate regulations that address both near-term and long-term issues attendant to a new regulatory program.

The metric, proposed above in Section I.B, also provides for a better measurement of a vehicle's fuel efficiency and greenhouse gas emissions. Vehicles that are able to accomplish more work during a given time period produce greater overall vehicle fuel efficiency. Vehicles that are able to avoid power losses and accelerate more effectively in urban traffic over the course of a day can make more stops, deliver more goods and complete more tasks required of them. Relatively small time savings, when replicated repeatedly over the course of a day or week, greatly enhance the productivity of a vehicle. Therefore, the work needed to be performed by a vehicle can be accomplished with relatively less running time (in the case of a single vehicle) and the work needed to be accomplished by a fleet can be accomplished with relatively fewer vehicles. 12 [EPA-HQ-OAR-2010-0162-2735.1, p.6]

EPA and NHTSA have recognized that personal vehicles, regulated pursuant to the 2009 LDV Rule and MD/HD vehicles, addressed by this proposed rule, are utilized differently and are affected by different external factors. But EPA and NHTSA have not fully incorporated this differential in the utilization of different vehicle classes into the proposed metric. The use of commercial vehicles addressed by this proposal is largely driven by the demands of the U.S. economy; it is the responsibility of the transportation industry to provide the required ton-miles of freight transport in any given year. This contrasts starkly with personal vehicle use that is affected by multiple non-economic factors, including recreational use, and other personal driving. [EPA-HQ-OAR-2010-0162-2735.1, p.7]

Within the LDV Rule, EPA and NHTSA accounted for changes in fuel cost per mile, personal income, vehicle prices, vehicles per capita, and other factors in deriving an estimate of the 'rebound effect.' EPA and NHTSA stated that '[the fuel economy rebound effect for light-duty vehicles has been the subject of a large number of studies since the early 1980s. Although they have reported a wide range of estimates of its exact magnitude, these studies generally conclude that a significant rebound effect occurs when vehicle fuel efficiency improves.' In other words, when the costs of driving decrease, individual vehicle use can increase. [EPA-HQ-OAR-2010-0162-2735.1, p.7]

In this proposed rule, EPA and NHTSA have recognized that the commercial and business purpose of MD/HD vehicles will predominate with regard to considerations of vehicle use. For example, driver pay is estimated to constitute 44% of the operating cost per mile of trucks. There is minimal, if any, personal or recreational use of most commercial vehicles. EPA and NHTSA have also properly recognized that there may be short-term and longer-term factors that could affect truck usage and vehicle miles traveled ('VMT'). But the agencies have not fully incorporated these factors into their regulatory approach for the MD/HD vehicle sector. Overall, there needs to be a greater recognition in this proposed rule that commercial vehicle use is driven by profit motive, and that broader economic factors are paramount in creating the demand for commercial vehicle VMT. [EPA-HQ-OAR-2010-0162-2735.1, p.7]

Simply put, the relative state of the national economy and individual commercial decision-making by businesses will dictate MD/HD vehicle use. EPA and NHTSA have recognized this difference in their qualitative assessment and comments with respect to the 'rebound effect' for commercial vehicles. 16 What EPA and NHTSA have not done, however, is to take the next logical step in this observation. That is, EPA and NHTSA should recognize that if vehicles can accomplish the work dictated by the economy in less time, utilizing fewer vehicles, this will result in an overall increase in fuel efficiency within the MD/HD sector. Allison's proposed metric acknowledges this fact and would account for these efficiency and emission benefits. The simple ratio of fuel consumed to 1000 ton-miles, as proposed by EPA and NHTSA, will not address such benefits. [EPA-HQ-OAR-2010-0162-2735.1, pp.7-8]

Moreover, improving fuel efficiency within the MD/HD sector via utilizing fewer vehicles to accomplish the work required of the trucking industry will directly reduce overall GHG emissions. EPA has long recognized and taken steps to reduce the time that MD/HD vehicles idle through SmartWay program grants and planning. If more trucks are required to do the economy-prescribed transport task, there will be more overall truck idling time, which will consume more fuel, less efficiently, even when accounting for possibly higher rates of fuel consumption at higher speed. In addition, more trucks in traffic will add to congestion, creating additional idling time for automobiles, too. Since GHG emissions are overwhelmingly based on fuel combustion 17, using fuel more efficiently to complete the required work of MD/HD vehicles directionally reduces GHG emissions. In addition, the manufacture and maintenance of fewer vehicles reduces net GHG emissions from the MD/HD sector. [EPA-HQ-OAR-2010-0162-2735.1, p.8]

It has been observed that lower vehicle speeds can increase the fuel economy of individual trucks. At least in some instances, moving freight at lower speeds could consume less fuel due to lower wind resistance on a vehicle and the possible ability to operate at lower engine revolutions per minute ('rpm'). But this observation is of limited utility with regard to the promulgation of standards which would regulate the MD/HD sector. Commercial vehicles have inherent incentives to deliver goods more efficiently. In the commercial sector, time undoubtedly is money and the cost of operating a vehicle is only partially reflected in the fuel consumed. External factors - e.g., hourly wages paid, customer needs for prompt delivery play an intrinsic and undeniable role in vehicle utilization. In other words, theory cannot replace hard commercial facts. [EPA-HQ-OAR-2010-0162-2735.1, p.9]

In seeking to design appropriate metrics to measure and improve the FE and lower GHG emissions from MD/HD vehicles, both EPA and NHTSA thus need to more fully consider vehicle operational realities in the commercial sector. Assuredly, the focus of this rulemaking is broad-based with respect to addressing climate change and reducing the consumption of transportation fuels. EPA's statutory focus must necessarily reside with respect to the emission of GHGs from MD/HD vehicle sector. NHTSA, operating within its own statutory framework, is required to focus on 'maximum feasible improvement' for a fuel efficiency improvement program. 19 Overall policy direction has been framed with respect to preservation of our environment and decreased utilization of petroleum. [EPA-HQ-OAR-2010-0162-2735.1, p.9]

Using fewer vehicles to perform the work dictated by the U.S. economy is consistent with such aims. That is, a metric incorporating average vehicle speed, thereby truly reflecting how the commercial sector measures work performed, serves the complementary goals that EPA and NHTSA seek in this rulemaking-less GHGs and improved FE. [EPA-HQ-OAR-2010-0162-2735.1, p.9]

As noted, EPA and NHTSA are *not* required to propose or promulgate a metric based on the NAS Report recommendation for a measure of load specific fuel consumption ('LSFC'). This being said, under the accelerated rulemaking schedule that the agencies are following, it may be difficult to re-propose a different metric and adhere to the July 2011 deadline for a final rulemaking package. In the event that EPA and NHTSA decide to adhere firmly to the announced deadline, an alternative approach to the Allison proposed metric would be to include a 'correction factor' to the proposed metric. [EPA-HQ-OAR-2010-0162-2735.1, p.10]

The correction factor would be applied when HD engines are tested on a given duty cycle representing the classes and duty cycle of particular vocations. That is, EPA and NHTSA would utilize the proposed metric, but then adjust the certification of vehicles based on measured or modeled performance relative to drive cycles based on real-world driving conditions. The resulting compliance values would essentially be corrected based on the actual distance a vehicle travels when trying to meet the 'vehicle speed vs. time' trace for the specified duty cycle. [EPA-HQ-OAR-2010-0162-2735.1, p.10]

In this regard, the proposed gallons/IOOO ton miles standard is not a 'self-correcting' metric. If a vehicle is tested on an appropriate drive cycle and covers less distance on the drive cycle, it is true the denominator of the gallons/1000 ton miles metric will be smaller and thus produce a higher (i.e., worse) FE or GHG 'rating.' However, in this case, the numerator of the FE ratio will also decrease, which would improve the FE ratio. EPA and NHTSA should recognize this effect and not simply assume that the proposed metric automatically accounts for the different operation of different vehicles being tested (or simulated) on a drive cycle utilized for compliance. [EPA-HQ-OAR-2010-0162-2735.1, p.10]

As a simple example, suppose the goal of a drive cycle used for compliance is to compare the FE of two trucks at a steady cruising speed for one hour. It would be contrary to the purpose of the drive cycle to operate one truck at 65 mph and the other at 50 mph and then directly compare the FE of the two trucks, as measured in gal/1000 ton-mile. Yet such a result might be possible if the slower truck is allowed to 'pass' a drive cycle test (on the theoretical basis that because the slower truck goes a lesser distance over the 1 hour test period, the resulting performance of the truck is 'corrected' by the FE ratio in gal/1000 ton-mile). In short, it is logically inconsistent and not reflective of real world conditions to directly compare the FE of vehicles when they are operated at different average speeds and when their performance varies widely from that prescribed by a drive cycle.. Such an approach also would be misleading to ultimate purchasers of the vehicle who might rely on the vehicle's performance on a drive cycle as being indicative of real-world performance. [EPA-HQ-OAR-2010-0162-2735.1, p.10]

Drive cycles are designed to simulate real world traffic conditions. Therefore, the inability of any vehicle to follow the 'trace' of a drive cycle is not simply a failure without consequence. It means that the vehicle in the real world will not be able to keep up with traffic, will take more time to complete the work required of it and will consume more fuel to complete the work required of it (or, in the aggregate, a fleet will require more vehicles to fulfill its business obligations). Therefore, a correction factor is necessary to account for this failure, either in the form of a correction based on average speed as incorporated within the Allison-proposed metric, or with respect to a correction based on the distance a vehicle travels on the duty cycle versus the distance that would be covered by a vehicle which was following the trace. [EPA-HQ-OAR-2010-0162-2735.1, pp.10-11]

Altogether, Allison recognizes and appreciates that EPA and NHTSA are operating under tight timeframes in this rulemaking proceeding and that there are also constraints related to testing facilities and funding which might be needed in order to develop a more robust GHG/FE metric that would directly incorporate average speed or support a different approach to compliance than the approach in the proposed rules. Applying an adjustment factor would address these practical limitations, yet allow each agency to implement a more direct complete measure of each vehicle's FE and GHG emissions. [EPA-HQ-OAR-2010-0162-2735.1, p.11]

Given EPA and NHTSA intention for follow-on rulemakings, it is also incumbent upon both agencies to continue their evaluation of appropriate metrics for fairly comparing the relative GHG emissions and FE of different MD/HD vehicles. EPA and NHTSA should therefore recognize the limited focus of the NAS report, carefully evaluate alternatives to the proposed metric and work cooperatively with affected industries on a going-forward basis. An adjustment factor could serve as a bridge to the broader evaluation of appropriate FE and GHG metrics in follow-on rulemakings. [EPA-HQ-OAR-2010-0162-2735.1, p.11]

As an example, assume that Fleet A and Fleet B operate similar trucks with similar payloads and operating hours per day. But due to vehicle technology, including the use of advanced transmissions, Fleet A's trucks average 50 MPH, while Fleet B's trucks average only 40 MPH. The net result of such a different over the course of a year is highly significant. In the above example, Fleet B would need 10 trucks to transport the same ton-miles per year as 8 trucks at Fleet A.

EPA and NHTSA are using rebound effects of 5%, 10%, and 15% for vehicles covered by this proposed rulemaking, but have not tied these estimates directly to any specific study, but rather indicated that these estimates reflect the 'potential impact of the rebound effect in our analysis.' Id. at 9-4.

See Draft Regulatory Impact Analysis cited above at 5-12. Carbon Dioxide ('CO2') emissions from fuel combustion predominated MD/HD emissions. CO2 emissions in the base case are estimated at 58,232,974 metric tons in 2030 as compared with 353,576 metric tons of hydrochlorofluorocarbon ('HFC') emissions from air conditioning. CO2 emissions then represent an even higher percentage of all emissions as compared to LDVs, representing over 98% of GHG emissions.

Organization: Honeywell

The proposal represents a significant first step towards structuring a longer term regulatory program covering this segment of the motor vehicle market. With regard to vocational vehicles, the agencies should ensure that the compliance measuring metrics used for each vehicle segment (e.g., CO2 grams/ton mile) both accurately reflect the vehicle segment and promote technologies in that segment offering real world fuel efficiency and CO2 benefits. To the extent that a different metric may more accurately measure real world fuel use and emissions, and may better encourage fuel saving technologies, the agencies should adopt such metrics either in this or in future rulemakings. The proposal, while significant in establishing a first-time structure, represents a relatively modest level of improvement during this initial time-frame. In the future, more substantial levels of improvement can be cost-effectively attained as advanced technologies proliferate and as further development resolves current concerns over trade-offs between turbochargers and EGRs. Honeywell looks forward to working with its partners in industry in continuing to define, research and implement technological advances with the most promise for attaining maximum benefits with least possible costs. Honeywell similarly looks forward to working with the agencies in defining future regulations that acknowledge and encourage these advances. [EPA-HQ-OAR-2010-0162-1891.1, p. 3]

Response:

Based on NAS's recommendation and feedback from the heavy-duty truck industry, NHTSA and EPA proposed standards for vocational vehicles that would be expressed in terms of moving a ton of payload over one mile. Thus, NHTSA's proposed fuel consumption standards for these trucks would be represented as gallons of fuel used to move one ton of payload one thousand miles, or gal/1,000 ton-mile. EPA's proposed CO_2 vehicle standards would be represented as grams of CO_2 per ton-mile. The agencies understand the comments state that a payload-based metric is not appropriate for all types of vocational vehicles, specifically buses and waste haulers. The agencies recognize that a payload-based approach may not be the most representative of an individual vocational application; however, it best represents the broad vocational category which is appropriate for this first phase of standards. Put another way, a more differentiated metric would not affect the technology choice for vocational vehicles in this first phase of standards. The metric which we proposed treats all vocational applications equally and requires the same technologies be applied to meet the standard. Thus, the agencies are adopting the proposed metric, but will revisit the issue of metrics in any future action, if required, depending on the breadth of each standard.

6.2.2. Stringency of Standards

6.2.2.1. Vocational Vehicles –Tire Availability

Organizations Included in this Section:

Rubber Manufacturers Association
Bridgestone
Ford Motor Company
Waste Management
National Solid Wastes Management Association (NSWMA)
National Automobile Dealers Association
American Automotive Policy Council
Volvo

Organization: Rubber Manufacturers Association (RMA)

In the NPRM, EPA and NHTSA provide an assessment of the various technologies available to vehicle manufacturers to achieve the proposed standards, including low rolling resistance tires. During this assessment, EPA and NHTSA should evaluate the balance of tire performances necessary in truck tires - particularly the tread wear and traction aspects of tire performance, as well as the tires' contribution to vehicle fuel efficiency, or rolling resistance. Trucks, especially those used in long haul applications, are expected to perform well in a variety of weather, in a broad geographical region, over varied topographies. Tires play a critical role in a truck's ability to perform in a safe manner under these circumstances, and the demands on a truck tire should be considered in the evaluation of the extent to which rolling resistance can be improved to assist in meeting an overall vehicle standard. [EPA-HQ-OAR-2010-0162-1963.1, p.5]

The proposed vocational vehicle fuel consumption standards would require vehicle manufacturers to specify tires with low rolling resistance. This would be the first time that low rolling resistance tires would be considered in this market segment. Both the EPA SmartWayTM Verified Technologies program and the California Air Resources Board (CARB) have focused on tire RRC in the line haul segment, which includes four main sizes of dual tires and the 50 and 55 series of wide base single tires. These are the most common tire sizes for steer, drive and trailer fitments for the class 8, tractor/trailer long haul vehicles that would benefit the most from low rolling resistance tires. [EPA-HQ-OAR-2010-0162-1963.1, p.3]

Since tire rolling resistance does not play as large a part in overall vehicle fuel efficiency in urban, regional and vocational applications as compared to long haul applications, tire industry research and development, testing and business efforts have been focused more on tires for long haul applications. Indeed, desired tire performance attributes in these applications most often are centered on resistance to wear, heavy load applications and traction. As a consequence, limited RRC data exist for vocational application and size tires. Additional data is needed before the proposed limits can be properly reviewed. Tire manufacturers have limited data for vocational tires. As described above, the EPA SmartWayTM verified technologies program is in the midst of a significant testing program that involves testing tires for vehicle classes 2B to 7. This program is expected to provide valuable information about tire rolling resistance performance for tires in these market segments. Once this testing program is completed and the data reviewed by industry experts, EPA and NHTSA should evaluate the data and use it in the development of this regulation. RMA requests that EPA and NHTSA give an opportunity for public comments, if the proposed standards are revised that incorporate this new data. [EPA-HQ-OAR-2010-0162-1963.1, pp.3-4]

In order to comply with the provisions of the NPRM, most manufacturers would have to perform initial rolling resistance test for most or all of the tire offerings in this segment before assessing what tire design changes might be necessary, potentially redesigning tires, advising vehicle manufacturer customers and providing tires that would enable compliance with the proposed standards. This will pose a significant testing burden on tire manufacturers. [EPA-HQ-OAR-2010-0162-1963.1, p.4]

The NPRM states that "we believe on- versus off-road traction (primarily tread pattern) is the only tire performance parameter which trades off with tire rolling resistance so significantly that tire manufacturers would be unable to develop tires meeting both the assumed lower rolling resistance performance while maintaining or improving other characteristics of tire performance."4 The NPRM seeks comments on this issue. As well, a similar question was posed to Michelin North America, Inc. ("Michelin") at the NPRM Public Hearing on November 18, 2010 in Cambridge, MA. On behalf of its members, including Michelin, RMA takes this opportunity to provide the agencies with input on this question. [EPA-HQ-OAR-2010-0162-1963.1, p.4]

The range of rolling resistance of tires used on the NPRM category of vocational vehicles today varies with the drive cycles typical for these applications, i.e. truck buyers may value tire traction and durability more heavily than rolling resistance. In the case of emergency vehicles such as fire trucks, rescue and medical services, towing and recovery vehicles, refuse haulers, cement trucks, and utility vehicles, the operation of these vehicles include both improved road/highway and unimproved road surfaces and terrain. [EPA-HQ-OAR-2010-0162-1963.1, p.5]

Tire manufacturers make design and material choices that determine the overall balance of performance of a tire for the intended application. With regards to the capabilities of such tires to meet both the NPRM low rolling resistance values while maintaining off-road traction needs, RMA recognizes that in some applications and needs, traction design considerations will prevail over the expectations of a dedicated improved-road surface low rolling resistance tire. RMA recommends a thorough review of tires for these off-road vehicle segments to assure that the final rule does not have any unintended consequences. [EPA-HQ-OAR-2010-0162-1963.1, p.5]

RMA supports the use of a vehicle emissions and fuel consumption model to facilitate standard setting and compliance with the proposed standards. Modeling provides an efficient means of compliance. The current NPRM relies heavily upon the tire RRC values entered in the GEM rather than real-world testing such as TMC/SAE In-Service Fuel Consumption Test Procedure – Type II, also known as TMC's RP 1102 and SAE J1321. An alternative approach would not rely upon a specific tire rolling resistance coefficient (RRC) threshold, but would allow vehicle manufacturers to choose from various fuel efficient technologies – including tires – and demonstrate compliance to a threshold for overall fuel efficiency reduction by using a validated FE models, backed as necessary by vehicle performance tests such as SAE J1321. Since a model is proposed in the NPRM, it is important that GEM inputs for tire RRC are highly data-driven to avoid potential unintended consequences and therefore a comprehensive study encompassing tires for all vehicle types to be regulated may be needed where only anecdotal evidence or limited data exists. [EPA-HQ-OAR-2010-0162-1963.1, p.6]

Organization: Bridgestone

Of the technologies used in the GEM model to establish Greenhouse Gas Emissions and Fuel Consumption vehicle standards, tires are the primary vehicle component that contributes to safety (traction on all highway surfaces). [EPA-HQ-OAR-2010-0162-2120.1, p.2]

"….NHTSA should evaluate the balance of tire performances necessary in truck tires - particularly the tread wear and traction aspects of tire performance, as well as fuel efficiency (Rolling Resistance). Trucks, especially those used in long haul applications, are expected to perform well in a variety of weather, in a broad geographical region, over varied topographies. Tires play a critical role in a truck's ability to perform in a safe manner under these circumstances, and the demands on a truck tire should be considered in the evaluation of the extent to which rolling resistance can be improved to assist in meeting an overall vehicle standard." [EPA-HQ-OAR-2010-0162-2120.1, p.2]

As regulations push tires to ever lower levels of rolling resistance, it becomes increasingly difficult for tire manufacturers to achieve an optimal balance with traction and wear life. [EPA-HQ-OAR-2010-0162-2120.1, p.2]

Bridgestone Americas recommends that NHTSA and the EPA conduct a study to fully understand the market impact of trending to low rolling resistance tires and the potential effects upon the balance of tire performances necessary in truck tires. Bridgestone Americas is willing to support and participate in any way we can. [EPA-HQ-OAR-2010-0162-2120.1, p.3]

Organization: Ford Motor Company (Ford)

Ford supports preserving the utility and functionality of commercial vehicles including maintaining separate gasoline and diesel targets. [EPA-HQ-OAR-2010-0162-1761.1, p.2]

Ford believes that several aspects of the proposed vocational engine requirements should be reevaluated prior to finalizing the rule. In addition to the AAPC comments, we believe that specific revisions to the tire rolling resistance requirements should be incorporated. [EPA-HQ-OAR-2010-0162-1761.1, p.2]

The proposed model-based requirement for Class 2b-8 vocational vehicles requires rolling resistance values of approximately 8.0-8.1 for all tire types used in this category. However, the varying tires used for this broad range of vehicles have significantly different constructions, sizes and usages. Ford met with the agencies on January 13,2011 to provide background on these tire characteristics and submitted additional confidential material in support of that discussion. In general, lighter weight vehicles use smaller tires, with bias ply tire or rubber-coated layer construction that have a significantly shorter lifetime than those used on the heaviest vehicles within this class, which predominantly use steel construction. Agency data' used to develop the standard was primarily based on available Smartway tire data for line-haul trucks, without taking into consideration smaller tires used for lighter heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1761.1, pp.5-6]

Ford collected tire rolling resistance data for a broad variety of tires. Although the number of tests is limited, general trends in the data indicate that different classes of tires inherently produce varying levels of rolling resistance. Based on the differing tire characteristics that impact rolling resistance, and consistent with the AAPC comments, Ford recommends that

EPA and NHTSA revise the requirement or the modeling method to stratify the effective tire rolling resistance standard based on tire class with separate requirements for LT tires, 19.5' tires, and 22.5' tires. The standards should be set based on data collected on high volume in-use tires and set at a level that ensures the availability of multiple compliant tires. [EPA-HQ-OAR-2010-0162-1761.1, p.6]

Organization: Waste Management

The Agencies' Proposed Baseline for HD vocational vehicles greatly overestimates the fuel efficiency of HD refuse trucks. The 2010 baseline Heavy HD vocational vehicle performance is outlined in the preamble as: [EPA-HQ-OAR-2010-0162-1854.1, p.6]

• fuel consumption 11.3 gallon/1,000 ton-mile; [EPA-HQ-OAR-2010-0162-1854.1, p.6]

• CO2 emissions 115 g CO2/ton-mile; and [EPA-HQ-OAR-2010-0162-1854.1, p.6]

• tire rolling resistance 8.1 kg/metric ton. [EPA-HQ-OAR-2010-0162-1854.1, p.6]

In actuality, refuse trucks average about 33.3 gallons/1000 ton-mile, so the trucks consume approximately triple the amount of diesel estimated in the 2010 Baseline. The proposed CO2 standard is also problematic. The 2010 baseline performance assumes CO2 emissions of 115 g CO2/ton-mile. Using the SmartWay factors for estimating CO2 emissions: [EPA-HQ-OAR-2010-0162-1854.1, p.6]

• 1 gallon of Diesel produces 10.51 Kgs of CO2 , (Source: SmartWay) [EPA-HQ-OAR-2010-0162-1854.1, p.6]

• 1 gallon of Natural Gas produces 4.46 Kgs of CO2 (Source: SmartWay) [EPA-HQ-OAR-2010-0162-1854.1, p.6]

The average refuse truck consumes 1 gallon of fuel per 30 ton-mile and thus one ton-mile produces 350 g CO2 for Diesel and 150 g CO2 for Natural Gas. The divergence between the assumed baseline performance and actual performance should be incorporated in the engine certification framework to ensure that compliant engines are also able to meet the working demands of the vehicles. [EPA-HQ-OAR-2010-0162-1854.1, p.6]

As noted in the preamble of the proposed rule (pg 181 of the prepublication version) the 2010 National Academy of Sciences (NAS) Report noted that reduced rolling resistance tires may reduce fuel consumption between one and three percent over the next ten years, but 'rolling resistance impact on fuel consumption reduces with the mass of the vehicle and with drive cycles with more frequent stops and starts.' The average refuse vehicle is a textbook illustration of that caveat. Refuse vehicles are very heavy, ranging from 45,000 to 66,000 thousand GVWR, and experience in an average month of operation about 43,000 hard stops and starts. The heavy weight of the vehicle and the frequent hard stops and starts results in considerable wear and tear on the tires. [EPA-HQ-OAR-2010-0162-1854.1, p.7]

Waste Management maintains a disciplined approach to monitoring and optimizing tire pressure to reduce wear and friction, and tires are routinely rotated to ensure even wear. From a lifecycle GHG emissions standpoint, WM's tire recycling program likely results in far greater overall fuel savings than use of low resistance tires. Waste Management retreads between 150,000 and 175,000 tires per year, for a savings of 13 gallons of petroleum per tire or nearly 2.3 million gallons of fuel per year. Waste Management has documented our fleet duty cycles and estimated fleet fuel efficiency performance in our EPA SmartWay data. [EPA-HQ-OAR-2010-0162-1854.1, p.7]

Organization: National Solid Wastes Management Association (NSWMA)

Finally, the agencies have chosen to make the use of low rolling resistance tires the sole criteria for achieving the fuel consumption standard for the universe of vocational vehicles. Yet the NAS report noted that low rolling resistance tires “do not generate the same level of fuel savings for drive cycles that include frequent stops and starts as for derive cycles with minimal amounts of braking” and that ”as a result of these factors, the contribution of rolling resistance to truck fuel use is less in delivery trucks and still less in refuse haulers…” (see NAS, page 115) and that “the use of low rolling resistance tires has some application in refuse packers, but their low vehicle speed profile and the need for good traction makes the application questionable” (see NAS, page 141). [EPA-HQ-OAR-2010-0162-1870.1, p.9]

Because of our concerns over the relevance of the pre-assigned values in the computer model and the deficiencies in the proposed drive cycles, we strongly urge the agencies to exclude waste services vehicles from this regulation until such time as they are prepared to write regulations that apply to this type of vocational vehicles. By excluding waste services vehicles from the final regulation, the agencies will be free to concentrate their attention and resources where they will receive the greatest return without wasting time and effort on a universe of trucks that is unique in its diversity. [EPA-HQ-OAR-2010-0162-1870.1, p.9]

Organization: National Automobile Dealers Association (NADA)

Section 102 of EISA provided for several other constraints on the regulatory process which protect truck dealership interests, including a requirement that any new fuel efficiency rules be “appropriate, cost-effective and technologically feasible.” These criteria are critical since federal fuel-economy (and emissions) mandates only apply to the manufacture of new motor vehicles and engines, not to their purchase. That is, such mandates attempt to push new designs and technologies into the new vehicle marketplace without commensurate requirements or incentives for their purchase. Thus, unless fuel efficiency rules are “appropriate, cost-effective and technologically feasible,” prospective customers will avoid purchasing new vehicles and engines, electing instead to hold onto existing ones longer or to turn to the used marketplace, either way leaving dealerships with expensive unsold inventory and undermining the livelihood of dealership employees. [EPA-HQ-OAR-2010-0162-2705, p.3]

Even where no potential performance compromises exist, prospective vocational purchasers must be convinced that their vehicles’ duty-cycles will allow for a reasonable fuel economy pay-back of the extra costs involved with investing in low rolling resistant tires. Given expected and perceived performance and payback concerns, it is highly unlikely that customers will adopt low rolling resistant tires at anything like the 70% rate estimated in the proposal. [EPA-HQ-OAR-2010-0162-2705, p.9]

Organization: American Automotive Policy Council

AAPC has concerns about the availability of compliant tires, particularly in the case of tires smaller than 22.5', in the time frame of the regulation. The proposed model-based requirement for Class 2b-8 vocational chassis appears to require tires with rolling resistance values of approximately 8.0-8.1 or better. Limited data available for smaller diameter tires such as LT tires used on many light heavy duty trucks and vans suggest few if any choices for tires that would comply. The cost to participate in this vehicle segment is high for tire manufacturers due to relatively small volumes. As a result, there is little financial incentive for tire manufacturers to make the significant investments that would be necessary to meet the requirement in the short term, and they would likely abandon the segment rather than incur those costs. EPA and NHTSA need to have the tire based standard vetted with test data representative of the full range of tires in the vocational vehicle segment before setting a performance standard. [EPA-HQ-OAR-2010-0162-1762.1, p.19]

AAPC recommends that EPA revise the requirement or the modeling method to stratify the effective tire rolling resistance standard based on tire class with separate requirements for LT tires, 19.5' tires, and 22.5' tires. The standards should be set based on data collected on high volume in-use tires and set at a level that ensures the availability of multiple compliant tires. [EPA-HQ-OAR-2010-0162-1762.1, p.19]

Organization: Daimler Trucks North America

The Agencies Need Actual Tire Data In Order To Properly Establish Vocational Vehicle Standards. [EPA-HQ-OAR-2010-0162-1818.1, p.84]

On page 75 Fed. Reg. 74244 (note 186), the Agencies state that they derived the expected tire rolling resistance value from an estimate based upon very different types of vehicles (tractors used in long haul operation and passenger cars). In turn, the tire rolling resistance values may be highly inaccurate. And, because the only parameter that is used in determining whether a vocational vehicle complies is its tire rolling resistance, the Agencies’ estimate leaves open the possibility that the vocational vehicle certification limits are inappropriate. Extrapolation from different types of tires is insufficient. Our solution is to analyze additional data to determine if standard is realistic. [EPA-HQ-OAR-2010-0162-1818.1, pp.84-85]

The Agencies' Program Might Force Vehicles That Currently Are 4x2 With High Rolling Resistance Tires Necessary To Meet Their Traction Needs To Be Come 6x4 Vehicles, Which Could Worsen Fuel Consumption. [EPA-HQ-OAR-2010-0162-1818.1, p.85]

Tire rolling resistance standards, incorporated through GEM, might encourage a person to put LRR tires on a vehicle, which may in turn force it from 4x2 to 6x4, which in turn will increase fuel consumption and emissions. In turn, the agencies need a credit for 4x2 tractors. [EPA-HQ-OAR-2010-0162-1818.1, p.85]

Organization: Fire Apparatus Manufacturers' Association

The proposed rule uses the GEM computer model to determine compliance with the new regulations. For vocational trucks, the tire rolling resistance value (CRR) is the only factor in the GEM model that may be entered by the chassis manufacturer. Every other factor is provided by the EPA and NHTSA. [EPA-HQ-OAR-2010-0162-1328.1, p.1]

Since the CRR is the only factor available to be modified, and the regulation establishes what the final result must be, the chassis manufacturer has no choice but to install tires that meet the prescribed CRR. [EPA-HQ-OAR-2010-0162-1328.1, p.1]

Only tires with a CRR value of 8.0 kg/metric ton or less will provide a passing score for vocational vehicles in the GEM model. [EPA-HQ-OAR-2010-0162-1328.1, p.1]

The feedback available from the major manufacturers of truck tires is that they have tested very few vocational tires. Up to this point the vocational industry has had little interest in low rolling resistance tires, so there has been no impetus for the tire manufacturers to perform this testing. Few of the tire manufacturers have been able to provide CRR values for tires with the more aggressive mixed-service tread patterns (tires capable of both onroad and off-road performance). Some manufacturers who plan this testing are predicting that published values will not be available until the summer of 2011. [EPA-HQ-OAR-2010-0162-1328.1, p.2]

While some of the tread patterns used by fire apparatus will likely fall below the 8.0 kg/metric ton limit, the tire manufacturers predict that the more aggressive tread patterns will be above this limit. Rolling resistance is a function of the amount of rubber deflection.

As the tread patterns become more aggressive (less rubber on the road and more voids) the deflection of the remaining rubber is greater and more energy is consumed in hysteresis as the tire rolls. More energy consumption means higher values of rolling resistance. [EPA-HQ-OAR-2010-0162-1328.1, p.2]

[Pictures of a Smartway Low CRR Tire and Mixed Service On/Off Road Tire can be found on page 2 of this comment.]

Tire tread selection is made by the fire department depending on the needs in their region. One FAMA company surveyed the latest 2,300 medium and large fire apparatus specified by fire departments. Each of the 65 tire models was then categorized into one of four service designations: highway, highway traction, on/off road mixed service, or off-road. [EPA-HQ-OAR-2010-0162-1328.1, p.3]

[A tire tread table can be found on pages 3-4 of this comment.]

When the numbers of each brand and model of tire were tallied, the results showed that aggressive tread or lugged tires in the On-Off Road Mixed Service category were the most prevalent selection. [EPA-HQ-OAR-2010-0162-1328.1, p.5]

[A table can be found on page 5 of this comment.]

Although unconfirmed by actual values from the tire manufacturers, we assume that the greater the aggressiveness of the tread, the less likely it will be to meet the criteria. [EPA-HQ-OAR-2010-0162-1328.1, p.5]

[Tire pictures can be found on page 5 of this comment.]

As this public comment is being written the CRR values for most of the tires in question are not available. [EPA-HQ-OAR-2010-0162-1328.1, p.11]

Organization: International Association of Fire Chiefs (IAFC)

Do not include emergency vehicles in the vehicle portion of the rule unless and until the majority of tires currently employed on fire apparatus are shown to have CRR values below the 8.0kg/metric ton criteria. [EPA-HQ-OAR-2010-0162-1760.1, p.2]

As the FAMA comments explain, the NPRM would use the GEM computer model to determine compliance with the new regulations. For vocational vehicles, the tire rolling resistance value (CRR) is the only factor in the GEM model that may be entered by the chassis manufacturer. Since the CRR is the only factor available to be modified, the chassis manufacturer must install tires with a CRR value of 8.0 kg/metric ton or less to provide a passing score for a vocational vehicle. [EPA-HQ-OAR-2010-0162-1760.1, p.2]

Unfortunately, as the FAMA comments describe in great detail, the major manufacturers of truck tires have tested very few vocational tires. The FAMA comments predict that the more aggressive tread patterns for tires will likely have CRR values that are above the 8.0 kg/metric ton limit. Due to the various “on-road” and “off-road” missions of a fire apparatus, the FAMA comments show that "on/off road mixed service" tires with aggressive treads or lugged tires are the most prevalent type of tires used by the fire service. [EPA-HQ-OAR-2010-0162-1760.1, p.2]

In light of the prevalent use of tires with aggressive treads that have not been tested for CRR values, the IAFC would recommend a delay in enforcing the regulations outlined in this NPRM until these tires have been tested and the effect of the 8.0 kg/metric ton limit on emergency operations has been fully analyzed. [EPA-HQ-OAR-2010-0162-1760.1, p.2]

Organization: Volvo

Volvo Group notes that it is still unclear, due to lack of available data, what effect Low Rolling Resistance (LRR) tires will have on vocational vehicles and applications *See* 75 FR 74382, 74383. There is also a need for manufacturers to understand how different axle configurations are to be input, since GEM appears to assume only a 6X4 axle configuration and only allows for two tire types (steer and drive) per vehicle. Also, some tires have requirements such as sidewall scuff resistance or tread life under scuffing (due to sharp turns) that need to be evaluated. It is not clear if low Crr tires as defined in the proposal are even available. Also, the GEM model reacts to Cd, speed, and idling inputs for vocational vehicle. These inputs should be locked. All of these issues should be clarified within the rule and within GEM. [EPA-HQ-OAR-2010-0162-1812.2, p.35]

Due to the nature of the marketplace for tires, HD vehicle manufacturers do not identify target rolling resistance characteristics for particular tires. Instead, the rolling resistance is one of the many tire features (along with brand, model, size, tread configuration, load and speed ratings, etc.) that a customer considers when choosing a tire for a particular HD vehicle. The tire manufacture designs the tire for a particular rolling resistance characteristic, and measures that rolling resistance to validate the tire's performance. As such, tire manufacturers are responsible for the rolling resistance of the HD tires that they provide to the marketplace. [EPA-HQ-OAR-2010-0162-1812.2, pp.40-41]

Response:

Since the NPRM, the agencies have conducted substantial additional research on tire rolling resistance for medium- and heavy-duty applications. This research involved direct discussions with tire suppliers,[10] assessment of the comments received, additional review of tire products available, and a more thorough review of tire use in the field.[11] In addition, EPA has conducted tire rolling resistance testing to help inform the final rulemaking.[12] This information

[10] Records of these communications, and additional information submitted by the supplier companies and not CBI, are available at Docket No. EPA-HQ-OAR-2010-0162.
[11] See Docket EPA-HQ-OAR-2010-0162
[12] See Docket EPA-HQ-OAR-2010-0162

largely corroborates the agencies' initial conclusions regarding use of LRR tires for vocational vehicles set out at proposal.

The agencies discussed many aspects of low rolling resistance tire technologies and their application to vocational vehicles with tire suppliers since publication of the NPRM. Several tire suppliers indicated to the agencies that low rolling resistance tires are currently available for vocational applications that would enable compliance with the proposed vocational vehicle standards, such as delivery vehicles, refuse vehicles, and other vocations. However, these conversations also made the agencies aware that availability of low rolling resistance tires varies by supplier. Some suppliers stated that they focused their company resources on areas of the medium- and heavy-duty vehicle spectrum where fleet operators would see the most fuel efficiency benefits for the application of low rolling resistance technologies; specifically the long-haul, on-highway applications that drive many miles and use large amounts of fuel. These suppliers stated that this choice was driven by the significant capital investment that would be needed to improve tire rolling resistance across the relatively large number of product offerings in the vocational vehicle segment, based on the wide range of tire sizes, load ratings, and speed ratings, compared to the much narrower range of offerings for long-haul applications.[13] Other suppliers stated that they have made conscious efforts to reduce the rolling resistance of all of their medium- and heavy-duty vehicle tire offerings, including vocational applications, in an effort to become leaders in this technology.

As described in Section II.D of the preamble of the final rule, the agencies conducted independent testing of current tires available in the heavy-duty market. The agencies utilized this information in developing the vocational vehicle standards predicated on use of LRR tires.[14] The agencies acknowledge there can be a series of tradeoffs when designing a tire for reduced rolling resistance. These tradeoffs can include characteristics such as wear resistance, cost and scuff resistance. However, the tire test samples were selected from those currently available on the market, and therefore have no known safety issues and meet all current requirements to allow availability in commerce; including wear, scuff resistance, braking, traction under wet or icy conditions, and other requirements. These tires included a wide array of sizes and designs intended for most all vocational vehicle applications, including those used for school buses, refuse haulers, emergency vehicles, concrete mixers, and recreational vehicles.[15] As the test results revealed, there are a significant number of tires available that meet or exceed the rolling resistance values used to set the vocational vehicle standards, for both Light-Truck (LT) (with an adjustment factor) and non-LT tire types, while meeting all applicable safety standards. The agencies also conducted a winter traction test of 28 tires to evaluate the impact of low rolling

[13] More tire types and sizes have been developed for vocational vehicle applications than for long-haul applications. In some cases, suppliers offer up to 17 different vocational tire designs, and for each design there may be 8-10 different tire sizes. In contrast, a line-haul application may have only 2-3 tire designs with a fewer range of sizes.
[14] Bachman, Joseph. EPA Memo to Docket. Heavy-Duty Tire Evaluation. Docket EPA-HQ-OAR-2010-0162.
[15] Bachman, Joseph. EPA Memo to Docket. Heavy-Duty Tire Evaluation. Docket EPA-HQ-OAR-2010-0162.

resistance designs on winter traction. The results of the study indicate that there was no statistical difference between rolling resistance and snow traction.[16]

Overall, a total of 156 medium- and heavy-duty tires were included in this testing, which was comprised of 88 tires covering various commercial vocational vehicle types, such as bucket trucks, school buses, city delivery vehicles, city transit buses and refuse haulers among others; 47 tires intended for application to tractors; and 21 tires classified as light-truck (LT) tires intended for Class 4 vocational vehicles such as delivery vans.

The test results for 88 commercial vocational vehicle tires (19.5" and 22.5" sizes) showed a test average RR_C of 7.4 kg/metric ton. To comply with the proposed vocational vehicle fuel consumption and GHG emissions standards using improved tire rolling resistance as the compliance strategy, a manufacturer would need to achieve an average tire RR_C value of 8.1 kg/metric ton.[17] The measured average RR_C of 7.4 kg/metric ton is thus better than the average value that would be needed to meet vocational vehicle standards. Of those eighty-eight tires tested, twenty tires had RR_C values worse than 8.1 kg/metric ton, two were at 8.1 kg/metric ton, and sixty-six tires were better than 8.1 kg/metric ton. Additional data analyses examining the tire data by tire size to determine the range and distribution of RR_C values within each tire size showed each tire size generally had tires ranging from approximately 6.0 to 8.5 kg/metric ton, with a small number of tires in the 5.3 to 5.7 kg/metric ton range and a small number of tires in a range as high as 9.3 to 9.8 kg/metric ton. Review of the data showed that for each tire size and vehicle type, the majority of tires tested would enable compliance with vocational vehicle fuel consumption and GHG emission standards.

The test results for the 47 tires intended for tractor application showed an overall average of 6.9 kg/metric ton, the lowest overall average rolling resistance of the different tire applications tested.[18] This is consistent with what the agencies heard through comments and meetings with tire suppliers whose efforts have focused on tractor applications, particularly for long-haul applications, which yield the highest fuel efficiency benefits from LRR tire technology.[19]

Finally, the 21 LT tires intended for Class 4 vocational vehicles were comprised of two sizes; LT225/75R16 and LT245/75R16 with 11 and 10 samples tested, respectively. Some auto manufacturers have indicated that RR_C values for tires fitted to these Class 4 vehicles typically have higher RR_C values than tires found on commercial vocational vehicles because of the smaller diameter wheel size and the ISO testing protocol. The test data showed the average RR_C for LT225/75R16 tires was 9.1 kg/metric ton and the average for LT245/75R16 tires was 8.6

[16] Bachman, Joseph. EPA Memo to Docket. Heavy-Duty Tire Evaluation. Docket EPA-HQ-OAR-2010-0162.
[17] See 75 FR at 74244.
[18] The RR_C values for these applications ranged from 5.4 to 9.2 kg/metric ton.
[19] The memos documenting the ex parte communications can be found in Docket #EPA-HQ-OAR-2010-0162.

kg/metric ton. The range for the LT225/75R16 tires spanned 7.4 to 11.0[20] and the range for the LT245/75R16 tires ranged from 6.6 to 9.8 kg/metric ton. Overall, the average for the tested LT tires was 8.9 kg/metric ton.

Analysis of the EPA test data for all vocational vehicles, including LT tires, shows the test average RR_C is 7.7 kg/metric ton with a standard deviation of 1.2 kg/metric ton. The data further show that for each tire size and vehicle type, there are many tires available that would enable compliance with the proposed standards for vocational vehicles and tractors except for LT tires for Class 4 vocational vehicles where test results show the majority of these tires are worse than 8.1 kg/metric ton.

The agencies are revising the final GEM inputs for tire RRc are being revised to 7.7 kg/metric ton based on the significant availability of tires for vocational vehicles applications which have performance better than the originally proposed 8.1 kg/metric ton target. As just discussed, 63 of the 88 tires tested for vocational applications had RR_C values better than the proposed input value. The tires tested covered fitment to a wide range of vocational vehicle types and classes; thus the agencies believe, after reviewing the testing data, that the original input value of 8.1 kg/metric ton was too lenient after reviewing the testing data. Therefore, the agencies believe it is appropriate to reduce the proposed GEM input to be based on performance of an RR_C value 7.7 kg/metric ton for non-LT tire type. As discussed previously, this value is the test average of all vocational tires tested (including LT) which takes a conservative approach over setting a target based on the average of only the non-LT Vocational tires tested. For LT tires, based on both the test data and in alignment with the comments from AAPC and Ford Motor Company, the agencies recognize the need to provide an alternative based on the test data and discussions with vehicles manufacturers. In lieu of having two sets of Light Heavy-Duty vocational vehicle standards, the agencies are finalizing an adjustment factor which applies to the RR_C test results for LT tires. The agencies developed an adjustment factor dividing the overall vocational test average RR_C of 7.7 kg/metric ton by the LT Vocational Average of 8.9 kg/metric ton. This yields an adjustment factor of 0.87. For LT vocational vehicle tires, the measured RR_C values will be multiplied by the 0.87 adjustment factor before entering the values in the GEM for compliance. With the adjustment factor, there are ample numbers of available compliant LRR LT tires for all vocational vehicle types.

The agencies also made follow-up inquires with tire manufacturers in regard to vehicles responding to time sensitive situations on public road and, at times, possibly exceeding the posted speed limits in response to an emergency situation. The responses to these inquiries with tire suppliers combined with the independent tire test data discussed in the final rule preamble (see preamble Section II.D) further indicate the rolling resistance targets for on-road vocational

[20] The agency notes the highest RRC values recorded for LT tires, of 11.0 and 10.9, were for two tires of the same size and brand. The nearest recorded values to these two tires were 9.8; substantially beyond the differences between other tires tested. See Appendix A.

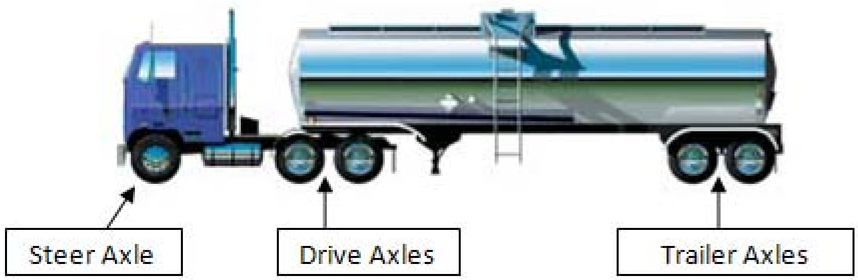
vehicles can be met with tires that are currently available for many vehicle types and applications.

As part of the final rule, the agencies provided provisions to allow for exemption of specific off-road capable vocational vehicles from the fuel efficiency and greenhouse gas standards. The agencies are adopting provisions to exempt any vocational vehicle having speed restricted tires rated at 55 mph or below. In addition, any vehicle primarily designed to perform work off-road such as in oil fields, forests, or construction sites and having permanently or temporarily affixed components designed to work in an off-road environment (i.e., hazardous material equipment or off-road drill equipment) or vehicles operating at low speeds making them unsuitable for normal highway operation; and meeting one or more of the following criteria:

- Any vehicle equipped with an axle that has a gross axle weight rating (GAWR) of 29,000 pounds; or
- Any truck or bus that has a speed attainable in 2 miles of not more than 33 mph; or
- Any truck that has a speed attainable in 2 miles of not more than 45 mph, an unloaded vehicle weight that is not less than 95 percent of its gross vehicle weight rating (GVWR), and no capacity to carry occupants other than the driver and operating crew.

In response to the comment that our baseline vehicles are not properly defined, for the first phase of this program the agencies are treating all vehicles within a weight class as a single unit vehicle. The agencies recognize that this approach may not be the most representative of an individual vocational application; however, it best represents the broad vocational category. We again note that a more refined baseline would not alter the agencies' choice of technology on which to predicate a vocational vehicle standard, nor the agencies' evaluation of that technology's performance -- tire rolling resistance would be evaluated identically. The vehicle which we proposed treats all vocational applications equally and requires the same technologies be applied to meet the standard. Thus, the agencies are adopting the proposed vehicle configurations in the GEM, but will revisit the issue of baseline vehicle configurations in any future action, if required, depending on the breadth of each standard.

In response to the comment regarding a need for manufacturers to understand how different axle configurations are to be input, since GEM appears to assume only a 6X4 axle configuration and only allows for two tire types (steer and drive) per vehicle. The agencies have developed the program such that each vehicle has only two steer tires while the rest of the tires (whether they are drive or non-drive) as depicted in the picture below, also included in RIA Figure 1-21.



6.2.2.1. Vocational Vehicles –More Stringent

Organizations Included in this Section:

Natural Resources Defense Council
American Lung Association & Environmental Defense Fund
American Council for an Energy-Efficient Economy
Anonymous Public Comment
Allison Transmission
Parker Hannifin Corporation
California Air Resources Board
Clean Air Task Force
International Council on Clean Transportation
National Association of Clean Air Agencies
Eaton Corporation
Odyne
Northeast States for Coordinated Air Use Management
Sierra Club
Motor & Equipment Manufacturers Association
Union of Concerned Scientists
Chew, Yuli
Virginia Department of Transportation
United States Senators

Organization: Natural Resources Defense Council (NRDC)

Truck efficiency and GHG emissions improvements are available across all on-road truck classes. We appreciate EPA and NHTSA's attention to improvements across the spectrum of medium- and heavy-duty vehicles from Class 2b to Class 8. We believe the standards should dramatically improve efficiency and emissions by being set at the maximum technically feasible, cost-effective level for all classes. As discussed in following sections, the stringency of the standard should be increased in some cases beyond proposed levels to reach the appropriate level. [EPA-HQ-OAR-2010-0162-1776.1, p.5]

Stringency for vocational vehicles should be increased to capture the fuel use and emissions reductions from a suite of cost-effective and available technologies that are not currently required by the proposal. The proposed stringency is based on improvements to engines and use of low rolling resistance tires. Additional savings are available from improved aerodynamics, mass reduction, gearing and transmission selection and hybrid drivetrains. [EPA-HQ-OAR-2010-0162-1776.1, p.6]

Findings by the NAS indicate that transmissions and driveline adjustments, for example, can reduce fuel consumption in the range of 2 to 8 percent. Reduction in vehicle weight can provide savings of 2 percent in light (Class 2b-5) and medium (Class 6-7) heavy-duty vocational vehicles. [EPA-HQ-OAR-2010-0162-1776.1, p.6]

We recommend that stringency for the light and medium classes is increased to a level such that MY 2017 trucks achieve at least an additional 5 percent in fuel and emissions reduction beyond what would be achieved by tires alone. This will capture opportunities in transmission and weight reduction but not require hybridization. Similarly, for heavy (Class 8) vocational trucks, the stringency should be increased by an additional 3 percent to capture transmission benefits. [EPA-HQ-OAR-2010-0162-1776.1, p.6]

We recognize that the structure of the rule, which handles vocational trucks through separate engine and chassis standards, impacts the technologies that the agencies considered. The agencies require compliance with vehicle-level standards by assuming a standardized body and transmission for the chassis and therefore only capture changes to the tires. The agencies have proposed to allow chassis manufacturers to generate credits from the sale of ‘advanced’ technologies. The challenge with this approach is that there is little incentive to pursue the credits, and therefore little incentive to install fuel-saving advanced transmissions and hybrid drivetrains because the chassis standard can be met with just tire improvements. To make the credits valuable and promote advanced technology production, the stringency for vocational vehicles should be increased as described above. [EPA-HQ-OAR-2010-0162-1776.1, pp.6-7]

In addition, the agencies should consider additional stringency increases to further spur hybridization. Vocational vehicles often operate over stop-and-go modes and may include specialized power take-off equipment which make them good candidates for hybrid systems. Hybrid drivetrains are projected to enter the market to meet these duty cycles; for example, a recent report from Pike Research estimates 300,000 medium- and heavy-duty hybrid sales, or 7 percent of projected sales, by 2015. An additional increase in stringency by 2 percent for all vocational trucks by MY 2017 is justified based on the hybrids achieving per truck fuel and greenhouse gas emission reductions of about 30 percent. [EPA-HQ-OAR-2010-0162-1776.1, p.7]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

EDF and ALA strongly encourage the agencies to ensure that the final standards reflect the greatest emissions reductions feasible, leveraging existing technologies and driving advanced technologies to protect human health and the environment from air pollution. [EPA-HQ-OAR-2010-0162-3129.1, p.11]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Standards for Class 2b-8 Vocational Vehicles Recommendation (stringency of vocational vehicle standards): Strengthen vocational vehicle standards to reflect the potential for at least 5 percent (light and medium vocational) and 3 percent (heavy vocational) savings from transmission and driveline improvements and weight reduction. The proposed standards for vocational trucks would yield 2 percent savings beyond what is gained through engine efficiency improvements, reflecting the benefits of low rolling resistance tires alone. The potential for savings among these vehicles is far greater than 2 percent. While setting standards for vocational vehicles is complex due to the wide variety such vehicles, which have very different features and duty cycles, it is important that the rule do more to promote advanced technologies for this subsector. The findings in the NAS report regarding potential reductions in fuel consumption for four types of vocational vehicles (Class 6 box, Class 6 bucket, Class 8 refuse, and urban bus) are shown in Table 3. [EPA-HQ-OAR-2010-0162-1894.1, p.17]

[Table 3 can be found on page 17 of this comment.]

Recommendation (low rolling resistance tires and low-friction lubricants): Assign benefits to the rule only for the tires and lubricants sold with the vehicle unless and until standards are adopted for those products. [EPA-HQ-OAR-2010-0162-1894.1, p.22]

No compliance mechanism has been proposed for the use of low RR and low friction lubricants; the agencies simply assume that owners will replace these items with similar, efficient products as needed. This is not a reasonable assumption. Any savings attributed to low RR tires and low friction lubricants should apply only to the initial tires and lubricants, unless and until standards for those products or some other mechanism is put in place to ensure the replacements will have similar efficiency properties. [EPA-HQ-OAR-2010-0162-1894.1, p.22]

The standards reflect none of these vehicle savings opportunities. The explanation for this, in general, is not that the agencies have rejected the NAS report findings, but rather that there are obstacles (real or perceived) to capturing these savings given the structure and protocols of the rule. For example, it is not clear how the standards could reflect aerodynamic improvements involving the body, given that a single chassis may be used with multiple bodes and that the chassis manufacturers are the regulated entities for vocational vehicles. Full vehicle testing, together with further segmentation of vocational vehicles and perhaps a change in regulated parties, will be needed to drive maximum fuel savings. [EPA-HQ-OAR-2010-0162-1894.1, p.18]

In the meantime, however, other technologies cited by the NAS can and should be reflected in the standard. An improvement of 3-4 percent in 2015-2020 appears to be a reasonable expectation for transmission and driveline improvements in the vocational segment generally, through a combination of 8-speed automatic transmission, reduced driveline friction and automated shift logic (NAS p. 6-13). For Class 3-6 box trucks, a very large group of vocational vehicles, as well as bucket trucks, the NAS estimates a capital cost of $1800 for these transmission savings} implying a payback of about two years. Box trucks and bucket trucks account for much of Class 6 in particular, which is responsible for 10 percent of all Class 2b-8 fuel use. Similar transmissions gains are presumably available for platform trucks as well. On this basis, it seems quite reasonable to assume a cost-effective benefit from transmission and driveline improvements of 3 percent by 2017 across vocational vehicles. [EPA-HQ-OAR-2010-0162-1894.1, p.18]

The agencies make the case that optimization of gearing is specific to the complete vehicle and therefore cannot be driven by a rule applicable to chassis manufacturers (p.74241). If savings are widely available across the sector, however, it is important that the basic compliance package for vocational vehicles, as well as the stringency of the standard, capture this potential. Any manufacturer that can demonstrate a substantial fuel savings potential of a transmission through an A-to-B chassis test over the vocational drive cycle(s) adopted for the rule should be permitted to assign those savings to all vocational vehicles using that transmission. The GEM model should be modified to accept this information as an input. Alternatively, the agencies could treat transmission and driveline improvements as off-cycle technologies and assign a fixed percentage savings for the inclusion of an appropriate technology (e.g. AMT or dual clutch transmission). This would be similar to the treatment of idle reduction for tractors with sleeper cabs. [EPA-HQ-OAR-2010-0162-1894.1, p.18]

The NAS discussion of weight reduction similarly indicates the potential for savings in the vocational sector, at least for light and medium heavy-duty trucks. While some of this potential may reside in the bodies, we would expect that much of the opportunity for weight reduction would be in the chassis, or in components under the control of the chassis manufacturer. A baseline vehicle weight against which to measure weight reductions cannot be assigned from the chassis alone, but fuel savings from reductions in the weight of specified components can nonetheless be estimated through GEM, in the same way that the model reflects reductions in wheel and tire weight for tractors. A reasonable estimate of savings potential from weight reduction would be 2 percent for light and medium heavy-duty vocational vehicles in 2017. [EPA-HQ-OAR-2010-0162-1894.1, pp.18-19]

Thus we recommend that 2017 standards for vocational vehicles include savings of 5 percent for light and medium heavy-duty vocational vehicles and 3 percent for heavy heavy-duty vocational vehicles from transmission and driveline improvements and weight reduction. The standards would then reduce light and medium vocational vehicles' fuel consumption and GHG by 14 percent (instead of 10 percent) and heavy vocational vehicles' emissions by 10 percent (instead of 7 percent) relative to the 2010 baseline. [EPA-HQ-OAR-2010-0162-1894.1, p.19]

In addition to savings from transmission improvements and weight reduction, vocational vehicles' anticipated benefits from hybridization are large. According to the NAS, hybrid savings available in 2015-2020 will range from 30 to 40 percent for the vehicle types listed in Table 3 above. NAS' estimated cost for a parallel hybrid Class 3-6 box truck is $20,000, implying a payback of three years (NAS Table 6-6). Hydraulic hybrids, discussed in the next section, offer large savings at a lower cost for certain applications. [EPA-HQ-OAR-2010-0162-1894.1, p.19]

Significant penetration of hybrids is anticipated in the vocational sector in the near future. For example, Pike Research projects 300,000 medium- and heavy-duty hybrid sales, or 7 percent of projected sales, by 2015. At this sales level and per vehicle fuel savings of 35'percent, vocational vehicles' savings from hybridization would be over 2 percent on average by 2015. These savings are not reflected in the standards. [EPA-HQ-OAR-2010-0162-1894.1, p.19]

Organization: Anonymous Public Comment

Setting these standards higher, rather than lower will benefit the United States, manufactures, and citizens as a whole. Higher standards will reduce American dependence on foreign oil more quickly. If reasonable timelines for achieving these standards are established, engine manufacturers will have time to create better technology that can achieve even higher efficiency in vehicles. The enhanced standards will make American businesses more competitive and create more jobs, which are needed most during these hard economic times. In the end, the standards will also reduce the cost of transportation by more than the standards as they are now and generate further interest in clean energy. Citizens will also be benefited by the healthier environment produced by these stricter requirements. [EPA-HQ-OAR-2010-0162-1330.1, p.1]

Organization: Allison Transmission

EPA and NHTSA have requested comment with regard to a 'clear measure of performance improvement' associated with ATs We believe that such a clear measure exists with respect to the information provided in Section I of these comments and Attachments 1 and 3. [See Docket number 2736.1 for Attachment 1, See Docket number 2738.1 for Attachment 3] In sum, ATs offer the ability to achieve FE gains and improved GHG performance in transient operating conditions due to the ability of the transmission type to more quickly and efficiently accelerate. In the prevailing driving conditions for many vehicle types, including both Class 7 and 8 tractor cabs and Class 2-8 vocational vehicles, this inherent ability of ATs to increase the average speed of MD/HD vehicles results in FE improvement and GHG emission benefits by enabling completion of the required transport work by fewer commercial vehicles. Since work is externally defined in the national economy, ATs offer the ability to utilize fewer vehicles to perform the same amount of work as other vehicles equipped with manual and AMTs. [EPA-HQ-OAR-2010-0162-2735.1, pp.34-35]

Within the rationale underlying this proposed rule, EPA and NHTSA mistakenly equate both ATs and AMTs with the effect of a 'well-trained driver.' This statement, however, is without factual support or data as is the assertion that a well-trained driver might perform better than a vehicle with an AT because he or she can see road ahead. Overall, it is not apparent on what basis this statement is made. The NAS report did not make this finding. [EPA-HQ-OAR-2010-0162-2735.1, p.33]

Instead, the NAS report provided supporting statements and information indicating that ATs can have a positive impact on vehicle emissions and FE. Instead of persisting in this unsupported comparison, EPA and NHTSA should recognize that ATs can reduce or take away the influence of ill-trained drivers, while making additional positive impacts on a vehicle's FE and GHG emissions. ATs effectively reduce and/or eliminate driver input into the selection of proper gears. Any comparison of transmission technologies to the GHG and FE effect of bad drivers is attempting to compare measurable factors with disparate and largely unknowable quantities. /67/ As cited above, significant differences do arise with regard to different transmission types. The NAS report recognized such differences; at minimum, EPA and NHTSA should further investigate the gains that can be made through wider utilization of advanced transmission technologies in the vocational vehicle sector. [EPA-HQ-OAR-2010-0162-2735.1, p.33]

/67/ It might further be noted that both EPA and NHTSA lack statutory authority to directly address any effect of under-trained drivers on FE and GHG. While none is asserted within the proposed rule, this fact further underlies arguments for the agencies to focus on measurable differences within their respective statutory authority

---

Organization: Parker Hannifin Corporation

This rule lacks incentives to encourage the development of innovative technology. For two of the three categories of trucks, compliance with vehicle fuel consumption standards is based on a model where the only variable available for a manufacturer to adjust is tire rolling resistance and in the case of Combination Tractors aerodynamic drag coefficient. [EPA-HQ-OAR-2010-0162-3276, p.1]

This rule does not recognize the potential fuel reduction of hydraulic hybrid vehicles. Hydraulic hybrid vehicles are only mentioned once in Section III.C(1)(a) on page 74242 of the proposed rulemaking package. Hydraulic hybrid vehicles have demonstrated the ability to significantly reduce the fuel consumption of large vehicles. That same section of the proposed rule states that “hybrids developed to date have seen fuel consumption and CO2 emissions reductions between 20 to 50 percent in the field." The EPA OTAQ website lists several hydraulic hybrid vehicles that EPA has developed and tested, including a large SUV (similar to the Large Pickup Trucks and Vans) with fuel economy improvements of 85% (a 46% fuel consumption reduction) and a Delivery Truck with fuel economy improvements from 60 – 70% (37 – 41% fuel consumption reduction). Parker-Hannifin has refuse vehicles operating in Miami, Florida that are achieving 40% reductions in fuel consumption. Parker Hannifin agrees with EPA and NHTSA that the standard should not be set based on hybrid technology, but there should be some mechanisms to encourage the introduction of technologies with this potential to reduce fuel consumption. Any incentives should be tiered to provide greater benefits to manufacturers and fleets that adopt technologies with superior fuel consumption and emissions reductions. [EPA-HQ-OAR-2010-0162-3279, p.1]

This rule does not recognize the potential fuel reduction of hydraulic hybrid vehicles. Hydraulic hybrid vehicles are only mentioned once in Section III.C(1)(a) on page 74242 of the proposed rulemaking package. Hydraulic hybrid vehicles have demonstrated the ability to significantly reduce the fuel consumption of large vehicles. That same section of the proposed rule states that "hybrids developed to date have seen fuel consumption and CO2 emissions reductions between 20 to 50 percent in the field." The EPA OTAQ website lists several hydraulic hybrid vehicles that EPA has developed and tested, including a large SUV (similar to the Large Pickup Trucks and Vans) with fuel economy improvements of 85% (a 46% fuel consumption reduction) and a Delivery Truck with fuel economy improvements from 60 – 70% (37 – 41% fuel consumption reduction). Parker-Hannifin has refuse vehicles operating in Miami, Florida that are achieving 40% reductions in fuel consumption. Parker Hannifin agrees with EPA and NHTSA that the standard should not be set based on hybrid technology, but there should be some mechanisms to encourage the introduction of technologies with this potential to reduce fuel consumption. Any incentives should be tiered to provide greater benefits to manufacturers and fleets that adopt technologies with superior fuel consumption and emissions reductions. [EPA-HQ-OAR-2010-0162-3279, p.1]

Hydraulic hybrid vehicles are only mentioned once in Section III.C(1)(a) on page 74242 of the proposed rulemaking package. Hydraulic hybrid vehicles have demonstrated the ability to significantly reduce the fuel consumption of large vehicles. That same section of the proposed rule states that "hybrids developed to date have seen fuel consumption and CO2 emissions reductions between 20 to 50 percent in the field." The EPA OTAQ website lists several hydraulic hybrid vehicles that EPA has developed and tested, including a large SUV (similar to the Large Pickup Trucks and Vans) with fuel economy improvements of 85% (a 46% fuel consumption reduction) and a Delivery Truck with fuel economy improvements from 60 – 70% (37 – 41% fuel consumption reduction). Parker-Hannifin has refuse vehicles operating in Miami, Florida that are achieving 40% reductions in fuel consumption. Parker Hannifin agrees with EPA and NHTSA that the standard should not be set based on hybrid technology, but there should be some mechanisms to encourage the introduction of technologies with this potential to reduce fuel consumption. Any incentives should be tiered to provide greater benefits to manufacturers and fleets that adopt technologies with superior fuel consumption and emissions reductions. [EPA-HQ-OAR-2010-0162-2406-cp, p.1]

Organization: California Air Resources Board (ARB)

The agencies have stopped short of proposing fuel consumption and GHG emissions standards for trucks based on use of hybrid powertrain technology. However, hybrid technology applications are fairly well developed for class 2b and 3 vehicles and vocational vehicles. As a result, ARB staff recommends that instead of a hybrid credit program, the agencies should adopt more stringent standards for certain vocational truck sub-groups premised on the application of hybrid technology on vehicles in those subgroups (e .g., trash trucks and local-delivery trucks). This would require that the agencies further refine vocational truck sub-categories to better address chassis efficiencies. Setting stringent, hybrid-based standards for vocational truck sub-groups that have been shown to significantly benefit from hybrid technologies would establish a framework for further study and expansion of these technologies to other vocational truck sub-groups. [EPA-HQ-OAR-2010-0162-2354.1, p. 3]

The current proposal would require an engine shutdown system on all Class 8 sleeper cab tractors that use idle reduction technology to meet the proposed truck standards. ARB staff urges the agencies to establish a similar requirement for all other heavy-duty vehicles covered by the proposal (Class 8 day cab tractors, Class 7 tractors, Class 2b-3 pick-ups and vans, Class 2b-8 vocational trucks). Although the idling of sleeper cab tractors during rest periods uses significant amounts of fuel and produces significant amounts of emissions, a 2006 study conducted by the Argonne National Laboratory concluded that extended workday idling (0 5 hour or more) may actually be a much more significant source of petroleum use due to the large number of contributing vehicles.5 As such, ARB staff believes extended workday idling should be addressed in this rulemaking by requiring an engine shutdown system on all heavy-duty vehicles. If warranted, the agencies could consider allowing for a manually-activated override mechanism that would automatically deactivate when the driver either depresses a pedal, changes gears, or manually shuts down the engine. However, the agencies should ensure that override mechanisms are designed in a manner that discourages discretional idling. Some possible strategies include requiring the driver to depress an override button for a pre-determined period of time (e.g. , 10 seconds) or only allowing the override to be engaged in a predetermined window of time after stopping (e.g. , a 30-second window following four minutes of continuous idling). [EPA-HQ-OAR-2010-0162-2354.1, pp. 4-5]

/5/ Gaines, L., Vyas, A., & Anderson, J. L. (2006) Estimation of Fuel Use by Idling Commercial Trucks, Paper No 06-2567 Argonne National Laboratory from http://www.transportation.anl.gov/pdfs/TA/373.pdf

Organization: Clean Air Task Force (CATF)

We urge EPA to strengthen its proposal by taking full advantage of technology options to reduce fuel consumption and greenhouse gas emissions from heavy-duty highway vehicles, including those that are described in the recent comprehensive report by the National Academy of Sciences. In evaluating the technologies available to reduce fuel use and GHG emissions from heavy-duty engines and vehicles, EPA relied heavily on the NAS report, as well as other published reports and confidential discussions with engine and vehicle manufacturers. To a large extent EPA evaluated the same technologies evaluated by the NAS panel, but came to different conclusions about the potential fuel savings that would be available in the 2015 – 2018 time frame. [EPA-HQ-OAR-2010-0162-2734.1, pp.3-4]

A comparison of the NAS panel findings on the fuel savings potential for various types of trucks to EPA's proposed stringency levels for MY2018 (% reduction for MY2018 trucks compared to MY2010 trucks) in the HD GHG Rule is shown in Figure 1 below. As shown, EPA's proposed stringency levels are significantly lower than what the NAS panel indicated was possible. Thus: [EPA-HQ-OAR-2010-0162-2734.1, p.4]

[Figure 1 can be found on page 5 of this comment.]

- the NAS panel indicated that fuel use from vocational trucks could be reduced by 40-50% in the 2015 – 2020 time frame, while the proposed Rule is mandating only a 10% reduction for MY2018; and similarly, [EPA-HQ-OAR-2010-0162-2734.1, p.4]

- the NAS panel indicated that fuel use from HD pickups and vans could be reduced by 45% in the 2015 – 2020 time frame, while the proposed Rule is mandating only a 15% reduction for MY2018. [EPA-HQ-OAR-2010-0162-2734.1, p.4]

These differences are attributable to two primary factors: 1) EPA judged some of the technologies included in the NAS report to not be technically feasible and/or cost effective for implementation by MY2018, and 2) to arrive at the potential fuel reduction figures the NAS report assumes essentially 100% penetration of all listed technologies fleet-wide, while EPA's proposed fleet average stringency levels assume more limited penetration rates for some technologies. [EPA-HQ-OAR-2010-0162-2734.1, p.4]

As shown in Figure 1, the NAS panel indicated that in the 2015 – 2020 time frame reductions in fuel use of 40 – 50% are possible from vocational trucks. By contrast EPA is requiring only a 10-15% reduction in fuel use for these types of MY2017 trucks, compared to the assumed MY2010 baseline. For vocational trucks the entire reduction proposed will come from engine improvements and the use of low rolling resistance tires. Other potential vehicle improvements, including aerodynamics and mass reduction, cannot be captured by the proposed regulations because the regulated entities are the chassis manufacturers, and the regulated vehicle has a standard body by assumption. Similarly, gearing and transmission selection are not captured by the standard. [EPA-HQ-OAR-2010-0162-2734.1, p.9]

The most significant difference between the NAS assessment and EPA's proposed standards is that the NAS panel essentially assumed a 100% penetration rate for hybrid technologies and EPA assumed none at all. EPA specifically excluded hybrid power trains from the technology suite required to meet the proposed standards because "there are still some key issues that are restricting the penetration of hybrids, including over-all system cost, battery technology, and lack of cost-effective electrified accessories… We have not predicated the standards based on the use of hybrids reflecting the still nascent level of technology development and the very small fraction of vehicle sales they would be expected to account for in this timeframe – on the order of only a percent or two." However, significant penetration of hybrids in the vocational sector is anticipated by others. For example, Pike Research projects 300,000 medium- and heavy-duty hybrid sales, or 7 percent of projected sales, by 2015. We believe that there is a bit of a "chicken and egg" problem here. If EPA sets a standard based on an assumption that few if any hybrid vehicles will enter the market, that may become a self-fulfilling prophecy. If, on the other hand, EPA sets a standard that requires a reasonable level of hybrid penetration by 2017, this would help push the technology into the marketplace. In turn, increased sales could bring down prices of the technology. We urge EPA to set a vehicle standard for vocational trucks that assumes some substantial level of hybrid penetration by the 2017 time frame. [EPA-HQ-OAR-2010-0162-2734.1]

Organization: International Council on Clean Transportation (ICCT)

Capturing the Technology Potential of Class 2B – 8 Vocational Vehicles The proposed standards for vocational trucks would yield 2 percent savings beyond what is gained through engine efficiency improvements, reflecting the benefits of low rolling resistance tires alone. The potential for savings among these vehicles is far greater than 2 percent. While setting standards for vocational vehicles is complex due to the wide variety in different features and duty cycles, it is important that the rule do more to promote advanced technologies for this subsector. [EPA-HQ-OAR-2010-0162-1945.1, p.5]

The National Academy of Science (NAS) report shows the following potential reductions in fuel consumption for four types of vocational vehicles (Class 6 box trucks, Class 6 bucket trucks, Class 8 refuse trucks, and Class 8 urban buses): [EPA-HQ-OAR-2010-0162-1945.1, p.5]

[Table 1 can be found on page 5 of this comment.]

The stringency in the standards reflects none of these savings opportunities. The explanation for this is not that the agencies have rejected the NAS report findings, but rather that there are obstacles (real or perceived) to capturing these savings given the structure and protocols of the proposal. For example, it is not clear how the standards could reflect aerodynamic improvements involving the body, given that a single chassis may be used with multiple bodes and that the chassis manufacturers are the regulated entities for vocational vehicles. Full vehicle testing, together with further segmentation of vocational vehicles and perhaps a change in regulated parties, will be needed to drive maximum fuel savings. [EPA-HQ-OAR-2010-0162-1945.1, p.5]

In the meantime, however, other technologies cited by the NAS study can and should be reflected in the standard. An improvement of 3 – 4 percent in 2015 – 2020 appears to be a reasonable expectation for transmission and driveline improvements in the vocational segment, through a combination of 8-speed automatic transmissions, reduced driveline friction, and automated shift logic (NAS p. 6-13). /2/ For Class 3 – 6 box and bucket trucks, a very large group of vocational vehicles, the NAS panel estimates a capital cost of $1,800 for these savings, which translates to a payback of about two years. Box and bucket trucks account for much of Class 6 in particular, which is responsible for 10 percent of all Class 2B – 8 fuel use. Similar transmissions gains are presumably available for platform trucks as well. Based on this information, it seems quite reasonable to assume a cost-effective benefit from transmission and driveline improvements of 3 percent by model year (MY) 2017 across the vocational vehicle subsector. [EPA-HQ-OAR-2010-0162-1945.1, pp.5-6]

The agencies make the case that optimization of gearing is specific to the complete vehicle and therefore cannot be driven by a rule applicable to chassis manufacturers (Proposed Standards p.74241). If savings are widely available across the sector, however, the agencies should treat transmission and driveline improvements as off-cycle technologies and assign a fixed percentage savings for the inclusion of an appropriate technology (e.g., automatic manual transmission (AMT) or dual clutch transmission). This would be similar to the treatment of idle reduction for tractors with sleeper cabs. [EPA-HQ-OAR-2010-0162-1945.1, p.6]

The NAS study discussion of weight reduction similarly indicates the potential for savings in the vocational sector, at least for light (Class 2B – 5) and medium (Class 6 and 7) heavy-duty trucks. While some of this potential may reside in the bodies, we would expect that much of the opportunity for weight reduction would be in the chassis, or in components under the control of the chassis manufacturer. A baseline vehicle weight against which to measure weight reductions cannot be assigned from the chassis alone, but fuel savings from reductions in the weight of specified components can nonetheless be estimated through the Greenhouse Gas Emission Model (GEM), in the same way that the model reflects reductions in wheel and tire weight for tractors. A reasonable estimate of savings potential from weight reduction would be 2 percent for light and medium heavy-duty vocational vehicles in MY 2017. [EPA-HQ-OAR-2010-0162-1945.1, p.6]

Thus we recommend that MY 2017 standards for vocational vehicles include savings of 5 percent for light and medium heavy-duty vocational vehicles and 3 percent for heavy (Class 8) heavy-duty vocational vehicles from transmission and driveline improvements and weight reduction. The standards would then reduce light and medium heavy-duty vocational vehicles' fuel consumption and GHG emissions by 14 percent (instead of 10 percent) and heavy heavy-duty vocational vehicles' emissions by 10 percent (instead of 7 percent) relative to the MY 2010 baseline. [EPA-HQ-OAR-2010-0162-1945.1, p.6]

In addition to savings from transmission improvements and weight reduction, vocational vehicles' anticipated benefits from hybridization are large. According to the NAS study, hybrid savings available in 2015 – 2020 will range from 30 – 40 percent for the vehicle types listed in

Table 1. The NAS study estimated that the cost for a parallel hybrid Class 3 – 6 box truck is an additional $20,000, resulting in an approximate payback of three years (NAS Table 6-6). Significant penetration of hybrids is anticipated in the vocational sector in the near future. For example, Pike Research projects 300,000 medium- and heavy-duty hybrid sales, or 7 percent of projected sales, by 2015.5 At this sales level and assuming per-vehicle fuel savings of 35 percent, vocational vehicles' average savings from hybridization would be over 2 percent by 2015. These savings are not reflected in the standards. [EPA-HQ-OAR-2010-0162-1945.1, pp.6-7]

Unless the vocational standard is strengthened, however, the credits will not drive the adoption of advanced transmissions or any innovative technologies, because it will take very little effort for manufacturers to meet the standards without the credits. If on the other hand the standards are strengthened as recommended above, manufacturers will have an incentive to adopt a range of technologies, including hybrids. [EPA-HQ-OAR-2010-0162-1945.1, p.7]

Strengthen the vocational vehicle standards to reflect the potential for additional 5 percent (light and medium heavy-duty vocational) and 3 percent (heavy heavy-duty vocational) savings from transmission and driveline improvements and weight reduction. For the MY 2017 standard, this would bring vocational vehicle reductions (including engines) in these categories to 14 percent and 10 percent, respectively, while promoting the production of hybrids and other advanced technologies. [EPA-HQ-OAR-2010-0162-1945.1, p.7]

Specify allowable protocols for attributing fuel savings and GHG reductions to advanced transmissions and, to the extent possible, other efficiency technologies. [EPA-HQ-OAR-2010-0162-1945.1, p.7]

/2/ In fact, at least one transmission manufacturer is claiming average savings of more than 8 percent for vocational trucks using automated manual or dual clutch transmissions to replace the torque converter automatics that now dominate the market. [EPA-HQ-OAR-2010-0162-1945.1, p.5]

Organization: National Association of Clean Air Agencies (NACAA)

One of the most significant aspects of the agencies' proposal is that it is predicated on the application of existing technologies rather than a systematic wide-scale adoption of hybrid technology. While the proposed rulemaking provides an appropriate regulatory baseline for the near term, the second phase of the standards, starting with MY2017, should emphasize the application of hybrid technologies such as electric drive, hydraulic systems, regenerative braking, engine downsizing and the use of batteries and/or ultra-capacitors. A wide range of architectures for electric drive systems is under intense and very competitive development. Electric drive hybridization technology is the most significant opportunity for emission reductions since the introduction of catalysts, unleaded gasoline and low-sulfur diesel fuel. For example, the only means of "recycling" the lost kinetic energy from braking is to utilize regenerative braking systems, which are at the core of virtually all hybridization options. Such “regen” technology represents the equivalent of finding an additional one-half to 1.5 million barrels per day of additional national energy supply, compared to our daily import requirements of over 10 million barrels per day. The use of regenerative braking in heavy-duty applications provides especially significant fuel saving benefits. [EPA-HQ-OAR-2010-0162-1607.1, p.2]

Virtually all major truck makers and Tier I system suppliers are developing hybrid electric drive technologies, including Paccar, Peterbilt, Navistar, Volvo, Eaton, Cummins, Siemens, GM, Caterpillar, UQM, Alison, Rexroth Bosch Group, Custom Chassis, Maxwell, Parker, BAE, Cobasys, GE and ISE. The rate of progress in this area is nothing short of stunning: Navistar now has at least six engine/horsepower/torque configurations; Peterbilt has applied such technology to dump trucks, cargo and utility body packages; Freightliner has demonstrated delivery and beverage, buses and RV platforms; Kenworth has class 7 and 8 hybrid tractors which handle loads up to 55,000 GVW; Eaton has innovative hydraulic system designs, and is applying them cooperatively with the Electric Power Research Institute in Class 5, 6 and 7 applications; and Bosch Rexworth and Parker have parallel and series hydraulic architectures under development. The scope and breadth of hybrid technology innovation is so vast that it cannot be ignored as a foundation for the second phase of the proposed standards for all classes of vehicles and engines. Accordingly, NACAA recommends that EPA enhance the stringency of the standards as follows, based on recent findings from the National Academy of Sciences related to hybrid systems: [EPA-HQ-OAR-2010-0162-1607.1, pp.2-3]

[See the table on page 3 of this comment.]

Organization: Eaton Corporation

Allowing the certification of advanced driveline technologies will provide enhanced flexibility for the OEM's to meet the standards and also ensure these technologies are available to truck fleets that want to further reduce their fuel consumption and GHG emissions, thereby promoting over-compliance. Over-compliance will move the baseline for future rulemaking by making new, efficient technologies standard on vocational trucks.[EPA-HQ-OAR-2010-0162-1649.1, p.5]

Without testing certification methods for driveline technologies, advanced transmission technologies that have the capability to increase fuel efficiency and reduce GHG emissions by 7.5% to 22% in a large number of vocational vehicles may not have a path to market. The table below shows comparisons of mechanical transmissions versus the market standard (Automatic Torque Converter technology) [EPA-HQ-OAR-2010-0162-1649.1, p.5]

[The table can be found on page 5 of this comment.]

Organization: Odyne Systems, LLC

Allow hybrid systems to be installed by truck OEM, intermediate stage manufacturer or final stage manufacturer. Must be CARB/EPA compliant after installation, allow default to CARB/EPA compliant performance if system fault. [EPA-HQ-OAR-2010-0162-1853.1, p.10]

EPA Vol. 75 No. 229 pg. 74245: The agencies welcome comments on whether hybrid powertrain technologies are appropriate to consider for the 2017 model year standard, or if not, then when would they be appropriate. [EPA-HQ-OAR-2010-0162-1853.1, p.10]

Odyne supports earlier adoption of standards, before 2017, incorporating hybrid powertrain technology if it is not limited to only the chassis OEM's. At times, the OEM does not know the application until after the vehicle is built or purchased. As discussed previously, Odyne recommends including the intermediate or final stage manufacturer and hybrid supplier in the process, the installed hybrid system performance can be better aligned with the end application and align with the end user application. [EPA-HQ-OAR-2010-0162-1853.1, p.10]

Odyne recommends that hybrid solutions must require regenerative braking to allow the energy to be captured while driving and used either during driving or while the vehicle is at the jobsite. [EPA-HQ-OAR-2010-0162-1853.1, p.10]

Organization: Northeast States for Coordinated Air Use Management (NESCAUM)

Because of these important economic, environmental, and security benefits, we encourage the agencies to adopt the most stringent standards that are both technically and economically feasible. To that end, we recommend strengthening the proposed standards for pickups, vans, and vocational vehicles, and finalizing the rules for all vehicle and engine types at the earliest possible date. In addition, we ask that the agencies commit to an accelerated effort to develop complementary standards for commercial trailers. Our recommendations on each of these issues are explained in detail below. [EPA-HQ-OAR-2010-0162-1757.1, pp.1-2]

The proposed standards for vocational trucks consider only the benefits from engine efficiency improvements and low-rolling-resistance tires. We urge the agencies to strengthen the standards for this vehicle category to reflect the potential for other viable technologies, such as improved aerodynamics, mass reduction, advanced transmissions, and hybridization. A 2010 National Academy of Sciences (NAS) study found that fuel consumption could be reduced by up to 50% for some types of vocational vehicles using a combination of these advanced technologies. Moreover, Pike Research projects medium- and heavy-duty hybrid sales of 300,000 vehicles annually, equal to about 7 percent of total projected sales, by 2015. [EPA-HQ-OAR-2010-0162-1757.1, p.2]

The proposed rule would require a 7 to 10 percent reduction in GHG emissions from vocational trucks by 2017. However, assuming modest gains from hybridization and other improvements consistent with the NAS study, we believe that substantial additional savings will be achievable in the same timeframe. We urge the agencies to require vocational trucks to reduce emissions by at least an additional 5 percent for light and medium vehicles, and an additional 3 percent for heavy vehicles by 2017 in order to promote the production of hybrids and the faster uptake of advanced technologies. [EPA-HQ-OAR-2010-0162-1757.1, p.2]

Organization: Sierra Club

Establish a long-term trajectory for medium and heavy duty engine standards. The proposed standards will drive reductions in fuel consumption and greenhouse gas emissions in vehicles sold in model years 2014-2017. However, the need to bring advanced technologies into the market and to further reduce our dependence on oil does not stop with model year 2017. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

While the proposed standards are based largely on the use of existing technologies, additional technologies under development could significantly improve engine performance. Providing an indication of future stringency would encourage further development and investment of these advanced technologies. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

To ensure sustained investment in advanced technologies and to guarantee further oil and pollution reduction, EPA and NHTSA should include in the final preamble a discussion of future technologies identified by the National Academies of Sciences and identify 2020 targets for stringency for each engine category. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

Regarding vocational trucks, the proposed standards consider improvements from engine efficiency and low rolling resistance tires. Credits are available for hybrids and other advanced technologies. While manufacturers can claim credit for transmission improvements and other innovative improvements by demonstrating reductions to the agencies' satisfaction, reductions from gearing and transmission selection are not captured by the standard. [EPA-HQ-OAR-2010-0162-1889.1, p. 3]

To promote the production of hybrids, faster deployment of advanced technology and advanced transmissions, EPA and NHTSA should increase the stringency of standards for vocational trucks. [EPA-HQ-OAR-2010-0162-1889.1, p. 3]

Organization: Truck Renting and Leasing Association (TRALA)

The regulations should promote the development and adoption of emerging, advanced fuel efficient technologies and include mechanisms to subsequently ensure that such technologies are reflected in the applicable standards [EPA-HQ-OAR-2010-0162-1816.1, p.4]

The regulations should encourage the development of emerging, fuel efficiency technologies, instead of inadvertently precluding the same by, for example, using rigid and formulaic modeling assumptions and methodologies. Furthermore, the regulations should include mechanisms to ensure that such technologies are subsequently reflected in the applicable standards. /5/ [EPA-HQ-OAR-2010-0162-1816.1, p.4]

The agencies acknowledge that this sector is 'complex' (75 Fed. Reg. at 74156, 74160). We agree. In moving forward with models and test metrics related to fuel consumption and emission standards, the agencies should ensure that enough flexibility is built into relevant models and metrics to accommodate, and not disadvantage, emerging engine, transmission and related technologies. The fuel efficiency benefits of hybrids, for example, do not appear to be captured by the regulations. [EPA-HQ-OAR-2010-0162-1816.1, p.4]

EPA and NHTSA should include regulatory mechanisms that not only promote advanced fuel efficient technologies, but that also subsequently require their importation into the program with minimal additional regulatory effort. [EPA-HQ-OAR-2010-0162-1816.1, p.5]

/5/ With respect to the Proposed Standards for Class 2b-8 vocational vehicles, EPA and NHTSA state that the 'agencies intend to monitor the development of and production feasibility of new vehicle-related GHG and fuel consumption reduction improving technologies and consider including these technologies in future rulemakings' (75 Fed. Reg. at 74166). We agree with these sentiments but would feel comfortable if this flexibility was built into the regulatory program now instead of deferring the matter to potential future rulemakings. [EPA-HQ-OAR-2010-0162-1816.1, p.4]

Organization: Motor & Equipment Manufacturers Association (MEMA)

The agencies ought to seriously reconsider their exclusion of mass reduction relative to increasing fuel efficiencies and lowering emissions for vocational vehicles. Reducing weight without compromising function and reliability can contribute to reduced GHG emissions and fuel consumption. [EPA-HQ-OAR-2010-0162-1752.1, p.10]

At a minimum, the agencies should consider including lower-weight wheels and tires for the vocational vehicle GEM model, similar to the proposed combination tractor trailer vehicle GEM model. Ideally, the expanded inclusion of other lighter-weight technologies and applications (e.g. aluminum bodies, cross-members, and bumpers) would provide additional benefits and incentives for mass reduction if they were also included in the GEM simulation model for vocational vehicles. [EPA-HQ-OAR-2010-0162-1752.1, pp.10-11]

Organization: Union of Concerned Scientists (UCS)

I urge you to finalize the strongest possible fuel economy and emissions standards for new trucks, utilizing all available technology to save fuel and cut pollution. With its 'UCS

Convoy' model, the Union of Concerned Scientists has shown that truckers stand to gain tens of thousands of dollars in net savings if improvements are made to all of the components of trucks, including engines, trailers, tractors, and tires. And all Americans stand to gain from a significant reduction in oil use and pollution from this part of our transportation market. [EPA-HQ-OAR-2010-0162-0372_Mass, p.1]

Maximize Benefits Standards should dramatically improve fuel efficiency of medium and heavy-duty vehicles to improve the nation’s energy security and reduce the threat of climate change. [EPA-HQ-OAR-2010-0162-1764.1, p.4]

The current proposal requires only engine and tire improvements for vocational vehicles. However, there are significant opportunities for much greater reductions from these vehicles. Hybrid technology is gaining market share in numerous vocational applications and is expected to continue to do so over the timeframe of the proposed standards. /8/ Other identified by the NAS study. The proposal would allow credits to be generated by these types of technologies, but would make them of little value given they were not considered in setting the stringency of the standards. [EPA-HQ-OAR-2010-0162-1764.1, pp.9-10]

The standards should be strengthened to reflect the introduction of these technologies into the vocational vehicle fleet. In the 2015 to 2020 time frame, transmission improvements could provide an additional 3 to 4 percent reduction in fuel consumption, while weight savings could provide and [sic] additional 1 to 4 percent savings, depending on application. Hybrid technology can provide much greater savings, between 20 and 40 percent according to NAS, but will likely be most cost-effective in limited applications in the near term. To reflect the availability of these conventional transmission and weight savings strategies as well as the expected increase in hybrid vehicle market share by 2017, the vocational truck emissions reduction requirement should be at least 6 percentage points greater than currently proposed for medium-duty vocational trucks and 3 percentage points greater for heavy-duty vocational trucks in 2017. [EPA-HQ-OAR-2010-0162-1764.1, p.10]

/8/ Pike Research estimates 300,000 hybrid sales by 2015. http://greenbigtruck.com/2010/06/pike-research-forecasts-300000-medium-heavy-duty-hybrids-by-2015

Organization: Chew, Yuli

I also urge EPA to incorporate more hydraulic, electronic and plug-in hybrids into the fleet to achieve the long term sustainable goal. [EPA-HQ-OAR-2010-0162-0558.1, p.2]

Organization: Virginia Department of Transportation (VDOT)

The next area of concern involves unknown operational impacts, including those associated with the upfitting process. Since engine technologies in diesel-powered vehicles have evolved so dramatically to meet increased emission standards imposed in model year 2007 and again in 2010, continued improvements in engine technologies will likely be limited. That will leave in-production or available-for-production technologies (i.e., vehicle weight reduction, tire rolling resistance, aerodynamics, speed limiters and extended idle reduction) as feasible areas in which advancements in vehicular engineering would yield fuel efficiency gains. While these technologies may prove to be sound in the long term, a full understanding of how these changes could affect the operational capabilities of a state transportation agency, especially during emergency snow removal operations, are unknown at this time. [EPA-HQ-OAR-2010-0162-1611.1, p.2]

Organization: United States Senators (Dianne Feinstein, Olympia Snowe, Maria Cantwell, Richard Durbin, Barbara Boxer, Benjamin Cardin, Sheldon Whitehouse, Jack Reed, Jeff Merkley, Joseph Lieberman, Frank Lautenberg, Bill Nelson, Robert Menendez, Mark Udall, Thomas Carper, Daniel Akaka, Daniel Inouye, and John Kerry)

The proposed standards for vocational vehicles - such as delivery trucks - and tractor trailer trucks also do not factor in all the fuel savings technologies identified in the National Academy Report.

The vocational truck standard is based on potential improvements to engines and tires exclusively. Savings potential identified in the National Academy Report from hybridization, aerodynamic improvements, advanced transmission, and mass reduction are not considered. For transmissions, for example, the NAS found savings in the range of 2 to 8 percent.

The draft rule explains that your agencies have chosen not to factor in additional technologically feasible oil savings potential due to concerns that it would add complexity and measurement challenges to the Vocational Truck standard. However, the statute requires the DOT to study and implement a fuel efficiency improvement program for "heavy-duty on-highway vehicles," not just the engines and tires of those vehicles. We recommend your agencies develop objective testing and data collection methods that allow savings from the technologies identified by the NAS to be factored in to the vocational vehicle standard. If a standard for the full vehicle is not possible at this time, we strongly encourage the final rule to lay out a plan to establish such a standard in the future.

Response:

The agencies received comments from many stakeholders including Motor Equipment Manufacturers Association, Eaton, NRDC, NESCAUM, NACAA, ACEEE, ICCT, Navistar, Arvin Meritor, the Union of Concerned Scientists and others that technologies included in the NAS Report such as idle reduction, advanced transmissions, advanced drivetrains, weight reduction, hybrid powertrains, and improved auxiliaries provide opportunities to reduce fuel consumption from vocational vehicles. Commenters asked that the agencies establish regulations that would reflect performance of these technologies and essentially force their utilization.

The agencies assessed these technologies and have concluded that they may have the potential to reduce fuel consumption and GHG emissions from at least certain vocational vehicles, but the agencies have not been able to estimate baseline fuel consumption and GHG emissions levels for each type of vocational vehicle and for each type of technology, given the wide variety of models and uses of vocational vehicles. For example, idle reduction technologies such as APUs and cabin heaters can reduce workday idling associated with vocational vehicles. However, characterizing idling activity for the vocational segment in order to quantify the benefits of idle reduction technology is complicated by the variety of duty cycles found in the sector. Idling in school buses, fire trucks, pick-up trucks, delivery trucks, and other types of vocational vehicles varies significantly. Given the great variety of duty cycles and operating conditions of vocational vehicles and the timing of these rules, it is not feasible at this time to establish an accurate baseline for quantifying the expected improvements which could result from use of idle reduction technologies. Nor did the commenters suggest any means of satisfactorily addressing these difficulties. Although one commenter refers to an Argonne Study for work day idling estimates, but that study likewise indicates that “to develop an accurate estimate of idling fuel use, data on vehicles and fleets in many industries would have to be collected.”[21] Similarly, for advanced drivetrains and advanced transmissions determining a baseline configuration, or a set of baseline configurations, is extremely difficult given the variety of trucks in this segment. The agencies do not believe that we can legitimately base standard stringency on the use of technologies for which we cannot identify baseline configurations, because baseline emissions and fuel consumption are the benchmarks against which standards are developed.

For some technologies, such as weight reduction and improved auxiliaries – such as electrically driven power steering pumps and the vehicle’s air conditioning system -- the need to limit technologies to those under the control of the chassis manufacturer (the only entity regulated under this phase of the program) further restricted the agencies’ options for incorporating the technologies into the final rules. For example, lightweight components that are under the control of chassis manufacturers are limited to a very few components such as frame rails.

The agencies found little opportunity to improve the aerodynamics of the equipment on the vocational truck. For example, the aerodynamics of a recovery vehicle are impacted significantly by the equipment such as the arm located on the exterior of the truck.[22] The agencies also evaluated the aerodynamic opportunities discussed in the NAS report. The panel

---

[21] Gaines, L., et. al. “Estimation of Fuel Use by Idling Commercial Trucks.” January 2006. Page 11.
[22] A recovery vehicle removes or recovers vehicles that are disabled (broken down).

found that there was minimal fuel consumption reduction opportunity through aerodynamic technologies for bucket trucks, transit buses, and refuse trucks[23] primarily due to the low vehicle speed in normal operation. The panel did report that there are opportunities to reduce the fuel consumption of straight trucks by approximately 1 percent for trucks which operate at the average speed typical of a pickup and delivery truck (30 mph), although the opportunity is greater for trucks which operate at higher speeds.[24]

While the agencies are quite optimistic about the potential for increased use of hybrid powertrains in the future, we do not draw the same conclusions from the NAS report that many of the commenters have. For example, the NAS report shows that absent fuel prices above $4.20 per gallon for box trucks and $5.40 per gallon for bucket trucks the NAS technology packages will not pay back to the consumer over the entire life of the product. The fuel prices necessary for payback are higher than the EIA projections in this timeframe, and hence, we cannot conclude as the commenters suggest that these solutions will pay back in 2-3 years.

Similarly, we are not able to reconcile the commenters reference to 300,000 MHD and HHD hybrid vehicles by 2015. Although the referenced Pike Research study was not made available to the agencies by the commenters, we believe the number refers to global production through the 2015 period. We are not aware of any projections for US production of hybrid vehicles that projects volumes more than a few thousand units across all manufacturers.

Considering the fuel efficiency and GHG emissions reduction benefits that will be achieved by finalizing these rules in the timeframe proposed, rather than delaying in order to gain enough information to include additional technologies, the agencies have decided to finalize standards that do not assume the use of these technologies and will consider incorporating them in a later action applicable to later model years.

As the program progresses and the agencies gather more information, we thus expect to reconsider whether vocational vehicle standards for MYs 2019 and beyond should be based on the use of additional technologies besides low rolling resistance tires.

The agencies are requiring that manufacturers provide instructions to the owner/operator with adequate information to replace consumable components (such as tires) with comparable replacements. We believe that as LRR tires become more common on new equipment, the aftermarket prices of these tires will also decrease. Along with decreasing tire prices, the fuel savings realized through use of LRR tires will ideally provide enough incentive for owner/operators to continue purchasing these tires.

[23] *See* 2010 NAS Report, page 133.
[24] *See* 2010 NAS Report, page 110.

6.2.2.2. Stringency of HD Engine Standards

Organizations Included in this Section:

Competitive Enterprise Institute
Cummins, Inc.
Union of Concerned Scientists
Clean Air Task Force
American Council for an Energy-Efficient Economy
Bendix Commercial Vehicle Systems, LLC
Honeywell
Daimler Trucks North America

Organization: Competitive Enterprise Institute

Despite its bland title, Air Pollution: EPA Could Take Additional Steps to Help Maximize the Benefits of the 2007 Diesel Emission Standards, GAO's March 2004 report leaves little doubt that EPA regulations and enforcement actions hindered manufacturers from making and truckers from buying vehicles with better fuel efficiency. [EPA-HQ-OAR-2010-0162-2418.1, p.7]

[See pp.7-9 for additional comments pertaining to Diesel emission standards penalize fuel efficiency]

In short, industry representatives estimated the 2007 Rule combined with the consent decree could lower heavy-truck fuel economy by as much as 10%. And that's just the potential direct effect of emission-control systems on the fuel efficiency of diesel engines. [EPA-HQ-OAR-2010-0162-2418.1, p.9]

If we also factor in the opportunity costs of EPA's emission standards program — foregone investment in fuel-saving technology R&D, foregone purchases of more fuel-efficient trucks – it is entirely plausible that EPA's regulatory and enforcement actions account for all of the 1.2 % decline in heavy-truck fuel economy during 1998-2008. Were it not for truckers' use of regulatory avoidance strategies – installing defeat devices in the 1990s, pre-buying older engines, and low-buying new engines in the 2000s — heavy-truck fuel economy would likely have declined even faster. [EPA-HQ-OAR-2010-0162-2418.1, p.10]

Organization: Cummins, Inc.

Cummins supports the EPA CO2 and NHTSA fuel consumption standards for diesel engines. We believe that the stringency of the proposed diesel engine standards is appropriate. [EPA-HQ-OAR-2010-0162-1765.1, p.19]

Cummins agrees with the proposed method of aligning the EPA CO2 standards and the NHTSA fuel consumption standards. Alignment between the EPA CO2-based standards and the NHTSA fuel consumption-based standards is critical in achieving a single national program. Cummins believes the proposal achieves this alignment through its proposed method of measuring CO2 then converting to fuel consumption. [EPA-HQ-OAR-2010-0162-1765.1, p.19]

Organization: Union of Concerned Scientists (UCS)

I urge you to finalize the strongest possible fuel economy and emissions standards for new trucks, utilizing all available technology to save fuel and cut pollution. With its 'UCS Convoy' model, the Union of Concerned Scientists has shown that truckers stand to gain tens of thousands of dollars in net savings if improvements are made to all of the components of trucks, including engines, trailers, tractors, and tires. And all Americans stand to gain from a significant reduction in oil use and pollution from this part of our transportation market. [EPA-HQ-OAR-2010-0162-0372_Mass, p.1]

- Maximize Benefits Standards should dramatically improve fuel efficiency of medium and heavy-duty vehicles to improve the nation’s energy security and reduce the threat of climate change. [EPA-HQ-OAR-2010-0162-1764.1, p.4]

Additional improvements beyond the proposed 6 percent reduction in tractor engine emissions appear possible based on technology evaluated by the NAS and should be reflected in the final standard. Based on technologies evaluated in the NAS report expected to be available by 2015, an improvement of 8.5 to 13% is possible over 2010 levels for long-haul tractors. This reflects up to twice the level of improvement in the proposed standards. In the agencies analysis, it appears similar technology improvements are evaluated, yet the expected performance improvements are significantly lower. For example, in Table 2-35 of the Regulatory Impact Analysis (RIA) , the estimated range of CO2 equivalent effectiveness for engine segment HHDDcomb is 2-7% in the areas of combustion control improvements, fuel injection and air handling. However, when these technologies are modeled over the SET test protocols, the level of improvement appears to be only as high as 3% (a combination of columns 6 and 7 in Table 2-10 of the RIA). It is unclear in the documentation how the agencies determined the impact of the individual technology improvements over the SET test cycle. The agencies should revisit the evaluation of these technologies and the expected performance over the SET test cycle, provide a more transparent explanation of their evaluation of engine technologies in each of the engine categories, and ensure all feasible engine technologies available by 2017 are included in setting the stringency levels. [EPA-HQ-OAR-2010-0162-1764.1, pp.10-11]

Organization: Clean Air Task Force (CATF)

We urge EPA to strengthen its proposal by taking full advantage of technology options to reduce fuel consumption and greenhouse gas emissions from heavy-duty highway vehicles, including those that are described in the recent comprehensive report by the National Academy of Sciences. In evaluating the technologies available to reduce fuel use and GHG emissions from heavy-duty engines and vehicles, EPA relied heavily on the NAS report, as well as other published reports and confidential discussions with engine and vehicle manufacturers. To a large extent EPA evaluated the same technologies evaluated by the NAS panel, but came to different conclusions about the potential fuel savings that would be available in the 2015 – 2018 time frame. [EPA-HQ-OAR-2010-0162-2734.1, pp.3-4]

A comparison of the NAS panel findings on the fuel savings potential for various types of trucks to EPA's proposed stringency levels for MY2018 (% reduction for MY2018 trucks compared to MY2010 trucks) in the HD GHG Rule is shown in Figure 1 below. As shown, EPA's proposed stringency levels are significantly lower than what the NAS panel indicated was possible. Thus: [[EPA-HQ-OAR-2010-0162-2734.1, p.4]

[Figure 1 can be found on page 5 of this comment.]

These differences are attributable to two primary factors: 1) EPA judged some of the technologies included in the NAS report to not be technically feasible and/or cost effective for implementation by MY2018, and 2) to arrive at the potential fuel reduction figures the NAS report assumes essentially 100% penetration of all listed technologies fleet-wide, while EPA's proposed fleet average stringency levels assume more limited penetration rates for some technologies. [EPA-HQ-OAR-2010-0162-2734.1, p.4]

The NAS panel indicated that base diesel engine efficiency could be increased by 11-23% in the 2015 – 2020 time frame, depending on truck type. These improvements are predicated on application of a range of technologies, as shown in Figure 1. Some of these technologies are already in production on new engines and others are still under development. [EPA-HQ-OAR-2010-0162-2734.1, p.10]

[Figure 1 can be found on page 5 of this comment.]

For MY2017 EPA's proposed engine standards mandate only a 6% reduction in brake-specific CO2 emissions from engines used in combination trucks (based on SET test cycle) and a 5-9% reduction in brake-specific CO2 emissions from engines used in vocational trucks (based on FTP test cycle), compared to EPA's assessment of baseline emissions from most MY2010 engines. We urge EPA to strengthen these proposed standards to bring them in line with the NAS recommendations. Again, given the enormity of the climate change problem, and understanding that the problem will become harder, not easier, to solve the longer we wait to address it, EPA's climate regulations, including this proposed Rule, should be technology-forcing in nature, not technology-following. [EPA-HQ-OAR-2010-0162-2734.1, p.10]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The agencies have proposed separate CO2 reduction targets for engines for vocational and for tractor truck applications that will be implemented in two phases; in 2014 and in 20171 as showed in Table 2. [EPA-HQ-OAR-2010-0162-1894.1, p.13]

[Table 2 can be found on page 13 of this comment.]

The 2010 NAS Study observed a potential of 6 percent and 15 percent reduction for heavy-duty engines for tractor application in 2014 and 2017, respectively from 2010 model year engine. Similarly the NAS identified technologies for vocational engines that would deliver reductions of 5 percent and 10 percent in 2014 and 2017, respectively. [EPA-HQ-OAR-2010-0162-1894.1, pp.13-14]

Recommendation (baseline engine emissions): Review the baseline emissions level for vocational engines; revise downward as needed. [EPA-HQ-OAR-2010-0162-1894.1, p.11]

The agencies estimate 630 g of CO2/bhp-hr for 2010 model year baseline LHD and MHO engines and 584 g of CO2/bhp-hr for 2010 model year baseline HHD engine on the FTP Cycle (p. 74201). Based on the limited FTP certification data available on EPA's web site and other published CO2 emissions and fuel consumption data, this baseline engine emissions estimate appears to be too high. Brake-specific CO2 certification data from on-highway heavy-duty diesel engines collected from the EPA site are illustrated in Figure 1. More than 50% of the engines in this dataset had CO2 emissions less than 580 g/bhp-hr. Model year 2010 engines are more fuel-efficient and low-emitting than their predecessors due to the use of SCR, as noted by Delphi Powertrain System and manufacturers including Daimler and Cummins. [EPA-HQ-OAR-2010-0162-1894.1, pp.11-12]

Assuming 2010 engines are approximately 5 percent more efficient than their predecessors as a result of using SCR, a typical engine would be expected to have CO2 emissions in the range of 550 g/bhp-hr in 2010. This suggests that the baseline CO2 emissions level specified by the agencies is high. It is critical to have realistic baseline emissions, as the achievable emissions reductions have been calculated as a benefit of the standard will depend heavily on the proper selection of this baseline. [EPA-HQ-OAR-2010-0162-1894.1, p.12]

Recommendation (stringency of tractor engine standards): Increase the stringency of tractor truck engine standards by 3 to 5 percent in 2014 to reflect the availability of mechanical turbo-compounding. Strengthen the 2017 target to reflect technologies including dual stage turbocharging with intercooling and variable valve actuation. [EPA-HQ-OAR-2010-0162-1894.1, p.13]

The NAS analysis implies that stringency for all heavy-duty engines, for both tractor truck and vocational applications, could be strengthened in order to have meaningful savings and consolidate pathways for advanced technologies. The next section will discuss this in detail. [EPA-HQ-OAR-2010-0162-1894.1, p.14]

The agencies request comment on the feasibility of more stringent engine standards for 2017, based on waste heat recovery technologies. The NESCCAF and NAS reports cite bottoming cycle, with fuel savings of up to 10 percent, as a technology available by 2017. The standard could reflect this technology even if product cycles preclude its universal adoption, given that manufacturers must comply with standards based on a three-year rolling average and hence would not be unduly disadvantaged if they were to delay adoption by a year or two. [EPA-HQ-OAR-2010-0162-1894.1, p.14]

In addition, the proposed engine standard could achieve greater savings even without relying upon a bottoming cycle, according to the NAS. That is because reductions from turbocompounding exceed those required by the standard, as shown by the NAS in its 2015 technology package. [EPA-HQ-OAR-2010-0162-1894.1, p.14]

In constructing packages of technologies available to meet new engine standards, the agencies do not consider some promising technologies mentioned in the NAS Study. In addition, their CO2 reduction estimates for technologies are low. For example, the NAS study indicates that addition of mechanical turbocompounding alone can reduce CO2 emissions by 3 to 5 percent, while the agencies have assigned 3 percent reduction to turbo-compounding together with other improvements. [EPA-HQ-OAR-2010-0162-1894.1, p.14]

The agencies exclude dual stage turbocharging with intercooling, variable valve actuation, electric turbo-compound, and bottoming cycle from their technology package. These technologies were not considered on the ground that manufacturers will be able to comply with the rule using modifications of the existing system rather than wholesale addition of technology. This is not a valid argument for excluding technologies. Any standards should be based on the availability of technologies that provides cost-effective benefits. The agencies omitted mechanical turbocompound from the 2014 target on the grounds that manufacturers may have insufficient lead time for product development and validation. However, the Detroit Diesel Corporation (DDC) has a turbo-compound engine in production (the DD15 diesel engine) in the USA, and Volvo has this technology for engines in Europe. Therefore, this technology could be included in the 2014 package and the stringency could be strengthened. A similar argument could be made for dual-stage turbocharging with intercooling. According to the NAS, this technology provides 2 to 5 percent reduction in fuel consumption and is already being used be some manufacturers in tractor truck engines. A major manufacturer will use this technology for vocational application for its 2011 model year vehicles. Higher stringency for both vocational and tractor engines would be possible if this technology is included in the package. [EPA-HQ-OAR-2010-0162-1894.1, pp.14-15]

Recommendation (stringency of vocational engine standards): Increase the required emissions reductions for gasoline engines in vocational applications to at least 9 percent in 2017. Also strengthen the standards for diesel engines used in vocational vehicles by at least 2 percent in 2014 to reflect the availability of dual-stage turbo-charging, variable valve actuation, and accessory electrification. [EPA-HQ-OAR-2010-0162-1894.1, p.15]

The agencies' gasoline engine package for medium-duty vehicles includes engine friction reduction, coupled cam phasing, and stoichiometric GDI. These three technologies together reduce CO2 by 6 percent, according to the EPA HD Lumped Parameter Model. The agencies do not consider promising technologies including cylinder deactivation and electrification of accessories, which are cheap but efficient. They asserted that technologies including cylinder deactivation will not be available for production by the 2017 model year (p. 74246). However, the agencies' selection of a vocational baseline gasoline engine that is similar to the baseline gasoline engine used in the light-duty GHG rule suggests that the available technologies are similar for the two engines. Hence cylinder deactivation, which has been available for some time in the light-duty segment, should be considered available for production by 2017. Addition of cylinder deactivation and electrification of accessories, according to EPA's Lumped Parameter Model, increases the CO2 reductions from vocational engines to 9 percent. Furthermore, the NAS Study projected CO2 reduction from this package in the range of 8-16 percent. Therefore, the standard for gasoline engines for vocational applications should be strengthened to reduce emissions by at least 9 percent in 2017. [EPA-HQ-OAR-2010-0162-1894.1, p.15]

For diesel engines in vocational applications, the agencies have selected the same technology package that they have considered for diesel engines for tractor applications in the 2014 model year. According to the NAS Study, Ford has announced that it will use dual-stage turbo-charging with intercooling in its Class 2b to 7 trucks beginning in 2011. This proven technology can further strengthen the 2014 target by 2 to 5 percent. The 2017 package, unlike the package for tractor truck engines, will not have turbo-compounding, but will rely on CO2 reductions from additional improvements in the after-treatment system. The exclusion of technologies including dual-stage turbo-charging with intercooling, variable valve actuation and accessory electrification should be reconsidered. [EPA-HQ-OAR-2010-0162-1894.1, p.15]

• Engines – The proposal calls for 6 percent efficiency gains for tractor-trailer engines, for example, where the recent National Academy of Sciences (NAS) study concluded that 8.5-13% improvement would be possible by 2017. The agencies should strengthen the engine standards and also send a clear signal that substantial additional improvements will be required for 2020 to for manufacturers and ensure their continued investment in engine technologies. [EPA-HQ-OAR-2010-0162-1894.1, p. 2]

The agencies estimate 630 g of CO2/bhp-hr for 2010 model year baseline LHD and MHO engines and 584 g of CO2/bhp-hr for 2010 model year baseline HHD engine on the FTP Cycle (p. 74201). Based on the limited FTP certification data available on EPA's web site and other published CO2 emissions and fuel consumption data, this baseline engine emissions estimate appears to be too high. Brake-specific CO2 certification data from on-highway heavy-duty diesel engines collected from the EPA site are illustrated in Figure 1. More than 50% of the engines in this dataset had CO2 emissions less than 580 g/bhp-hr. Model year 2010 engines are more fuel-efficient and low-emitting than their predecessors due to the use of SCR, as noted by Delphi Powertrain System and manufacturers including Daimler and Cummins. [EPA-HQ-OAR-2010-0162-1894.1, pp.11-12]

Assuming 2010 engines are approximately 5 percent more efficient than their predecessors as a result of using SCR, a typical engine would be expected to have CO2 emissions in the range of 550 g/bhp-hr in 2010. This suggests that the baseline CO2 emissions level specified by the agencies is high. It is critical to have realistic baseline emissions, as the achievable emissions reductions have been calculated as a benefit of the standard will depend heavily on the proper selection of this baseline. [EPA-HQ-OAR-2010-0162-1894.1, p.12]

Recommendation (stringency of tractor engine standards): Increase the stringency of tractor truck engine standards by 3 to 5 percent in 2014 to reflect the availability of mechanical turbo-compounding. Strengthen the 2017 target to reflect technologies including dual stage turbocharging with intercooling and variable valve actuation. [EPA-HQ-OAR-2010-0162-1894.1, p.13]

The NAS analysis implies that stringency for all heavy-duty engines, for both tractor truck and vocational applications, could be strengthened in order to have meaningful savings and consolidate pathways for advanced technologies. The next section will discuss this in detail. [EPA-HQ-OAR-2010-0162-1894.1, p.14]

The agencies request comment on the feasibility of more stringent engine standards for 2017, based on waste heat recovery technologies. The NESCCAF and NAS reports cite bottoming cycle, with fuel savings of up to 10 percent, as a technology available by 2017. The standard could reflect this technology even if product cycles preclude its universal adoption, given that manufacturers must comply with standards based on a three-year rolling average and hence would not be unduly disadvantaged if they were to delay adoption by a year or two. [EPA-HQ-OAR-2010-0162-1894.1, p.14]

In addition, the proposed engine standard could achieve greater savings even without relying upon a bottoming cycle, according to the NAS. That is because reductions from turbocompounding exceed those required by the standard, as shown by the NAS in its 2015 technology package. [EPA-HQ-OAR-2010-0162-1894.1, p.14]

In constructing packages of technologies available to meet new engine standards, the agencies do not consider some promising technologies mentioned in the NAS Study. In addition, their CO2 reduction estimates for technologies are low. For example, the NAS study indicates that addition of mechanical turbocompounding alone can reduce CO2 emissions by 3 to 5 percent, while the agencies have assigned 3 percent reduction to turbo-compounding together with other improvements. [EPA-HQ-OAR-2010-0162-1894.1, p.14]

The agencies exclude dual stage turbocharging with intercooling, variable valve actuation, electric turbo-compound, and bottoming cycle from their technology package. These technologies were not considered on the ground that manufacturers will be able to comply with the rule using modifications of the existing system rather than wholesale addition of technology. This is not a valid argument for excluding technologies. Any standards should be based on the availability of technologies that provides cost-effective benefits. The agencies omitted mechanical turbocompound from the 2014 target on the grounds that manufacturers may have insufficient lead time for product development and validation. However, the Detroit Diesel Corporation (DDC) has a turbo-compound engine in production (the DD15 diesel engine) in the

USA, and Volvo has this technology for engines in Europe. Therefore, this technology could be included in the 2014 package and the stringency could be strengthened. A similar argument could be made for dual-stage turbocharging with intercooling. According to the NAS, this technology provides 2 to 5 percent reduction in fuel consumption and is already being used be some manufacturers in tractor truck engines. A major manufacturer will use this technology for vocational application for its 2011 model year vehicles. Higher stringency for both vocational and tractor engines would be possible if this technology is included in the package. [EPA-HQ-OAR-2010-0162-1894.1, pp.14-15]

Organization: Bendix Commercial Vehicle Systems, LLC (Bendix)

There are a range of engine accessories that can contribute to an engine's fuel consumption and emissions output. Various mechanical and electrical accessory technologies can impact efficiencies in various ways. In some cases the savings may be small, but Bendix contends that efficiencies and improvements can be beneficial when combined appropriately with other technologies. [EPA-HQ-OAR-2010-0162-1888.1, p.4]

Organization: Honeywell

In his recent Executive Order issued on January 18, 2011, President Obama made clear that regulations should advance public policy considerations while remaining practicable and promoting the economy. Turbo-technologies serve all of these objectives. First, turbochargers are proven facilitators of greenhouse gas reductions and fuel efficiency. Second, turbo-technologies enhance fuel efficiency without depending on technological leaps in propulsion systems or new materials and without requiring substantial investment in new infrastructure. Third, because turbo-technologies work with current and developing technology, the turbocharger market will contribute to economic recovery while simultaneously protecting the environment. [EPA-HQ-OAR-2010-0162-1891.1, p. 1

This proposal represents a reasonable first step towards a longer term program that can benefit from turbo-technologies. In developing the initial and future regulatory programs, the agencies should ensure that all advanced technologies are encouraged arid should not endorse one propulsion system over another. A future vehicle fleet will incorporate various forms of engine and transmission technologies. As that fleet develops, the opportunities for turbo-technologies to create real world benefits are substantial. [EPA-HQ-OAR-2010-0162-1891.1, p. 2

Turbochargers indirectly reduce CO_2 emissions by enhancing the fuel efficiency of engines in which they are incorporated. Advanced turbo-technologies further enhance engine efficiencies and utilize recirculated exhaust to provide additional benefits. Turbochargers are designed in conformance with strict specifications from the engine and/or vehicle manufacturers. The OEMs in turn, ensure that the turbo-technologies are incorporated into their products in a way that ensures their engines and vehicles achieve anticipated performance levels. While turbo-technologies do not directly control and reduce emissions. They offer OEMs substantial efficiency improvements which may in turn be used to downsize engines or to incorporate other designs that result indirectly in lower CO2 emissions. Turbochargers therefore have traditionally and appropriately been described as emissions related technologies as opposed to emissions control technologies. The substantial and important contribution turbochargers make to reducing CO2 emissions through enhancing fuel efficiency is inseparably related to the engines and vehicles into which the technology is integrated. [EPA-HQ-OAR-2010-0162-1891.1, p. 3]

Organization: Daimler Trucks North America

EPA and NHTSA stated that they considered setting even more stringent engine standards for the 2017 model year based on the use of more sophisticated waste heat recovery technologies and that they did not propose more stringent standards because it was not believed that these technologies could be broadly available by the 2017 model year. Based on experience developing heat recovery technologies, we believe that waste heat recovery systems require considerable time to develop for production readiness. The process of designing, procuring, testing and validating new technologies for applications requiring the longevity of heavy-duty diesel engines is lengthy and it is appropriate to assume that many manufacturers will not have sufficient time to adequately develop and validate this technology for the 2017 model year. Therefore it is recommended that standards assuming the use of these technologies be set no earlier than the 2020 model year. The agencies requested comments on whether other diesel engine technologies are appropriate to consider for the 2017 model year standards, or if not, then when would they be appropriate. The promulgation of GHG regulations has been conducted at an extraordinarily fast pace but none the less has effectively characterized performance levels of CO2 emissions of current technology engines. Evaluation of new technologies supportive of potentially more stringent standards should be targeted for a future date providing more and sufficient time for a thorough assessment of evolving technologies. We suggest that the agencies conduct such an evaluation in the CY2014-2015 timeframe and in the context of model year 2020 affectivity. [EPA-HQ-OAR-2010-0162-1818.1, p.35]

EPA requested comment on the feasibility/cost-effectiveness of more stringent standards in the timeframe of the proposed standards. We agree that timing and stringency (subject to our objections to the alternative certification path noted above) of the proposed CO2 standards are reasonably structured. More stringent standards in the proposed timeframe are not appropriate. [EPA-HQ-OAR-2010-0162-1818.1, p.36]

Response:

In light of the above comments, the agencies re-evaluated the technical basis for the heavy-duty engine standards. The baseline HHD diesel engine performance in 2010 model year on the SET is estimated at 490 g CO_2/bhp-hr (4.81 gal/100 bhp-hr), based on our analysis of confidential data provided by manufacturers and data submitted for the non-GHG emissions certification process. Similarly, the baseline MHD diesel engine performance on the SET cycle is estimated to be 518 g CO_2/bhp-hr (5.09 gallon/100-bhp-hr) for the 2010 model year. Further discussion of the derivation of the baseline can be found in Section III of the preamble. Based on the use of technologies that are available to manufacturers in the 2014 timeframe, but which do not require re-design, such as improved aftertreatment systems, friction reduction, improved auxiliaries, turbochargers, pistons, and other components, the agencies continue to believe that the standards in 2014 MY, which will require diesel engine manufacturers to achieve on average a three percent reduction in fuel consumption and CO_2 emissions over the baseline 2010 model year performance, are achievable. The agencies also believe the standards are as stringent as technically feasible in the timeframe of the rule, given the fact that this is a first time regulation of this sector for GHGs and fuel consumption

Commenters noted that the National Academy of Sciences (NAS) study indicates that additional technology improvements can be made to heavy-duty engines in MY 2014 and 2017. For diesel engine standards, the agencies evaluated the following technologies: combustion system optimization, turbocharging and air handling systems, engine parasitic and friction reduction, integrated aftertreatment systems, electrification, and waste heat recovery.

The agencies carefully evaluated the research supporting the NAS report and its recommendations and incorporated them to the extent practicable in the development of the HD program. While the NAS report suggests that greater engine improvements could be achieved by the use of technologies such as improved emission control systems and turbo-compounding than do the agencies in this final rule, we believe the standards being finalized represent the most stringent technically feasible for diesel engines used in tractors and vocational vehicles in the 2014 to 2017 model year timeframe. The NAS study concluded that tractor engine fuel consumption can be reduced by approximately 15 percent in the 2015 to 2020 timeframe and vocational engine fuel consumption can be reduced by approximately 10 to 17 percent in the same timeframe.[25] Based on a review of existing studies, NAS study authors found a range of reduction potential exists for improvements in combustion efficiency, electrification of accessories; improved emission control systems; and turbocompounding. The study found that improvements in combustion efficiency can provide reductions of 1 percent to 4 percent; electrification of accessories can provide reductions of 2 percent to 5 percent in a hybridized vehicle; improved emission control systems can provide a 1 percent to 4 percent improvement (depending on whether the improvement is to the EGR or SCR system); and a 2.5 percent to 10 percent reduction is possible with mechanical or electrical turbocompounding. While the reductions being finalized in this regulation are lower than those published in the NAS study, the agencies believe that the percent reductions being finalized in this rule are consistent with the findings of the NAS study. The reasons for this are as follows.

Significant technical advances will be needed in order to realize the upper end of estimates for some technologies. For example, studies evaluated by NAS on turbocompounding found that a 2.5 percent to 10 percent reduction is feasible. However, only one system is available commercially and this system provides reductions on the low end of this range. Little

[25] National Research Council, "Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles Figure S-1, page 4, National Academies Press, 2011

technical information is available on the systems that achieve reductions in the upper range for turbocompounding. These systems are based on proprietary designs the improvement results for which have not yet been replicated by other companies or organizations. The agencies are assuming that all tractor engine manufacturers will use turbocompounding by 2017 model year. Even though turbocompounding is used today by one manufacturer, it will require a significant change in the design of the heavy-duty tractor engines which do not currently include it, even for one that represents the maximum technically feasible standard even at the low end of the assumed improvement spectrum.

Finally, different duty cycles used in the evaluation of medium- and heavy-duty engine technologies can affect reported fuel consumption improvements. For example, some technologies are dependent on high load conditions to provide the greatest reductions. The duty cycles used to evaluate some of the technologies considered by NAS differed significantly from that used by the agencies in the modeling for this rulemaking. Maximum and average speed was higher in some of the cycles used in the studies, for example, and one result was demonstrated on a nonroad engine cycle. The effectiveness of turbocompounding when evaluated on a duty cycle with higher engine load can show a greater reduction potential than when evaluated with a lower engine load. In addition, technologies such as improvements to cooling fans, air compressors, and air conditioning systems will not be demonstrated using the engine dynamometer test procedures being adopted in this final rule because those components are not installed on the engine during the testing. The agencies are interested in developing full vehicle test procedures that could potentially capture the performance attributes of the vehicle cooling system, but as explained in response 6 above we are unable to do so at this time. The Supplemental Emissions Test (SET) selected by the agencies for tractors engines is based on a statistical sampling (weighting) of operating modes from combination tractors. We believe it to be a more appropriate drive cycle than simple average road load conditions commonly used for comparisons such as the NAS report.

We gave consideration to finalizing an even more stringent standard based on the use of waste heat recovery via a Rankine cycle (also called bottoming cycle) but concluded that there is insufficient lead-time between now and 2017 for this promising technology to be developed and applied generally to all heavy-duty engines. TIAX noted in their report to the NAS committee that the engine improvements beyond 2015 model year included in their report are highly uncertain, though they include Rankine cycle type waste heat recovery as applicable sometime between 2016 and 2020.[26] The Department of Energy, along with industry are both working to develop waste heat recovery systems for heavy-duty engines. At the Diesel Engine-Efficiency and Emissions Research (DEER) conference in 2010, Caterpillar presented details regarding their waste heat recovery systems development effort. In their presentation, Caterpillar clearly

[26] TIAX Report (2009). Page 4-29.

noted that the work is a research project and therefore does not imply commercial viability.[27] At the same conference, Concepts NREC presented a status of exhaust energy recovery in heavy-duty engines. The scope of Concepts NREC included the design and development of prototype parts.[28] Cummins, also in coordination with DOE, is active in developing exhaust energy recovery systems. Cummins made a presentation to the DEER conference in 2009 providing an update on their progress which highlighted opportunities to achieve a 10 percent engine efficiency improvement during their research, but indicated the need to focus their future development on areas with the highest recovery opportunities (such as EGR, exhaust, and charge air).[29] Cummins also indicated that future development would focus on reducing the high additional costs and system complexity. Based upon the assessment of this information, the agencies did not include these technologies in determining the stringency of the final standards. However, we do believe the bottoming cycle approach represents a significant opportunity to reduce fuel consumption and GHG emissions in the future. EPA and NHTSA are therefore both finalizing provisions described in Section IV to create incentives for manufacturers to continue to invest to develop this technology.

As noted in comments, the agencies have not based the standard for gasoline engines on the use of cylinder deactivation technology despite our projections that this technology will be used to show compliance with the similar passenger car and light-duty truck regulations. We have made this distinction concluding that cylinder deactivation is less appropriate for heavy-duty work trucks that will commonly operate under high engine loads due to heavier vehicle base weights and heavier average payloads. Under these conditions, cylinder deactivation would rarely actuate and would provided little fuel consumption or GHG benefits. The agencies selected engine technologies and the estimated fuel reduction percentages for setting the standards. For the reasons stated above, the agency believes the technologies and required improvements in fuel consumption represent the maximum feasible improvement, and are appropriate, cost-effective, and technologically feasible.

Organization: Navistar, Inc.

The proposed engine standards are supposedly based on a volume, weighted averaging of engine emissions representing a “0.2 g/bhp-hr NOx standard.” Unlike the detailed standards

---

[27] Kruiswyk, R. “An Engine System Approach to Exhaust Waste Heat Recovery.” Presented at DOE DEER Conference on September 29, 2010. Last viewed on May 11, 2011 at http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2010/wednesday/presentations/deer10_kruiswyk.pdf

[28] Cooper, D,, N. Baines, N. Sharp. “Organic Rankine Cycle Turbine for Exhaust Energy Recovery in a Heavy Truck Engine.” Presented at the 2010 DEER Conference. Last viewed on May 11, 2011 at http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2010/wednesday/presentations/deer10_baines.pdf

[29] Nelson, C. “Exhaust Energy Recovery.” Presented at the DOE DEER Conference on August 5, 2009. Last viewed on May 11, 2011 at http://www1.eere.energy.gov/vehiclesandfuels/pdfs/deer_2009/session5/deer09_nelson_1.pdf

development process for Class 2b/3 that are set out in the docket, the record is devoid of any explanation applicable to the development of the engine standards for engines over 14,000 lbs GVWR. EPA baldly states that engines from "2007 through 2011 model year" were utilized, but there were no MY 2007-2009 heavy-duty diesel engines certified to the 0.20 g NOx standard. Therefore, the utilization of such data must have been normalized to the "0.2g" standard. [EPA-HQ-OAR-2010-0162-1871.1, p.22]

Additionally, this data was "adjusted," in some fashion that EPA never explains, based on technologies used in current MY 2010 production controlled by SCR. As such, even putting aside that the GHG standards cannot be based on a control-technology that does not meet 0.20 g NOx, the CO2 results are improperly tilted in favor of the majority of the present technology types. This results in artificially high efficiency and correspondingly artificially low GHG emissions for some technologies. [EPA-HQ-OAR-2010-0162-1871.1, pp.22-23]

Response:

The agencies' development of a baseline is important in describing the emissions reduction we expect to achieve from this regulation, but it is not directly determinant of the emission standards that we are setting. The proposed standards that we are finalizing today reflect the performance of a notional 2014 engine equipped with the technologies we describe in Section III of the preamble in the NPRM (75 FR at 74227) and for this final rulemaking. If the agencies have incorrectly captured the 2010 baseline emissions or if our estimate is accurate but skewed due to unusual sales patterns over the last few years, this could slightly alter our estimates of the emission reductions from this rule but would have no impact on our assessment of the capability of diesel engines to attain the CO_2 emission standards we are finalizing. In other words, there would be no effect on standard stringency which is based on technology capability -- irrespective of baseline level. (Note that this situation varies from that for vocational vehicles, where the agencies are unable to set any baseline at all from which to evaluate technology performance (except for LRR tires), as opposed to issues here regarding the precise baseline level.) Navistar seems to suggest that the agencies may have painted an overly rosy picture of the CO_2 performance of the 2010 products as a whole but undercounting some engines with higher CO_2 emissions. The agencies disagree. See the following comment response. Even if that is the case, however, the agencies would only have likely underestimated the benefits of today's rule. However, that should have no impact on our estimates of the potential performance levels of 2014 engines nor our estimates of the costs necessary to achieve those standards. For the purposes of showing feasibility of the CO_2 emission standards, it is sufficient to show a technology path by which the standards can be achieved taking cost into consideration. The agencies describe that technology path in both Section III.A and III.C of the preamble and Chapter 2.4 of the RIA.

Organization: Navistar, Inc.

More specifically, the baseline engine relies on SCR but does not attempt to account for the additional GHG effects resulting from consumption of diesel exhaust fluid ("DEF") attributable to these systems. The NAS report, which EPA relies upon heavily in many other respects, states:

The SCR aftertreatment system for reducing NOx also requires a fluid, which is urea mixed with water (called Adblue in Europe and DEF in the United States), to supply the reducing agent. The urea is made from natural gas. The energy use of this fluid and/or its cost must be accounted for in the calculation of energy consumption. The use of SCR can allow a higher engine-out NOx level, which in turn can be used to reduce fuel consumption, but this improvement must be weighed against the urea consumption of the SCR aftertreatment system. [EPA-HQ-OAR-2010-0162-1871.1, p.23]

Despite this clear instruction from the National Research Council, at no point in the NPRM does EPA engage in the analysis that the NAS Report says is necessary. To the contrary, EPA once again favors urea fluid-based SCR technology, just like EPA did when it declined to model the effects of inoperable urea-fluid based SCR systems on NOx emissions in defiance of EPA's own findings in its January 2001 rulemaking. Simply put, consumption of DEF must be accounted for in the performance of the baseline engine and the setting of standards. Failure to account for DEF usage is arbitrary and capricious. Essentially, EPA is adopting a particular technology in this rule, while looking only at its purported benefits and ignoring its known costs. [EPA-HQ-OAR-2010-0162-1871.1, p.23]

Of the two primary methods of addressing NOx emissions in current technology, urea fluid-based SCR and in-cylinder exhaust gas reduction ("EGR"), the method EPA used to determine the baseline only captures the emissions and efficiency profile of EGR systems because it only measures diesel fuel use and emissions. The method does not fully reflect the true emissions profile of urea fluid-based SCR because it ignores DEF consumption, which is essentially a stand-in for diesel fuel use. [EPA-HQ-OAR-2010-0162-1871.1, p.23]

<u>Response:</u>

Urea or Diesel Emissions Fluid (DEF) has the chemical formula CH_4N_2O and hence contains one carbon atom per ammonia molecule. The consumption of DEF to control NOx in an SCR catalyst contributes to tailpipe CO_2 emissions on a one to one basis (one molecule of urea will produce one molecule of CO_2). The tailpipe CO_2 increase due to the consumption of urea is fully captured in the engine test procedure and is therefore reflected in the emissions rate used to determine compliance with the CO2 standard. Manufacturers choosing to use a urea SCR catalyst system to comply with the NOx and CO_2 standards will have to limit their total CO_2 emissions from both the consumed diesel fuel and consumed urea. The standard is thus fully consistent with the NAS recommendation.

Organization: Navistar, Inc.

Moreover, EPA failed to account for the improper CO2 benefits resulting from the artificially low maintenance interval EPA approved for SCR systems. Under its Allowable Maintenance regulations, EPA requires manufacturers to design the longest period technologically possible before scheduled maintenance on an emission system. The "standard" interval prescribed for heavy-duty engines is 100,000 miles (and 150,000-mile intervals thereafter). But in order to accommodate the size and weight marketing goals of urea fluid-based SCR-manufacturers – namely, DEF is heavy and tanks needed to meet "standard" intervals would be customer unfriendly – EPA approved unprecedented, frequent driver-DEF replenishment as "allowable maintenance" by arbitrarily finding that intervals of a few thousand miles conformed to applicable regulations that, in all previous cases, required at least tens of thousands of miles before maintenance. In short, EPA approved DEF tanks weighing thousands of pounds less than what should have been required, but nowhere does EPA take into account the resulting CO2 advantages conferred by weight savings from approval of extremely small DEF tanks – not on engines and not on vehicles. [EPA-HQ-OAR-2010-0162-1871.1, p.24]

Sticking to its unlawful conclusion that SCR is EPA's favored technology and therefore must be favored at all costs, EPA ignores the negative GHG impacts from a smaller maintenance interval and from SCR in general. The more frequent maintenance is required, the greater the need for a large urea infrastructure to accommodate the small tanks and a large number of trucks traversing the country and delivering the DEF uniquely required by SCR engines. This puts competitive technology that does not use DEF at a significant disadvantage under the Proposed GHG Rule. As with DEF usage, failure to account for these artificial savings in the baseline is arbitrary. [EPA-HQ-OAR-2010-0162-1871.1, p.24]

This is no "slippery slope." Accounting for DEF use and artificially low maintenance is not only justified and feasible, it is absolutely necessary under legal standards. DEF is a direct offset for diesel use which, if left unaccounted for, results in seemingly "free" efficiency and emission improvements. In addition, manufacturers using SCR have essentially "backslided" (sic) or taken a "step back" as far as base engine technologies, deliberately increasing the levels of engine-out NOx in order to achieve purported efficiency gains. As discussed in detail below, SCR is a false cure with countless problems. This technology does have an adverse emissions impact and a cost and, as recognized by the National Research Council in its NAS Report, these elements must be accounted for. Indeed, it is EPA that has always emphasized the total "well to wheel" concept in its rulemakings. Therefore, EPA must develop and incorporate into any final regulations a scientifically sound method to account for the contribution of DEF and SCR to GHG emissions, and such method must be applied in MY 2014. Accounting properly could take the form of either a penalty applied to SCR systems that increase emissions calculations and decrease efficiency to reflect DEF dosage and weight. Alternatively, EPA could grant additional credits for systems that do not use DEF to ensure that both EGR and SCR systems adequately account for their actual energy consumption. [EPA-HQ-OAR-2010-0162-1871.1, pp.24-25]

Response:

The commenter's issues refer to a separate action that EPA took in 2009 allowing additional maintenance for SCR systems. 74 FR 57671 (November 9, 2009). That action was taken pursuant to 40 CFR § 86.094-25(b)(7), which allows manufacturers to request approval for new scheduled maintenance, which is maintenance that did not exist prior to the 1980 model year, including maintenance that is the result of new technology not found in production prior to the 1980 model year. EPA granted manufacturer requests to allow maintenance intervals for engines using SCR technology such that DEF tanks are designed for refill intervals that correspond to fuel tank capacity. The DEF tanks would be designed such that refill would occur no earlier than some multiple of the range of the vehicle's fuel capacity (from a 1:1 ratio to a 3:1 ratio, depending on the operation of the truck). EPA found that basing DEF fill capacity on diesel refueling intervals is reasonable given that it is likely that the DEF refill maintenance would be undertaken at the same time as fuel refill. EPA explained in the November 9, 2009 notice why its action was warranted and reasonable under the regulations. While the current rulemaking does not take any action regarding this maintenance interval decision, nor otherwise reopen or reconsider that action, EPA believes it is appropriate that our analysis of the cost of the program take into account this final decision taken over a year ago.

Navistar is correct that the November 9, 2009 action is likely to have a beneficial effect on the fuel economy of engines using SCR technology, but EPA fails to see why this should be considered a negative consequence , and Navistar does not itself provide any reason why better fuel economy should be considered a negative consequence. Nor does Navistar provide any basis for saying that EPA failed to take into account any negative impacts of a smaller maintenance interval, in terms of additional infrastructure requirements. We see no basis for concluding that the size of the urea tank has any significant impact on the CO2 emissions related to the urea distribution system. In either scenario, large tanks or small, the total volume of urea consumed by the vehicles remains the same, and hence, the number of trucks and resulting GHG emissions related to distribution remain the same as well. The only increase in activities related to the tank size is the urea refilling events themselves. Since these will inevitably correspond to fueling events, they should not increase the number of starts or stops for trucks over the condition without urea use. It is true that the reduced maintenance intervals improve the viability of SCR technology. That is one of the factors EPA reviewed when EPA granted the reduced maintenance interval, and again, EPA does not consider it to be a disbenefit to allow actions that further the viability of an emission control technology. Navistar has not shown that there are any significant disbenefits from allowing this reduced interval. Manufacturers using competitive technologies may wish to create roadblocks to the use of SCR technologies, but that is no reason for EPA to make it artificially difficult to manufacture engines using SCR.

Organization: Navistar, Inc.

In addition, the statistical method used to develop the baseline engine is unlawfully absent from the NPRM, because EPA does not describe many of the key elements. EPA states that it used a correction factor for the levels of NOx emissions but does not disclose that factor. Therefore, it is impossible to tell from the proposed rule how this baseline engine was derived. For instance, to develop production volumes, did the method look at the entire period from 2007 through projected 2011 numbers and use an average? What specifically was the correction factor EPA used to adjust engines to correlate to an emissions level of 0.20 g NOx and how was it applied? Navistar cannot meaningfully comment on the baseline because these key elements are not disclosed in enough detail to allow such comment. EPA's failure to properly disclose this information violates its rulemaking obligations under the CAA. [EPA-HQ-OAR-2010-0162-1871.1, p.25]

The volume estimates used by EPA also are invalid. Because of the unusual economic circumstances over the past few years, the numbers used for production volumes likely will not be representative going forward. There is nothing in the administrative record, in sum, that supports the choice of SCR as the baseline or the calculation of that baseline. [EPA-HQ-OAR-2010-0162-1871.1, p.25]

For these reasons, EPA's proposal to impose the "medium heavy" vocational engine standard on "light heavy" vocational engines also is not supportable with facts. EPA's reliance on a baseline "medium heavy" engine utilizing SCR is not representative of the "light heavy" fleet, which largely does not use SCR technology. In short, it appears that EPA has jettisoned the same sales-weighted approach used to derive the "heavy-heavy" and "medium-heavy" vocational standard, because such an approach for the "light-heavy" market would result in a standard that EPA does not prefer. Such an arbitrary distinction is unlawful. Even-handed application of methodologies to all categories is required, and EPA must correct the baseline for this class of engines. /68/ [EPA-HQ-OAR-2010-0162-1871.1, pp.25-26]

Response:

As described in the preceding response to Navistar, the use of sales weighted performance values to project the average improvement for the fleet is not the same thing as the agencies' projections of the potential performance of a 2014 or 2017 engine. Other than in the case of legacy engines, we do not have reason to believe that all manufacturers cannot produce compliant engines meeting these standards. This is different from our passenger car CAFE and GHG regulations where industry averages and even manufacturer by manufacturer averages are used as a means to maintain vehicle attributes such as acceleration performance. In this case, we are projecting no tradeoff in these attributes in developing the performance level we believe achievable by 2014 and 2017, and hence, the industry weighted averages primarily provide an estimate of the expected reductions. Navistar has all of the information it needs to comment on our detailed projections of the performance levels that can be attained by 2014 and 2017. Regarding the question of normalizing to a common NOx level, the normalization was done simply by ratioing the performance of similarly configured engines to the same NOx level. Given the very small variation in NOx level (typically around one tenth of one gram) the impact on the projections of industry average improvement isn't unduly large.

The agencies grouped LHD and MHD engines together in making projections because technology and achievable performance levels for those engines are the same. There is no inherent difference in performance betweens engines in these two categories. The primary difference simply relates to the lower sales volumes for LHD engines. Regarding Navistar's contention that urea SCR is not available for LHD applications we note that for the 2011 vehicle model year, two of the three highest volume manufacturers of light heavy-duty diesel engines (Ford and General Motors) utilized urea SCR technology for their diesel products. We also note that on a calendar year basis the 2011 vehicle model year is much closer in time to the actual 2010 engine model year we have used in projecting the average fleet improvement relative to our standards.

Organization: Navistar, Inc.

Finally, the Agencies requested comment as to whether the alternative standard for engines should be extended for an additional model year – i.e., into model year 2017. We understand that this would be in lieu of the proposed 2017 emission standard for that model year. Navistar supports the extension of the alternate standard for an additional year. Indeed, without waiving the reasons why the Proposed GHG Rule is illegal for independent reasons, extending the alternative standard through MY 2017 is a necessity. [EPA-HQ-OAR-2010-0162-1871.1, p.26]

/68/ We also question EPA's assumption of using averaging as a mathematical technique because the heavy-duty diesel engine market in [sic] no longer homogenous when it comes to NOx control technologies. [EPA-HQ-OAR-2010-0162-1871.1, p.26]

On the current record, the proposed CO2 standard for MY 2017 is not "technologically feasible" as required by CAA § 202(a) and 49 U.S.C. § 32902(k)(2). Many of Navistar's comments regarding the proposed MY 2015-2016 GHG standards apply equally to the proposed MY 2017 standard, which also is not "feasible" because it is predicated on an infeasible technology – namely, urea fluid-based SCR. (EPA does not even purport to claim compliance is possible for engines other than its selected "baseline.") As discussed in Part VII.H., urea fluidbased SCR-engines cannot be the "baseline" engine for MY 2017 (or any) standard, because such engines do not even meet the 0.20 g NOx standard required of all heavy-duty diesel engines in 2010. In other words, EPA has improperly chosen a non-compliant engine as its baseline. EPA's selected "baseline" is thus arbitrary and capricious, an abuse of discretion, and otherwise not in accordance with law in its own right. Moreover, as it relates to the requirement for technological feasibility, by definition, a baseline engine that allows for significant excess NOx emissions in exchange for CO2 control is infeasible and cannot be the predicate for any standard. And, as a result, EPA and NHTSA cannot meet their statutory requirements that the standards they promulgate be feasible. [EPA-HQ-OAR-2010-0162-1871.1, pp.26-27]

EPA has requested comment on the possibility of a more stringent standard in MY 2017. Because the currently proposed standard for MY 2017 is infeasible, it follows that this standard should not be made more stringent. [EPA-HQ-OAR-2010-0162-1871.1, p.27]

"The emission standards set by EPA under its general regulatory power ... must be premised on a finding of technological feasibility." NRDC v. EPA, 655 F.2d 318, 322 (D.C. Cir. 1981). As noted above, EPA correctly acknowledges that "standards promulgated under CAA § 202(a) are to take effect only 'after providing such period as the Administrator finds necessary to permit the development and application of the requisite technology.' EPA cannot base this decision upon unsupported assumptions. See Motor Vehicle Mfrs. Ass'n, 463 U.S. at 43. In addition to all of the issues raised above concerning feasibility, there is a fundamental flaw in the Agencies' choice of their "baseline" engine. /139/ [EPA-HQ-OAR-2010-0162-1871.1, p.56]

EPA's "baseline diesel engine" that supports its technological feasibility determination is a MY 2010 engine utilizing a urea fluid-based SCR "aftertreatment system which meets EPA's 0.2 grams of NOX/bhp-hr." However, no such SCR system currently exists. Just the opposite, urea fluid-based SCR-equipped heavy-duty engines in MY 2010 do not meet the 0.20 g NOx standard because EPA authorized extended (indeed, in practice, indefinite) periods of operation with such SCR system turned off and, thus, with no NOx control whatsoever. See, e.g., Certification Requirements for Heavy-Duty Diesel Engines Using Selective Catalyst Reduction (SCR) Technologies, at 3-5 (Feb. 18, 2009) (authorizing operation for up to 1000 miles without the DEF necessary to control NOx and up to 2000 miles with the system disconnected). [EPA-HQ-OAR-2010-0162-1871.1, p.56]

Moreover, it is well-recognized, including by SCR-engine manufacturers themselves, that urea fluid-based SCR systems are ineffective, even with DEF, to control NOx in stop-and-go driving conditions (i.e., urban driving) because the engine simply does not run hot enough to allow for the conversion of urea to ammonia that is necessary for the SCR system to actually function. This, of course, raises significant concerns for the "vocational" engines and vehicles that the Agencies seek to regulate here, and which engines (like their line-haul counterparts) significantly dial-up NOx to obtain an artificially low CO2 emission "baseline" upon which the GHG standards are then based. Additionally, the urea fluid-based SCR system is unable to tell the difference between DEF, which operators must first find and then buy, and a readily available and free resource, tap water. DEF quality sensors are not currently available and, according to some SCR-engine manufacturers, will not be for some time. Therefore, again, the "baseline" engine is not even in compliance with the 0.20 g NOx standard. [EPA-HQ-OAR-2010-0162-1871.1, p.57]

Navistar and many others (including federal and state legislators as well as environmental organizations) have addressed these issues at length with EPA, and EPA is well aware of independent testing that demonstrates MY 2010 urea fluid-based SCR truck operation for indefinite periods without any SCR control, resulting in NOx emissions up to 40 times higher than when the system is operating as intended. See Comments of Navistar, Inc. to July 20, 2010, Public Workshop For Heavy-Duty Diesel Engines Employing Selective Catalyst Reduction ("SCR") Technology, Docket ID No. EPA-HQ-OAR-2010-0444 (Aug. 20, 2010). This testing confirms EPA's previous rulemaking conclusions that "the loss of NOx control to be expected from an SCR based program" would "be appreciable and, in effect, the NOx standard would not be met of a fleetwide basis." [EPA-HQ-OAR-2010-0162-1871.1, p.57]

Indeed, EPA determined that "we do not believe that feasibility of the 0.20 g/bhp-hr NOx standard can be based upon SCR technology." And yet, the "baseline" for EPA's proposed GHG standards are predicated upon this "infeasible" technology. That cannot be valid. There is nothing in the current record that supports the Agencies' singular choice of urea fluidbased SCR as the baseline or the calculation of that baseline. Just the opposite, the record demonstrates that urea fluid-based SCR is not a road-ready technology and that the proposed CO2 standards cannot be "feasible," unless and until the technology's severe potholes, including its failure to work during stop-and-go driving and its ability to run forever on only water, are resolved. As a result, EPA's selected "baseline" is thus arbitrary and capricious, an abuse of discretion, and otherwise not in accordance with law. [EPA-HQ-OAR-2010-0162-1871.1, pp.57-58]

As noted above (see supra at Part IV.B.), a "baseline" technology that allows for significant excess NOx emissions in exchange for CO2 control is by definition infeasible. Or, put another way, the proposed CO2 standard predicated on urea fluid-based SCR means that the proposed CO2 standard is only controlled by violating the 0.20 g NOx standard (assuming EPA takes the untenable position that such standard remains in effect). That too is the very definition of infeasibility as it further promotes a violation of an existing standard and/or a revision in the standard without rulemaking. [EPA-HQ-OAR-2010-0162-1871.1, p.58]

Because EPA is well aware of the significant deficiencies with MY 2010 SCR-equipped engines' ability to meet the 0.20 g NOx standard, in the interests of brevity, Navistar does not repeat those points here but, instead, hereby attaches and incorporates its previous public comments (as well as testing results and other significant materials) on these issues for EPA's consideration and review. See http://www.navistar.com/2010loopholes. In short, adopting MY 2010 SCR-equipped engines as the "baseline" against which technological feasibility should be measured is impermissible because SCR-equipped engines are not actually meeting the 0.20 g NOx standard. As a result, EPA has yet to conduct the "feasibility" analysis that EPA agrees is required by CAA § 202(a). A correct statutory analysis on "feasibility," utilizing MY 2010 "baseline" engines that actually exist in-use, would dramatically effect the Agencies conclusions regarding both the lead time necessary to implement the proposed GHG emission standards and the standards themselves. On the current record, neither the lead time feasibility conclusions nor the proposed standards (2014 or 2017) pass muster under the CAA or EISA. [EPA-HQ-OAR-2010-0162-1871.1, pp.58-59]

Response:

EPA disagrees with Navistar's statement that the baseline technology used in EPA's analysis, SCR, is infeasible. In fact, several engine families have been certified by EPA using SCR technology over the past two years, all of which have met the 0.20 g/bhp-hr NOx standard.[30] EPA disagrees with Navistar that SCR engines currently certified do not meet this standard. Compliance with the 0.20 g/bhp-hr FTP NOx standard is measured based on an engine's performance when tested over a specific duty cycle (see 40 CFR § 86.007-11(a)(2)). This is also true regarding the SET standard (see 40 CFR § 86.007-11(a)(3)). Further, the FTP and SET tests are average tests, so emissions could go over 0.20 even for some portion of the test itself. Manufacturers are also required to ensure that their engines meet the NTE standard under all conditions specified in the regulations (see 40 CFR § 86.007-11(a)(4)).

As noted, several manufacturers have been able to show compliance with these standards in applications for certification provided to EPA for several engine families. Navistar has provided no information indicating that these tests were false or improper. Indeed, Navistar does not appear to suggest, or provide any evidence, that engines with working SCR systems cannot meet the NOx standard. Thus, it is demonstrably false to conclude that the NOx standard cannot be met with SCR-equipped engines.

Instead, Navistar appears to object based on the fact that it is possible that, in certain circumstances, an SCR-equipped engine could be operated in use without a working SCR system. In particular, SCR-equipped engines could in theory be operated with no DEF, or with inadequate DEF, or with an SCR system that is malfunctioning or which has been tampered with. This is similar to the possibility that any engine equipped with emission controls can in theory operate in certain circumstances with inoperative emission controls, e.g. a gasoline car can in theory be operated without a functioning catalytic converter and a diesel engine equipped with EGR, like Navistar's engines, can in theory be operated with a failed EGR valve or cooler. In fact, in the case of EGR EPA routinely approves the use of auxiliary emission control devices (AECDs) designed to turn off EGR under certain circumstances to prevent condensation of nitric and sulfuric acids in the intake system of the engine. When this AECD is active, EGR based NOx control is reduced substantially or even eliminated.

First, it is important as a legal matter to point out that this possibility does not call into question the feasibility of the emission standard. The feasibility of the standard is based on the ability of manufacturers to meet the numerical limits of the standard under the test circumstances that are specified in the regulations. As noted above, manufacturers have been able to meet those limits under the circumstances specified. EPA does not require that engines be tested for certification without working emission controls. The emission tests performed by manufacturers for purposes of certification are performed on engines operating as designed by their manufacturers, i.e. with working emission control systems. As manufacturers have clearly shown that engines with working SCR technology can meet the standards under the test circumstances, the standards reflected in the baseline engine are feasible, and Navistar is fundamentally wrong in stating that NOx control is sacrificed for CO_2 control, or that the baseline engine is non-compliant with the applicable NOx standard.

[30] See "SCR Cert Families" in Docket #EPA-HQ-OAR-2010-0162.

Navistar's comment instead appears to complain that, even if the standard can be met by engines using SCR when the SCR system is working, the numerical limits in the standard cannot necessarily be met at all times, because engines may in theory be operated with non-working SCR systems. Again, this is not a fair complaint about the feasibility of the standard, which does not require numerical limits to be met at all theoretical times. Thus, it is less a complaint about what EPA does require than a complaint about what EPA does not require.

However, EPA does in fact have regulations that require manufacturers to design their engines such that emission controls are not easily circumvented. These regulations require that, for emission-related parameters that are physically capable of being adjusted, the manufacturer must inhibit the ability of users to adjust emission controls, or EPA may test the engine within the physically adjustable range of the parameter. 40 CFR § 86.094-22(e).

Under this regulation, in determining the parameters subject to adjustment, EPA will consider the likelihood that settings other than the manufacturer's recommended setting will occur in-use, considering such factors as, but not limited to, the difficulty and cost of getting access to make an adjustment; damage to the vehicle if an attempt is made; and the effect of settings other than the manufacturer's recommended settings on engine performance.

EPA has stated previously that SCR systems utilizing a reducing agent that needs to be periodically replenished could be considered an adjustable parameter. In particular, the level and quality of DEF are parameters that are potentially subject to adjustment under 86.094-22(e)(1)(i). These parameters can physically be adjusted, may significantly affect emissions and have not been present on previous model year engines in the same form or function. See EPA Guidance documents CISD-07-07 (March 27, 2007) and CISD-09-04 (December 29, 2009). In those guidance documents, EPA provided some guidance to manufacturers of engines using SCR technology regarding possible methods for safeguarding their engines against operation without proper DEF. EPA noted that a series of warnings that alert operators to potential operation without proper DEF, followed by engine operational controls that reduce the effectiveness of engine performance (e.g. derates of engine power, reductions in possible speed), would be particularly beneficial in reducing the likelihood that the vehicle will be used outside of manufacturer's settings in use.

EPA has certified many engine families that have incorporated such warnings and engines controls into their systems. EPA has received evidence that these engines, when in actual use, have operated almost exclusively with proper DEF.[31,32,33] Navistar has produced no evidence that actual operators of these engines have been operating for any significant amount of time with no SCR controls. Thus, the evidence indicates that the warnings and engine controls

[31] Greuel, Justin. Cummins Memo to Docket. Docket EPA-HQ-OAR-2010-0162.
[32] Greuel, Justin. ATA Memo to Docket. Docket EPA-HQ-OAR-2010-0162.
[33] California Air Resources Board. Heavy-Duty Vehicle Selective Catalytic Reduction Technology Field Evaluation. May 2011. Docket EPA-HQ-OAR-2010-0162. Last viewed on July 29, 2011 at http://www.arb.ca.gov/msprog/cihd/resources/reports/scrreport.pdf

put in place by manufacturers are having the intended effect of reducing the likelihood that engines equipped with SCR are operated without proper DEF.

Navistar has noted, and provided evidence, that these warnings and engine controls do not completely prevent the operation of SCR-equipped engines without proper DEF. This is true. It is possible that an operator could ignore the warnings and drive with reduced engine capacity for some amount of time. However, EPA has never required that manufacturers design their engines and vehicles to be completely tamper-proof or break-proof. Emission control systems, like all mechanical or electronic devices, sometimes break down or falter. This is true for SCR systems, as it is for EGR systems or catalytic converters on gasoline-powered cars. In addition, an operator that is intent on tampering with its emission-control systems (despite the fact that such tampering is illegal) can, if willing to give enough time, effort and money to the endeavor, in many cases defeat a device that a manufacturer puts on his engine to prevent tampering. EPA has not required that manufacturers make their emission controls completely inaccessible (in part because such controls may need actual service) or required manufacturers to have their engines stop immediately upon detection of a problem (in part because there is some inherent safety concern in doing so and because it can cause unnecessary problems for operators whose emission controls have faltered through no fault of the operator). EPA has required engine designs that significantly inhibit the adjustment of adjustable parameters. Indeed, manufacturers of SCR-equipped engines have taken steps that manufacturers of other types of emission controls have not been required to take. The operational controls on these engines have never been required for engines using other types of emission controls.

The Clean Air Act requires manufacturers to build engines and vehicles that can meet standards in use as well as at the time of certification, but, under CAA section 207(c), EPA can only recall an engine family when EPA finds that a substantial number of engines in that family, “although properly maintained and used,” fail to meet emission standards “when in actual use.” Clearly, an engine that is being operated without DEF, despite manufacturer-prompted warning signals and reductions in engine power, is not being “properly maintained and used.” Neither the Clean Air Act nor EPA’s regulations require that every engine sold by a manufacturer meet applicable standards over its useful life under all conditions even if the operator does not maintain and use the engine properly.

It is typical of catalyst based emission control systems for emissions control to decrease if exhaust temperatures are below the catalytic operating temperature (the so called light off temperature) of the catalyst. For this reason it is typical for three-way catalyst equipped gasoline vehicles to have their highest emissions during the first few minutes after vehicle start. Catalyst based diesel engines are no different in this respect. The heavy-duty Federal Test Procedure (the HD FTP) includes both a cold and a hot start to account for the reduced effectiveness of catalyst based emission control systems during cold operation and to ensure that manufacturers include elements of design such as insulated exhaust pipes to help preserve exhaust temperatures and maintain effective catalytic control. As Navistar notes, very slow vehicle operation (average speeds below 15 to 20 mph) such as could occur on during the height of rush hour traffic can lead to higher NOx emissions as the exhaust temperature falls and the catalyst operation approaches the performance that would be expected of repeated vehicle starts without any significant high load or high speed operation. This reduction in emission control is reflected in the test procedure and is accounted for in the resulting cycle weighted emissions results. Fortunately, slow speed rush hour type conditions reflect only a small portion of on-highway diesel truck vehicle miles traveled and hence emissions

In addition, EPA's own review of the maturity of urea sensors, which more directly monitor DEF quality, indicates that they will likely be available by the 2013 model year. As discussed above, EPA is aware of Navistar's testing that shows that when certain early model SCR-equipped engines were driven in a manner that conflicted with the use instructions of the manufacturer, there were periods when the vehicle could drive without proper DEF. In virtually all cases, the operation of the vehicle occurred despite the operation of warning lights and, in most cases, some derate of the engine. EPA notes that other testing and surveys performed indicate that in the real world, the warnings and engine performance controls that manufacturers have placed on SCR-equipped vehicles have been sufficient to prevent operation without proper DEF.[34] EPA also notes that in at least three cases, manufacturers of the SCR-equipped engines have already engaged in voluntary service actions to deal with these issues. While EPA does take such issues seriously, we also recognize that the initiation of new technology occasionally leads to implementation issues, and that as technology matures, added rigor is expected. It should also be noted that the testing by Navistar was on discreet engines and implicates only the particular manufacture of those particular engines. They do not implicate SCR as a technology. Navistar's information does not show that SCR-equipped engines can't be built to never run without proper DEF, only that these particular engines were not so built. Moreover, as discussed above, EPA believes that vehicle designs that include sufficient warnings and engine performance controls, when implemented properly, do provide sufficient protection against engines being operated without proper DEF for any significant amount of time in use.

Regarding Navistar's quote of EPA's ten-year old statement regarding SCR, EPA has never stated that SCR technology was infeasible or prohibited its use. In the 2001 rule promulgating the 0.20 g/bhp-hr NOx standard, in determining that the standard was achievable, EPA based the feasibility of the standard on separate technology, NOx adsorbers. At that time, EPA recognized that other technologies, like SCR, were being developed, but EPA believed that NOx adsorbers would have wider application by 2007. 66 FR 5036. EPA predicted that "SCR NOx control may be possible in some applications by 2007," but "believe[d] there are significant barriers to its general use for meeting the 2007 standards. 66 FR 5053. Those barriers included the need for urea infrastructure and the need for periodic refills of the urea tank. However, EPA did not state that SCR could not be used, only that we were not basing the standard on such use.

Over the past decade, as most manufacturers determined that SCR was the most appropriate technology for those manufacturers to use to meet the standard, manufacturers and EPA, as well as other parties like truck filling stations, have engaged in discussions to solve the

[34] Ibid.

concerns that EPA had with regard to SCR technologies. Those discussions, and the actions resulting from the discussions, have led to many changes from the status quo in 2001. A DEF infrastructure is now in place that allows trucks with SCR-equipped engines to find DEF as needed. In addition, as discussed at length above, manufacturers have designed their engines to inhibit the operation of trucks without proper DEF. Thus, through cooperative efforts, the facts that led to EPA's hesitance in 2001 have been changed to allow the use of SCR-equipped engines.

In response to the commenter's claim that the MY 2017 diesel engine standards are not feasible by other than SCR-based systems, this may be the case. Navistar does not challenge that there is sufficient lead time for all engine manufacturers, including those presently using non-SCR based systems, to redesign their systems by MY 2017. As noted at proposal, MY 2017 affords each engine manufacturer the opportunity for such a redesign. 75 FR at 74179. Navistar also does not challenge the technology path outlined by the agencies for achieving the MY 2017 standards – the addition of turbocompounding to the base engine technologies. 75 FR at 74178; RIA at Chapter 2.1. Consequently, Navistar's claim of infeasibility is predicated on perpetuation of other than SCR emission control, with attendant loss of GHG control and fuel efficiency. Neither agency's statutory authority compel such perpetuation.

6.2.2.3. Idle Reduction for Tractors

6.2.2.3.1. Support for Idle Reduction Provisions

Organizations Included in this Section:

DTNA
Engine Manufacturers and Truck Manufacturers Associations
Motor & Equipment Manufacturers Association
California Air Resources Board
American Council for an Energy-Efficient Economy

Organization: DTNA

We agree with the Agencies' approach of giving credits simply to vehicles with five minute or less idle shutdown timers. It should not matter to the Agencies whether a vehicle does not idle because it simply shuts down or because it shuts down in order to use some idle-reduction device like an APU. As discussed below, some customers may not select an idle shutdown timer because of a fear that at some times and in some places idling may be necessary for safety. On the other hand, the customer may intend to limit idling in other than emergency situations. These customers are easily identifiable because they purchase an APU or Park-Smart system. These devices are expensive and would not be purchased if they are not intended to be used. Accordingly, the regulation should be modified to allow the idle reduction credit to be applied for any vehicle that includes an APU or Park-Smart system, even if the vehicle does not include a idle shutdown timer. [EPA-HQ-OAR-2010-0162-1818.1, p.96]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The Proposed GHG/FE Standards include a provision whereby any vehicle equipped with idle reduction technology that will automatically shut off the main engine after 300 seconds (5 minutes) should input a 5 g/ton-mile 'credit' into GEM. (See 75 FR at 74393.) That is a reasonable requirement that will incentivize broader adoption of engine shut-off systems, and subsequently increase the use of alternative technologies for providing heat, air conditioning and electrical power ('hotel loads') for the extended periods of time that the driver is resting in a tractor's sleeper berth.

Organization: Motor & Equipment Manufacturers Association (MEMA)

We agree with the agencies’ proposal that in order to qualify for credits, it is mandatory that the truck be equipped with an automatic engine shut-off system. Future five-minute mandatory engine shutdown will support increased annual hours of operation for idle reduction equipment. [EPA-HQ-OAR-2010-0162-1752.1, p.12]

Organization: California Air Resources Board (ARB)

ARB staff strongly supports the agencies' proposal to require manufacturers to install a 5-minute automatic engine shutoff device without override capability as a condition for getting credits for extended idle reduction technologies. This requirement will help ensure that emission reductions are realized in-use. [EPA-HQ-OAR-2010-0162-2354.1, p. 8]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The agencies propose to provide idle reduction credit in the amount of 5 grams of CO2 per ton-mile to any Class 8 tractor fitted with sleeper cab provided the main engine shuts off after 5 minutes of idling when it is in a parked position. This approach is intended to reduce emissions and fuel consumption from extended idling and allow for the use of alternate technologies to idling of the main engine. In principle, we support the idea of this credit to encourage sleeper trucks to have anti-idle technologies installed on them. [EPA-HQ-OAR-2010-0162-1894.1, p.7]

Response:

We agree with the commenters that the agencies’ approach for reducing extended idling of sleeper cap tractors will incentivize broader adoption of engine shut-off systems and ensure that emission reductions are realized in-use. The final rules will reduce fuel use and emissions associated with extended idling, which are a large fraction of the emissions reduced from combination tractors in this HD National Program.

6.2.2.3.2. Expand Idle Reduction Provisions to cover other vehicles besides Class 8 sleepers

Organizations Included in this Section:

Motor & Equipment Manufacturers Association
Navistar, Inc.
California Air Resources Board

Organization: Motor & Equipment Manufacturers Association (MEMA)

The agencies must consider typical real-world operation issues that also impact their idling assumptions. Regarding the operation of Class 7 and 8 Day Cabs, MEMA notes that there are increasing requirements for companies that operate these vehicles to reduce their idle for "start-stop" operations, such as waiting in long lines to pick-up and drop-off, or where they may not be allowed to leave the truck or to sit at idle, such as at container docks. Restrictions on idling impact these Day Cab carriers in a very direct way. As examples, SmartWay partner shippers do not allow idling on their property and more and more cities/municipalities face non-attainment of air quality standards and must enforce idling restrictions. /12/ Some trucking operations are moving to a regionalized system in order to accommodate driver and customer preferences; consequently, utilization of Day Cabs – and associated idling – will increase.

MEMA recommends that Class 7 and 8 Day Cabs be credited with 35 percent of the credit given to Class 8 Sleeper Cabs when equipped with comparable technology. Offering credits for Day Cabs equipped with idle reduction technologies will result in reduced idling in Day Cabs and the desired result of reduced fuel consumption and emissions for the full slate of vehicles in the combination tractor category. [EPA-HQ-OAR-2010-0162-1752.1, p.13]

[12] Reference: http://www.epa.gov/smartway/documents/420b06004.pdf. Site lists nearly 30 states with anti-idling legislation.

Organization: Navistar, Inc.

The Agencies need to permit idle reduction as a vehicle credit option on GEM for vocational vehicles. Idle reduction technology can have a significant impact in certain vocational applications. [EPA-HQ-OAR-2010-0162-1871.1, p.28]

Organization: California Air Resources Board (ARB)

The current proposal would require an engine shutdown system on all Class 8 sleeper cab tractors that use idle reduction technology to meet the proposed truck standards. ARB staff urges the agencies to establish a similar requirement for all other heavy-duty vehicles covered by the proposal (Class 8 day cab tractors, Class 7 tractors, Class 2b-3 pick-ups and vans, Class 2b-8 vocational trucks). Although the idling of sleeper cab tractors during rest periods uses significant amounts of fuel and produces significant amounts of emissions, a 2006 study conducted by the Argonne National Laboratory concluded that extended workday idling (0 5 hour or more) may actually be a much more significant source of petroleum use due to the large number of contributing vehicles./5/ As such, ARB staff believes extended workday idling should be addressed in this rulemaking by requiring an engine shutdown system on all heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-2354.1, pp. 4-5, 7-8]

Response:

Beyond hoteling operations of sleeper cab tractors, idling may occur during the delivery process, queuing at loading docks or border crossings, during power take off operations, or to provide comfort during the work day. One study, conducted by Argonne National Laboratory, identified several different types of trucks which might idle for extended amounts of time during the work day.[35] Idling may occur during the delivery process, queuing at loading docks or border crossings, during power take off operations, or to provide comfort during the work day. However, the study provided only "rough estimates" of the idle time and energy use for these vehicles. The agencies assessed idle reduction technologies and have concluded that they may have the potential to reduce fuel consumption and GHG emissions, but the agencies have not been able to estimate baseline fuel consumption and GHG emissions levels for each type of vehicle given the wide variety of models and uses of HD day cabs. Given the variety of duty cycles and operating conditions of these vehicles and the timing of these rules, it is not feasible at this time to establish an accurate baseline for the idle reduction technologies evaluated. Considering the fuel efficiency and GHG emissions reduction benefits that will be achieved by finalizing these rules in the timeframe proposed, rather than delaying in order to gain enough information to include additional technologies like idle reduction, the agencies have decided to finalize standards that do not assume the use of idle reduction technologies on HD day cabs. Because idle reduction is not included in the test procedures for day cabs and is not in general use in the current fleet, the technology may be considered as an innovative technology.

6.2.2.3.3. Vary Credit by Technology

Organizations Included in this Section:

Motor & Equipment Manufacturers Association (MEMA)
California Air Resources Board (ARB)

[35] Gaines, L., et. al. "Estimation of Fuel Use by Idling Commercial Trucks." January 2006.

Union of Concerned Scientists (UCS)

Organization: Motor & Equipment Manufacturers Association (MEMA)

The Draft Regulatory Impact Analysis (RIA) published by EPA and NHTSA addresses idle control technologies and states that today's technologies include: auxiliary power units (APUs); fuel operated heaters (FOHs); battery air conditioning systems (BACs); and, thermal storage air conditioning systems (TACs).8 The RIA Table 2-22 assumes all idle reduction devices use 0.2 gallons of fuel per hour (gal/hr).

Each idle reduction technology should be given credit based on the fuel consumption and emissions of that technology and not be treated under the assumption that all devices consume 0.2 gallons of fuel per hour. This approach would be consistent with the different levels of credit given to different types of aerodynamics and tires. The various idle control technologies listed in the RIA have fuel consumption from the battery APU of almost zero to the diesel engine APU of approximately 0.3 gal/hr fuel consumed and also emit different amounts of GHG.

A complete chart in Appendix B illustrates MEMA's proposed modifications to Table 2-22 in the RIA. It shows the recommendation for credit based on the fuel consumption and GHG emissions of each technology. Using mid-idle figures, MEMA offers the following recommendation per technology (Figure II-4 is an excerpt from Appendix B):

Electrified Parking Spaces at truck stops have not been addressed for credits in this response. Even with the existence of equipped stops along the I-65 corridor and a few other areas, commercial truck drivers cannot count on a space being available when they need it even if some equipment exists at the stop. Considering the mandatory five minute shutdown that will be required, drivers will need to equip their trucks with idle reduction equipment such as FOHs and/or APUs, BACs and TACs. This will help ensure their safety if their out-of-service hours occur away from truck stops and/or if inclement weather or equipment failure leaves them stranded along the road. Once the truck is equipped with an idle reduction system, the Electrified Parking Spaces are of no additional value for credits. [EPA-HQ-OAR-2010-0162-1752.1, p.11] [EPA-HQ-OAR-2010-0162-1752.1, p.11]

Organization: California Air Resources Board (ARB)

The proposed regulation includes a 5 grams per ton-mile input as a credit for manufacturers that employ extended idle reduction technology as an enabling technology to meet the proposed CO2 standards for Class 8 sleeper cab tractors. This credit is based on the assumption that the manufacturer will employ diesel-fueled APUs to provide cab comfort to the sleeper cab. However, there are technologies such as battery-powered and thermal storage APUs that emit relatively lower CO2 as well as criteria pollutant emissions compared to the diesel-fueled APU. ARB staff recommends that the agencies encourage the use of zero or low emitting extended idle reduction technologies by allowing manufacturers to earn higher credit inputs to the GEM. ARB staff believes that the credit should be determined based on the amount of emissions eliminated by the technology while providing the same cab comfort amenities provided by the diesel-fueled APUs. For example, a battery-based APU together with a fuel-fired heater may be used to provide the same cab comfort amenities provided by a diesel-fueled APU while producing lower CO2 and criteria pollutant emissions.

Similarly, ARB staff recommends that the agencies require or incentivize Class 8 sleeper cab tractors to be equipped with electric plug-in capabilities to enable them to use grid power to reduce extended idling. ARB staff believes that mandating or incentivizing tractor plug-in capabilities would accelerate the installation of electrified parking spaces and would further encourage the purchase and use of cleaner battery electric-based APU technology.

ARB staff urges the agencies to establish a program for sleeper cab tractors that would incentivize the use of technologies that reduce thermal load, such as improved cab insulation, reflective window coatings, insulated curtains, etc. By reducing the thermal load on such vehicles, less energy would be required to maintain a comfortable temperature within the cab during rest periods, which would reduce fuel consumption and emissions of both greenhouse gases and criteria pollutants. Additionally, it would also drive the penetration of cleaner idle-reduction technologies, such as battery-powered APUs, thermal energy storage systems, etc., which have only seen limited application in the past due to their relatively limited cooling and/or heating performance. [EPA-HQ-OAR-2010-0162-2354.1, pp. 7-8]

Organization: Union of Concerned Scientists (UCS)

The current proposal gives credit for the use of auxiliary power units on tractor-trailers with sleeper cabs. The credits are based on the carbon dioxide (CO2) emissions reductions from using a diesel powered auxiliary power units (APUs). However, other options are available such as battery systems or plug-in options which provide comparable functionality while achieving varying levels of emissions reductions. At a minimum, extended idling alternatives other than diesel powered APUs should have a clearly defined path way to receive credited for additional benefits they may obtain. [EPA-HQ-OAR-2010-0162-1764.1, p.9]

<u>Response:</u>

The agencies recognize that the level of emission reductions provided by different IRT varies, but are adopting a conservative level to recognize that some vehicles may be sold with only an AES but may then install an IRT in-use. Some vehicles may be sold with one IRT but then choose to install alternative ones in-use. The agencies cannot verify the savings which depend on operator behavior. Further discussion of incentives is provided in Section 16 of this response document, Item 16.5.4.

6.2.2.3.4. Revise Calculation of Credit

Organizations Included in this Section:

Motor & Equipment Manufacturers Association
American Council for an Energy-Efficient Economy

Organization: Motor & Equipment Manufacturers Association (MEMA)

There are several issues that should be addressed regarding the idle reduction credit in the GEM Model for the combination tractor trailer vehicle category (Class 7 and 8). [EPA-HQ-OAR-2010-0162-1752.1, p.11-13]

The agencies assumed that the average Class 8 sleeper cab spends 1,800 hours in extended idle per year and travels about 250 days per year. MEMA recommends that the agencies use 2,500 annual hours for APUs and 1,250 annual hours for FOHs to better reflect real-world application and experiences. Our recommendations are based on the following reference information:

According to the agencies' data in the RIA of 250 days of travel, and that Class 8 sleeper truck drivers must have 10 hours out-of-service daily, idle time of 2,500 hours per year is reasonable for use of an idle reduction technology.

According to the data on the EPA SmartWay website, 2,400 hours per year is stated for idle hours on a Class 8 sleeper truck. "Some surveys say that trucks idle anywhere from 6-8 hours a day for as many as 250 to 300 days each year." /9/ Idling for 8 hours per day for 300 days per year equals 2,400 hours.

In the 2005 publication from Argonne National Laboratory, Comparing Emissions Benefits from Regulating Heavy Vehicle Idling the assumptions stated "Cab comfort devices were assumed to operate 7 hours per day, 303 days per year, except for the heater which runs 150 days per year." These calculations result in annual operation of 2,121 hours for APUs and 1,050 hours for the FOH. Also, the assumptions "Heater and current truck idling emissions and fuel consumption were derived from EPA (Lim, 2002) measurements, assuming 50% air conditioning and 50% heat."

The newly implemented Federal Motor Carrier Safety Administration (FMCSA) Compliance, Safety, Accountability (CSA 2010) driver guidelines reduce the number of hours that a driver is allowed to operate the truck each day by one to two hours. As a consequence, the truck would be out of service for 250 to 500 additional potential hours of idle or use of an idle reduction device especially with five-minute mandatory shutdown. This results in an increase over SmartWay's 2,400 hour idling hour figure to 2,650 to 2,900 hours.

The chart in Appendix B illustrates MEMA's proposed modifications to the RIA Table 2-22. It shows the recommendation for credit based on the recommended hours of operation for various APUs, FOHs, and combination units.

The RIA assumed that the main engine consumes about 0.8 gal/hr during idling. Based on the aforementioned Argonne report, EPA SmartWay, and actual field experience, MEMA recommends that 0.87 gal/hr fuel consumed by the main engine during idle be used in the calculations for credit. Our recommendations are based on the following reference information:

The midpoint data indicates the figure 0.87 gal/hr for mid-RPM idle with A/C on 50 percent of the time should be used as the fuel-consumption for a Class 8 sleeper truck 10

EPA's SmartWay program website states that idle fuel consumption is 0.82 gal/hr and acknowledges that high idle can consume more than 1.0 gal/hr /11/

In actual field operations, many truck drivers operate at higher RPMs during extended idle not only when operating the A/C system, but also to provide more power for hotel loads. In addition, truck drivers use high idle to minimize engine vibration while they are sleeping. Higher RPM at idle results in fuel consumption in excess of 0.8 gal/hr.

The chart in Appendix B illustrates MEMA's proposed modifications to the RIA Table 2-22. It shows the recommendation for credit based on the fuel consumption of 0.87 gal/hr of the main engine during idling.

---

[9] Reference: http://www.epa.gov/smartway/transport/what-smartway/idling-reduction.htm "What SmartWay Can Do for You," online 2011.

[10] Reference: http://www.transportation.anl.gov/pdfs/TA/361.pdf "How Much Could You Save by Idling Less?" U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, and the Argonne National Laboratory, 2006

[11] Reference: http://www.epa.gov/smartway/transport/calculators/calculatorexplanation.htm "SmartWay Technology Package Savings Calculator Explanation of Assumptions," online 2011. [EPA-HQ-OAR-2010-0162-1752.1, p.12]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The proposed credit is too high. The agencies' estimates of APU fuel consumption of 0.2 gallons per hour and truck engine idling fuel consumption of 0.8 gallons per hour should be revisited. Using chassis data from long haul trucks operating in California, Khan et al. observed a fuel consumption rate of 0.47 gal/hr for those equipped with electronic fuel injection.

Furthermore, Gaines observed 0.23 gal/hour of fuel consumption from APUs, on average. Assuming 0.50 gal/hr of fuel consumption from the main engine and 0.23 gal/hr of fuel consumption from APUs, an idle reduction credit of 2 grams per ton-mile would be more appropriate. It should also be noted however that, absent quality control measures, even less efficient idle reduction technologies might be installed in these vehicles for the express purpose of receiving credit for idle reduction.

The proposed credit of 5 grams per mile is a substantial part of the reductions the rule would require of the affected trucks. For example, a high roof sleeper truck would be required to reduce CO2 emissions by 16 grams per ton-mile (18%) from 89 grams per ton-mile in 2010 to 73 grams per ton-mile in 2014. Idle reduction thus represents one-third of the required reductions for 2014; so it is important that the estimate of savings from idle reduction be realistic.

Response:

The idle reduction credit value is based on the CO_2 emission and fuel consumption reduction from the technology when compared to main engine idling, as shown in Table 6-1. The agencies assume that the main engine consumes approximately 0.8 gal/hr during idling.[36] ACEEE argued that the agencies should use a fuel consumption rate of 0.47 gallon/hour for main engine idling based on a paper written by Kahn. MEMA argued that the agencies should use a main engine idling fuel consumption rate of 0.87 gal/hr, which is the midpoint of a DOE calculator reporting fuel consumption rates from 0.64 to 1.15 gal/hr at idling conditions, and between 800 and 1200 rpm with the air conditioning on and off, respectively. Having reviewed these comments and the sources provided, the agencies continue to believe that 0.8 gal/hr is the best estimate for a main engine idling fuel consumption rate. In the Kahn paper cited by ACEEE, the author states that while idling fuel consumption is 0.47 gal/hr on average for 600 rpm, CO_2 emissions increase by 25 percent with A/C on at 600 rpm, and increase by 165 percent between 600 rpm and 1,100 rpm with A/C on.[37] In addition, the presentation by Gaines, which is also mentioned, provides idling fuel consumption rates ranging between 0.6 and 1.2 gallon/hour. Drivers typically idle at speeds greater than 600 rpm for heating or cooling, to provide power for accessories such as interior lights, and protect the engine from damage. Finally, both the Gaines study and the NAS report cited in the RIA use 0.8 gallon/hour. Therefore, the agencies are adopting a main engine idle fuel consumption rate of 0.8 gallon/hour. Using a factor of 10,180 grams of CO_2 per gallon of diesel fuel, the CO_2 emissions from the main engine at idle is 8,144 g per hour.

[36] Gaines, L., A. Vyas, J. Anderson. Estimation of Fuel Use by Idling Commercial Trucks. 2006. Page 9.
[37] Kahn,AB, M, N. Clark, G. Thompson, W.S. Wayne, M. Gautam, and D. Lyons. Idle Emissions from Heavy-Duty Diesel Vehicles: Review and Recent Data. 2006. Journal of Air and Waste Management Association. Page 1416.

The agencies assumed the average Class 8 sleeper cab spends 1,800 hours in extended idle per year to determine the idling emissions per year.[38] MEMA recommended using 2,500 hours per year for APU operation, citing the SmartWay website which uses 2,400 hours per year (8 hours per day and 300 days per year), and an Argonne study which assumed 7 hours per day and 303 days per year, which equals 2,121 hours per year. MEMA also cited the FMCSA 2010 driver guidelines, which reduce the number of hours driven per day by one to two hours, which would lead to 2,650 to 2,900 hours per year in total.

The agencies reviewed these and other studies to quantify idling operation. The 2010 NAS study assumes between 1,500 and 2,400 idling hours per year.[39] Gaines uses 1,800 hours per year.[40] Brodrick, et al. assumes 1,818 hours per year (6 hours per day for 303 days per year) based on an Argonne study and Freightliner fleet customers.[41] An EPA technical paper states between 1,500 and 2,400 hours per year.[42] Kahn uses 1,830 hours as the baseline extended idle case.[43] Based on the literature, the agencies are finalizing as proposed the use of 1,800 hours per year as reasonably reflecting the available range of information.

The agencies then assumed the average Class 8 sleeper cab travels 125,000 miles per year (500 miles per day and 250 days per year) and carries 19 tons of payload (the standardized payload finalized for Class 8 tractors) to calculate the baseline emissions as 6.2 grams of CO_2 per ton-mile. The agencies proposed that the fuel consumption of a diesel-fueled APU would be used to quantify the fuel consumption and CO_2 emissions reduction of engines using an AES. The agencies assumed APUs consume approximately 0.2 gallon of diesel fuel per hour.[44] ACEEE argued that the agencies should use a fuel rate of 0.23 gal/hour for the APU (based on Gaines presentation). In response, the agencies reviewed the NAS study which lists 12 APUs and their associated fuel consumption, which ranged between 0.04 and 0.40 gal/hour. The average in the NAS report is 0.2 gal/hour.[45] Due to the range of fuel consumption of APUs and the precision of the available test information, the agencies are finalizing as proposed an APU fuel consumption of 0.2 gal/hr, which is consistent with ACEEE's comment.

---

[38] Gaines, L., A. Vyas, J. Anderson. Estimation of Fuel Use by Idling Commercial Trucks. 2006. Page 7.
[39] National Academy of Science. Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles. March 2010. Page 124.
[40] Gaines' L., A. Vyas, J. Anderson. Estimation of Fuel Use by Idling Commercial Trucks. 2006. Page 6.
[41] Brodrick, C., T.Lipman, M. Farshchi, H. Dwyer, S. Gouse III, D.B. Harris, and F.King, Jr. Potential Benefits of Utilizing Fuel Cell Auxiliary Power Units in Lieu of Heavy-Duty Truck Engine Idling. 2001. Page 3.
[42] Lim, Han. Study of Exhaust Emissions from Idling Heavy-Duty Diesel Trucks and Commercially Available Idle-Reducing Devices. EPA420-R-02-052. 2002. Page 2.
[43] Kahn,ABM, N. Clark, G. Thompson, W.S. Wayne, M. Gautam, and D. Lyons. Idle Emissions from Heavy-Duty Diesel Vehicles: Review and Recent Data. 2006. Journal of Air and Waste Management Association. Page 1405.
[44] National Academy of Science. Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles. March 2010. 2010. Page 122 says the best in class APU consumes 0.18 gallon per hour.
[45] National Academy of Science. Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles. March 2010. Page 124.

The CO_2 emissions from the APU equate to 1.5 grams per ton-mile. Therefore, the agencies are finalizing an idle reduction credit of 5 g CO_2 per ton-mile (0.5 gal/1,000 ton-mile) which represents the difference in emissions and fuel consumption between the main engine idling and operation of an APU. Credits are based on the requirement that all Class 8 sleeper cabs shall be equipped with an automatic engine shutdown. The credit reflects a technology's fuel consumption in conjunction with a shutdown.

Table 6-1: Idle Emissions Reduction Calculation

	Idle Fuel Consumption (gal/hour)	Idle CO_2 emissions per hour	Idle Hours per Year	Idle CO_2 Emission per year (grams)	Miles Per Year	Payload (tons)	GHG Emissions Due to Idling (g/ton-mile)	GHG Reduction (g/ton-mile)	Fuel Consumption Reduction (gal/1,000 ton-mile)
Baseline	0.8	8,144	1,800	14,659,200	125,000	19	6.2		
Idle Reduction Technology	0.2	2,036	1,800	3,664,800	125,000	19	1.5	5	0.5

6.2.2.3.5. Reconsideration of 100% Application Rate

Organization: Engine Manufacturers and Truck Manufacturers Associations

The proposed standards assume 'a 100 percent application rate for this technology for Class 8 sleeper cabs.' (See 75 FR at 74223.) If the CO2 emission standards are set assuming 100% adoption, then theoretically 100% of the vehicles must utilize the technology and there is no opportunity to earn 'credit' for adopting it. Further, achieving a 100% penetration rate is not realistic, particularly when the Agencies acknowledge that currently only 30% of sleep cab tractors utilize the technology. The proposed standards should be based on a more achievable penetration rate for the idle reduction technologies, something greater than 30% but less than 100%. [EPA-HQ-OAR-2010-0162-1940.1, p.28]

Response:

The agencies re-evaluated the proposed 100 percent application rate and determined that a 100 percent application rate for automatic engine shutdown technology for Class 8 sleeper cabs remains appropriate, even though the current fleet is estimated to have a 30 percent application rate for AES. Automatic engine shutdown technology is available today from all engine manufacturers, and therefore does not require significant lead time. The agencies are unaware of reasons why AES could not be applied to all tractors with a sleeper cab in the available lead time, and the commenter does not cite any reason other than the current application rate of the technology.

6.2.2.3.6. Giving Credit for IRT Without AES

Organizations Included in this Section:

Daimler Trucks North America
American Trucking Associations, Inc.

Organization: Daimler Trucks North America (DTNA)

As discussed below, some customers may not select an idle shutdown timer because of a fear that at some times and in some places idling may be necessary for safety. On the other hand, the customer may intend to limit idling in other than emergency situations. These customers are easily identifiable because they purchase an APU or Park-Smart system. These devices are expensive and would not be purchased if they are not intended to be used. Accordingly, the regulation should be modified to allow the idle reduction credit to be applied for any vehicle that includes an APU or Park-Smart system, even if the vehicle does not include a idle shutdown timer.

In the past, EPA has not given credit to Optimized Idle (OI), for example, in the list of technologies exempted from the Federal Excise Tax. OI saves fuel compared to prolonged engine idling, so the Agencies should give OI fuel- and CO2-credit. The criteria that the EPA used in determining which technologies qualify for the FET exemption were:

1. is affixed to a tractor;

2. is designed to provide services (such as heat, air conditioning, and/or electricity) to the vehicle or equipment that would otherwise require the operation of the main drive engine while the vehicle or equipment is temporarily parked or remains stationary; and

3. reduces unnecessary idling of such vehicle or equipment.

OI is part of engine software, so it is affixed to the engine. It provides capability to keep sleeper cab conditions within a desired temperature range and to do so with a minimum of engine idling. By keeping engine idling to a minimum, it reduces “unnecessary idling.” Accordingly, OI meets all three FET exemption criteria. Further, it very likely saves as much fuel as other idle reduction options, like a gen-set APU that operates all night or like a battery-powered HVAC system that gets its power from having the engine’s alternator charge the batteries. OI is an excellent fuel saving technology which the Agencies should encourage by allowing the same credit allowed for including an idle shutdown timer. [EPA-HQ-OAR-2010-0162-1818.1, p.96-97]

/ref/ Re.: http://www.epa.gov/smartway/transport/what-smartway/idling-reduction-fet-criteria.htm, last accessed Jan 10, 2011.

Organization: American Trucking Associations, Inc. (ATA)

The overriding presumption should be that if a fleet purchases an idling reduction device, the intent is to use the device and not to circumvent the myriad of local and state idling laws across the country. ATA is opposed to the installation of a mandatory, tamper-proof 5-minute shutdown device based upon safety and other concerns. ATA also recommends that a baseline "assumption" be built into the Greenhouse Gas Emission Model (GEM) that a vehicle equipped with an idling reduction device will not idle for more than 5-minutes. Vehicle manufacturers should be credited with the same efficiency benefits afforded as if such a mandated 5-minute shutdown device was installed on the vehicle. [EPA-HQ-OAR-2010-0162-2263.1, pp.5-6]

Response:

Use of an AES ensures the main engine will be shut down, whereas idle reduction technologies alone do not provide that level of certainty. Without an automatic shutdown of the main engine, actual savings would depend on operator behavior and thus be essentially unverifiable. The agencies are therefore finalizing the GEM input for idle reduction as proposed, along with the automatic engine shutdown requirement. The agencies accept that the other idle technologies may provide worthwhile reductions but are unable to define upfront through test procedure a method to address these technologies that inherently involve driver decision. Instead, we can consider these other idle reduction technologies as part of the innovative technology program.

6.2.2.3.7. Offering Exceptions and Overrides

Organizations Included in this Section:

American Trucking Associations, Inc.
Daimler Trucks North America
Cummins, Inc.
California Air Resources Board
Truck Renting and Leasing Association
Engine Manufacturers and Truck Manufacturers Associations

Organization: American Trucking Associations, Inc. (ATA)

ATA does not support the proposed deployment of a tamper-proof, automatic engine shutdown devices. According to the proposal, all Class 8 sleeper cabs must include 5-minute engine shutdown devices without override capabilities. While ATA supports efforts to reduce unnecessary idling, the mandatory use of this technology warrants additional considerations. Complicating this approach are the various state and local idling regulations which are currently in place. While such idling limits range from 0 to 15 minutes, a variety of exemptions and exclusions are made for emergency vehicle use, ambient air temperatures, traffic congestion, routine maintenance, and other activities which the rule does not address. Given the multitude of exemptions and exclusions deemed necessary by state and local governments, a 5-minute engine shutdown device without override capabilities is too simplistic to address real world operating situations by fleets. Such stringency in the agencies' approach will lead fleets to purchase idling reduction equipment in after-markets to enable them to regulate their engine shutdown capabilities. [EPA-HQ-OAR-2010-0162-2263.1, pp.5-6]

In 2006, the California Air Resources Board (CARB) adopted a regulation mandating 5-minute engine shutdown devices for heavy-duty diesel engines. The California regulation provides additional flexibilities when the parking brake is not engaged as well as a prescribed warning and reset system. In addition, specific override conditions are identified such as when operating in a power take-off mode, engine coolant drops below a certain temperature, exhaust controls need to regenerate, and performing maintenance. While ATA does not offer an opinion as to the adequacy of these additional flexibilities, they serve to highlight the fact that the projected 100% penetration rate may be overly optimistic and additional flexibilities or alternatives are needed. [EPA-HQ-OAR-2010-0162-2263.1, p.6]

California also provides an "in-lieu-of idling" emission standard that allows engine manufacturers to forego the use of automatic shutdown systems. Based upon a review of California certification orders, few heavy-duty diesel engines currently incorporate a 5-minute shutdown system, and instead, comply by way of the in-lieu-of standard. ATA believes this reflects customer demand which may be driven by a desire to maintain flexibility with regards to engine operations. Many of these customers employ management systems which allow them to monitor and take proactive steps to reduce engine idling, such as deploying idle reduction technologies. [EPA-HQ-OAR-2010-0162-2263.1, p.6]

Organization: Daimler Trucks North America (DTNA)

Agency regulations should exempt from shutdown engines in DPF re-generation or extreme cold conditions. In other words, a vehicle with an idle shutdown timer should be able to operate as necessary for service and warm-up reasons yet get credit based upon the overwhelming likelihood that it will not idle more than five minutes.

As discussed below, some customers may not select an idle shutdown timer because of a fear that at some times and in some places idling may be necessary for safety. On the other hand, the customer may intend to limit idling in other than emergency situations. These customers are easily identifiable because they purchase an APU or Park-Smart system. These devices are expensive and would not be purchased if they are not intended to be used. [EPA-HQ-OAR-2010-0162-1818.1, p.96-97]

Organization: Cummins, Inc

Currently, there exist fleet trimmable limitations to the idle shutdown timers. These include trims that require the parking brake be set and allow idle operation during extreme ambient temperature conditions. It is important to allow these safety exclusions if the Agencies would like to see broad market adoption.

Organization: CARB

If warranted, the agencies could consider allowing for a manually-activated override mechanism that would automatically deactivate when the driver either depresses a pedal, changes gears, or manually shuts down the engine. However, the agencies should ensure that override mechanisms are designed in a manner that discourages discretional idling. Some possible strategies include requiring the driver to depress an override button for a pre-determined period of time (e.g. , 10 seconds) or only allowing the override to be engaged in a predetermined window of time after stopping (e.g. , a 30-second window following four minutes of continuous idling).

Organization: Truck Renting and Leasing Association (TRALA)

TRALA is concerned that aspects of the Proposed Standards could be interpreted to put lower vehicle emissions ahead of driver well-being and safety.

With respect to the use of idle reduction technologies, for example, the Proposed Standards would 'require an automatic main engine shutoff after 5 minutes to help ensure the idle reductions are realized in-use' (75 Fed. Reg. at 74185). Imposition of such an arbitrary requirement could negatively impact driver well-being and safety in a variety of situations, such as extreme cold environments, break-downs and the like. TRALA is opposed to the inclusion of controls on idle reduction technologies that put drivers at risk. [EPA-HQ-OAR-2010-0162-1816.1, p.7]

Organization: EMA-TMA

In addition, extended idle reduction technologies must have features to safeguard the driver and allow it to be modified for unforeseen uses of the vehicle in the secondary market. The Preamble states that to comply with the standard, the idle reduction technology must be rigidly designed to shut down the engine 'without override capability.' (See 75 FR at 74223.) That requirement is too rigid. First, such systems should only shut down the engine when the parking brake is set. Otherwise, it may shut off the engine when the vehicle is stuck in traffic or waiting to maneuver during loading or unloading. Second, the proposed standard ignores the need to idle the vehicle's engine in extremely cold and hot weather conditions to provide heat or A/C for the driver and power for the vehicle's lights, or to charge a weak battery. Accordingly, the regulations should allow the systems to be flexible during hot and cold ambient conditions, and when the battery charge is too low. [EPA-HQ-OAR-2010-0162-1940.1, p.28]

Response:

The agencies have considered the many comments raising concerns about the proposed mandatory 5 minute automatic engine shut down without override capability. To avoid unintended adverse impacts, we are adopting limited override provisions for the following conditions: during exhaust emissions control device regeneration, during engine servicing and maintenance, when battery state of charge is too low, in extreme ambient temperatures, when engine coolant temperature is too low, and during PTO operation.

The California Air Resources Board (CARB) currently has an anti-idling rule for all medium-and heavy-duty vehicles, with several override provisions. The agencies find that four of CARB's override provisions are appropriate for the scope of this program – addressing long-term idling of Class 8 sleeper cab tractors - and are adopting similar provisions in this final HD National Program. CARB's anti-idling rule allows overrides for regeneration, engine/vehicle servicing, low coolant temperature and PTO operation. In addition, the agencies are adopting two override provisions that are not from CARB's rule: low battery state-of-charge and extreme ambient temperatures; which were reasonably requested by several of the industry commenters. More detail about each of these can be found in the RIA Chapter 2, Section 2.5.4.3. The regulatory text defining these overrides can be found at 40 CFR 1037.660.

6.2.2.3.8. Defining Tamper Resistant Idle Shutdown Timers

Organizations Included in this Section:

Daimler Trucks North America
Cummins, Inc

Organization:
Cummins, Inc.

Cummins is keenly interested in the vehicle speed limiter (VSL) and idle shutdown timer as these elements of the vehicle program will be handled by the engine. Cummins requests that the Agencies clarify their intent for tamper-resistant vehicle speed limiters and idle shutdown.

The Agencies should change the regulatory language to clarify that the VSL and idle shutdown trims should be tamper-resistant rather than tamper-proof. [EPA-HQ-OAR-2010-0162-1765.1, p.30-31]

Organization: Daimler Trucks North America

DTNA Believes Its Current Idle Shutdown Timers Meet The Agencies' Requirement For Tamper-Resistance Or For Being Tamper-Proof. If Not, The Agencies' Regulation Would Require Development Of New Technology And Change Of Product Plans, May Not Be Available For Early Credit Generation In Model Year (MY) 2013. [EPA-HQ-OAR-2010-0162-1818.1, p.96]

Current idle shutdown timers are tamper-resistant, although not tamper-proof in the sense that an extremely inventive vehicle operator may be able to (for example) fool the engine controller into believing the engine is not idling. We intend to offer idle shutdown timers like those used to satisfy CARB shutdown timer requirements, which we believe is consistent with the Agencies' intent that manufacturers be able to meet the 2014 standards using currently existing technologies. (75 Fed. Reg. 74172 and elsewhere.) In other words, we expect that our current idle shutdown timer technology will satisfy the Agencies' demand for tamper-resistance. If not, then we will need lead-time to develop new technologies. Changing engine controllers to include new and different tamper-resistant shut down timers might not be possible by early 2012, when the MY 2013 early credit generation is possible. Depending how much of change the Agencies demand (if you demand a change), that change might take much longer. DTNA Believes Its Current Idle Shutdown Timers Meet The Agencies' Requirement For Tamper-Resistance Or For Being Tamper-Proof. If Not, The Agencies' Regulation Would Require Development Of New Technology And Change Of Product Plans, May Not Be Available For Early Credit Generation In Model Year (MY) 2013. Current idle shutdown timers are tamper-resistant, although not tamper-proof in the sense that an extremely inventive vehicle operator may be able to (for example) fool the engine controller into believing the engine is not idling. We intend to offer idle shutdown timers like those used to satisfy CARB shutdown timer requirements, which we believe is consistent with the Agencies' intent that manufacturers be able to meet the 2014 standards using currently existing technologies. (75 Fed. Reg. 74172 and elsewhere.) In other words, we expect that our current idle shutdown timer technology will satisfy the Agencies' demand for tamper-resistance. If not, then we will need lead-time to develop new technologies. Changing engine controllers to include new and different tamper-resistant shut down timers might not be possible by early 2012, when the MY 2013 early credit generation is possible. Depending how much of change the Agencies demand (if you demand a change), that change might take much longer. [EPA-HQ-OAR-2010-0162-1818.1, p.96]

Response:

In response to the comments about how the agencies will evaluate tampering, NHTSA and EPA have added a number of requirements in the final rules relating to the AES, and also to the VSL features. The agencies encourage manufacturers to use good engineering judgment to ensure that these features are tamper resistant. General regulatory provisions that apply with respect to adjustable parameters also apply to the AES system operating parameters. EPA has defined some parameters relating to AES that are not adjustable features, at 40 CFR 1037.660(d). See the preamble at Section II.B.3(g) for a discussion of tampering with respect to VSL.

6.2.2.3.9. Providing an Expiration Date for AES

Organization: EMA-TMA

Finally, the regulation should allow manufacturers to program an 'expiration date' (based on time in service or mileage) into the automatic engine shutdown feature, after which it could be reprogrammed by the vehicle owner or service outlet. Similar to the 'expiration date' for vehicle speed limiters, the Agencies should upgrade GEM to allow manufacturers to input an 'expiration date' for the extended idle reduction feature so that it can adjust the modeled CO2 emissions reduction to account for the 'expiration date.' [EPA-HQ-OAR-2010-0162-1940.1, p.28]

Response:

The agencies recognize that automatic engine shutoff may impact the resale value of tractors and, in response to comments, are adopting provisions for the optional expiration of an AES. The agencies will discount the GEM input value of the AES based on the number of miles in which it is preset relative to the lifetime of the tractor. Thus, the initial buyer could select AES only for the expected number of miles before resale. The agencies calculated the lifetime miles of a combination tractor based on EPA's MOVES model as 1,259,000 miles. The discounting would be calculated in a similar manner as for vehicle speed limiters. The equation for determining the discount value for GEM input is found at 40 CFR 1037.660(c) and is described in the RIA, Chapter 2, Section 2.5.4.2.

6.2.2.3.10. PM standards for APUs

Organizations Included in this Section:

Clean Air Task Force
California Air Resources Board
American Lung Association & Environmental Defense Fund
Natural Resources Defense Council
American Council for an Energy-Efficient Economy
Union of Concerned Scientists

Organization: Clean Air Task Force (CATF)

Diesel-powered auxiliary power units ("APUs") offer significant fuel savings and carbon dioxide ("CO2") emission reduction benefits. However, diesel engines used to power APUs do not meet the same criteria pollutant emission standards as the main engine. As a result, the particulate matter (PM) emissions from a diesel fueled APU meeting the Tier 4 off-road engine standards will emit more than 5 times the PM emissions of an idling 2010 compliant on-road heavy-duty engine. To address this issue, the California Air Resources Board (CARB) requires diesel powered APUs to obtain equivalent or better particulate matter emissions than the main engine through the use of a diesel particulate filter or another alternative means. There are three manufacturers offering particulate matter filters for diesel fuel APUs.

EPA noted, as part of its evaluation of the Rule's net impacts on PM emissions, a net increase in overall PM emissions from the increased use of diesel fuel APUs. Diesel particulate matter is a toxic air pollutant that is linked to serious human health impacts, up to and including premature death. Furthermore, an increase in diesel particulate emissions means an increase in emissions of black carbon, one of the largest contributors to climate change with a global warming potential over a 20 year period of about 2000 times that of CO2. Given the availability of technology to control PM emissions from diesel powered APUs, the potential health impacts to communities from elevated levels of PM emission from truck idling, the potent climate forcing nature of black carbon, and the existence of preventative measures already in place in California, EPA should require diesel powered APUs to achieve the same or better level of PM emissions as the main engine. [EPA-HQ-OAR-2010-0162-2734.1, pp.7-8]

Organization: California Air Resources Board (ARB)

The proposed regulation assumes the use of extended idle reduction technologies including diesel-fueled auxiliary power units (APU) as enabling technologies to meet the CO2 standards for Class 8 sleeper cab tractors. However, as the agencies show in their inventory estimates, the use of diesel-APUs as an idle reduction technology would increase diesel particulate matter (PM) emissions while reducing CO2 and other criteria pollutant emissions. As a result, communities located downstream of emission sources (e.g., truckstops, warehouse and distribution centers, ports, etc) and drivers resting in the sleeper cabs, would be exposed to excessive diesel PM emissions from operating diesel-fueled APUs. The air pollution problem in these communities becomes exacerbated since many of these communities are environmental justice communities already disproportionately impacted by air pollution. Recognizing this issue, California currently requires diesel-fueled APUs operating in California to be equipped with Level 3 (filtering efficiency of 85 percent or more) diesel particulate filters (DPF). As a result, several APU and filter manufacturers have already verified their filters with ARB to meet this requirement. Since the technology already exists, ARB staff strongly urges the agencies to adopt similar standards for diesel-fueled APUs in this rulemaking. [EPA-HQ-OAR-2010-0162-2354.1, pp. 6-7]

Require Diesel Particulate Filters on Diesel-fueled Auxiliary Power Units. The proposed regulation assumes the use of extended idle reduction technologies including diesel-fueled auxiliary power units (APU) as enabling technologies to meet the CO2 standards for Class 8 sleeper cab tractors. However, as the agencies show in their inventory estimates, the use of diesel-APUs as an idle reduction technology would increase diesel particulate matter (PM) emissions while reducing CO2 and other criteria pollutant emissions. As a result, communities located downstream of emission sources (e.g., truckstops, warehouse and distribution centers, ports, etc) and drivers resting in the sleeper cabs, would be exposed to excessive diesel PM emissions from operating diesel-fueled APUs. The air pollution problem in these communities becomes exacerbated since many of these communities are environmental justice communities already disproportionately impacted by air pollution. Recognizing this issue, California currently requires diesel-fueled APUs operating in California to be equipped with Level 3 (filtering efficiency of 85 percent or more) diesel particulate filters (DPF). As a result, several APU and filter manufacturers have already verified their filters with ARB to meet this requirement. Since the technology already exists, ARB staff strongly urges the agencies to adopt similar standards for diesel-fueled APUs in this rulemaking. [EPA-HQ-OAR-2010-0162-2354.1, pp. 6-7]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

Auxiliary power units (APUs) are among the technologies available today to reduce fuel use from sleeper cab tractors due to idling. We request the agencies adopt more protective health-based diesel particulate matter (PM) emissions standards for these units to bring them in line with the truck engines they are relieving.

Reducing idling is an important step in reducing fuel consumption, GHG emissions and other airborne contaminants from diesel engines in sleeper cabs because they are estimated to idle 6-8 hours a day, as many as 250-300 days a year. EPA estimates that APUs can reduce fuel consumption and CO2 emissions from these engines by 6 percent. We support the inclusion of APUs as a technology option manufacturers can use to meet the proposed standards for sleeper cab trucks.

Auxiliary power units (APUs) are among the technologies available today to reduce fuel use from sleeper cab tractors due to idling. We request the agencies adopt more protective health-based diesel particulate matter (PM) emissions standards for these units to bring them in line with the truck engines they are relieving.

However, the diesel PM standards for diesel APUs, established under the nonroad rule, are not as protective as the truck engine standards for MY 2007 and later trucks, which require the use of diesel particulate filters (DPFs) or comparable alternative. This disparity allows diesel APUs to emit more than 5 times as much harmful diesel PM as a MY 2007 or later diesel sleeper cab engine. This increase in PM emissions will be particularly significant at idling “hotspots” like truck stops, travel centers, rest areas, distribution centers and port areas. Idling in these areas can create high concentrations of harmful diesel PM, threatening the health of drivers, truck stop, port and rest area workers and residents of neighboring communities, many of whom are often low income. In addition to the health impacts, diesel PM is made of primarily of black carbon, which is a potent greenhouse gas. We therefore request that the agencies put in place more protective PM emissions standards for these units to protect public health and the environment from the harmful impacts of diesel PM.

The California Air Resources Board recently established more protective standards for diesel APUs that require the use of diesel particulate filters or a comparable alternative, which reduce PM by as much as 85 percent and make APUs as clean as the truck engines they are attached to. CARB concluded that the technology to make these reductions is available and cost-effective. CARB has verified three diesel particulate filters that can be added to existing APUs and one new diesel APU that includes a DPF. [EPA-HQ-OAR-2010-0162-3129.1, p.13-14]

Organization: Natural Resources Defense Council (NRDC)

Diesel powered auxiliary power units (APUs) offer significant fuel savings and CO2 emissions benefits compared to main engine idling. However, the agencies note that the proposed rule results in a net increase in PM emissions from the increased use of diesel APUs (Table VII-3 of NPRM). Diesel engines used to power APUs do not meet the same criteria pollutant emission standards as the main engine. As a result, the particulate matter (PM) emissions from a diesel fueled APU meeting the Tier 4 off-road engine standards will emit more than 5 times the PM emissions of an idling 2010 compliant on-road heavy-duty engine.

Short- and long-term exposure to particulate matter pollution can have severe negative health impacts. Communities close to diesel vehicle and equipment operation suffer from high health risks due to PM exposure. To address this issue, the California Air Resources Board (CARB) requires diesel powered APUs to obtain equivalent or better particulate matter emissions than the main engine through the use of a diesel particulate filter or alternative means. There are three manufacturers offering particulate matter filters for diesel fuel APUs.

Given the availability of technology to control PM emission from diesel powered APUs, the potential health impact to communities from elevated levels of PM emission from truck idling, and the existence of preventative measures already in place in California, the agencies should require diesel powered APUs to achieve the same or better level of PM emissions as the main engine. [EPA-HQ-OAR-2010-0162-1776.1, p.12-13]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Gaines also observed that although APUs were saving fuel and reducing total NOx emissions, they have a negative effect on PM emissions compared to truck engine idling. It is not acceptable that the agencies would promote anti-idling approaches that increase diesel particulate emissions. Any tractor that is credited with fuel savings and emissions reductions for anti-idling should be required to demonstrate that its APU or other idling device will not emit particulate matter in excess of what the truck would emit at idle. This can be accomplished for example by equipping the APU with a particulate filter or by routing the APU's exhaust through the truck's emissions control system. [EPA-HQ-OAR-2010-0162-1894.1, p.8]

Organization: Union of Concerned Scientists (UCS)

Prevent Increases in Diesel Particulate Matter from Diesel APUs Diesel powered APUs offer significant fuel savings and CO_2 emissions benefits. However, diesel engines used to power APUs do not meet the same criteria pollutant emission standards as the main engine. As a result, the particulate matter (PM) emissions from a diesel fueled APU meeting the Tier 4 off-road engine standards will emit more than 5 times the PM emissions of an idling 2010 compliant on-road heavy-duty engine. [6]

To address this issue, the California Air Resources Board (CARB) requires diesel powered APUs to obtain equivalent or better particulate matter emissions than the main engine through the use of a diesel particulate filter or another alternative means. There are three manufacturers offering particulate matter filters for diesel fuel APUs.[7]

In the agencies evaluation of net impacts on PM emissions, they identify a net increase in overall PM emissions from the increased use of diesel fuel APUs. Diesel particulate matter is a local health pollutant and as a result, the health impacts of upstream and downstream PM emissions, which occur in different locations, are not equivalent. Communities near where diesel vehicles and equipment operate have the highest levels of exposure to diesel PM and suffer the greatest health risks from this pollution. Given the availability of technology to control PM emission from diesel powered APUs, the potential health impact to communities from elevated levels of PM emission from truck idling, and the existence of preventative measures already in place in California, the agencies should require diesel powered APUs to achieve the same or better level of PM emissions as the main engine. In addition, in assessing the overall impacts of the proposed standards, EPA must evaluate the localized impact of changes in particulate matter emissions from heavy-duty vehicles as a result of the standards. [EPA-HQ-OAR-2010-0162-1764.1, p.8-9]

---

[6] CARB estimates that the PM emission rate of a 2010 compliant main engine is .16 g/hr while a Tier 4 offroad APU diesel engine emissions rate is .87 g/hr. See Table 3 and Table 5 of Staff Report: Initial Statement of Reasons Notice of Public Hearing to Consider Requirements to Reduce Idling Emissions from New and In-Use Trucks, Beginning in 2008, California Air Resources Board, September 2005. Online at: http://www.arb.ca.gov/regact/hdvidle/isor.pdf

[7] See CARB verified devices listed at http://www.arb.ca.gov/msprog/cabcomfort/cabcomfort.htm

Response:

Under the Clean Air Act, APUs are considered nonroad engines, subject to different statutory provisions than those covering the highway motor vehicles and engines dealt with in this rulemaking. See CAA section 216 (11). Nonroad engines, including APUs, are subject to stringent Tier 4 PM standards that were set in 2004, and are now being phased in. More stringent PM standards for nonroad engines are not within the scope of this rulemaking.

6.2.2.4. Vehicle Speed Limiter

Organizations Included in this Section:

New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority
American Trucking Associations, Inc.
EMA/TMA
UPS
Daimler Trucks North America
Volvo

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

Speed governor technologies are 1) cost effective, 2) proven to reduce fuel consumption and emissions and 3) appear to be generally acceptable to the trucking industry. New York State believes that the use of vehicle speed limiters in Class 8 sleeper cab trucks would be an effective tool in reducing fuel consumption as these trucks travel long distances and could easily be set to a truck speed limit without compromising operational logistics. [EPA-HQ-OAR-2010-0162-2047.1, p.4]

Organization: American Trucking Associations, Inc. (ATA)

Reducing speed is a proven way to reduce GHG's and fuel consumption. To this end, ATA filed a petition with NHTSA and the Federal Motor Carrier Safety Administration (FMCSA) in October 2006 seeking a new federal requirement that electronic speed limiters on new trucks be incapable of being set at speeds greater than 68 mph. Subsequently, ATA's Sustainability Plan released in May 2008, and ATA's October 2008 Safety Task Force Report called for the enactment of a national 65 mph speed limit for all vehicles and the electronic governing of truck speeds at no more than 65 mph for all large trucks manufactured after 1992. [EPA-HQ-OAR-2010-0162-2263.1, p.8]

Organization: EMA/TMA

The proposed requirement that a vehicle speed limiter must be 'tamper-proof' (§1037.520(d)) is unrealistic and inconsistent with the Preamble discussion that the speed limiter must 'not be capable of being easily overridden by the fleet or the owner.' (See 75 FR at 74185.) Also, to ensure that the actual vehicle speed remains accurate in-use, owners must be able to reprogram inputs to the vehicle speed (e.g., tire radius, rear axle ratio, transmission gearing) to correspond with vehicle modifications that affect those inputs. Manufacturers also need to be able to program the speed limit setting to expire at a pre-determined point in time and/or to be exceeded for short periods of time or distance (i.e. .. a 'soft top' limit). [EPA-HQ-OAR-2010-0162-1940.1, p.27]

To address those issues, §1037.520(d) should be revised to require that the speed limiter be 'tamper resistant' instead of 'tamper proof.' (Only the maximum speed limiter setting entered into GEM should be tamper resistant; a slower speed limit should be easily programmable.) A requirement that the speed limiter be tamper resistant is consistent with the Agencies' stated intent that the setting not be capable of being easily overridden. One means of ensuring that the limiter is tamper resistant is to design the vehicle speed limit setting as a programmable feature that can only be controlled by the engine or vehicle manufacturer (in a manner similar to existing controls on engine programming that affect criteria pollutant emissions). [EPA-HQ-OAR-2010-0162-1940.1, p.27]

The regulatory text and/or Preamble should confirm that intentionally reprogramming the vehicle speed inputs (e.g., modifying tire radius, rear axle ratio, transmission gearing) to allow the vehicle to travel at higher speeds than the speed limiter setting would be considered illegal tampering. Similarly, the final rule should confirm that anyone who upgrades a vehicle component that has a corresponding input to the vehicle speed must also accurately adjust that input to the vehicle speed programming. [EPA-HQ-OAR-2010-0162-1940.1, p.27]

The final rule also should allow manufacturers to program an 'expiration date' (based on time in service or mileage) into the speed limiter, after which it could be reprogrammed by the vehicle owner or service outlet. In addition, the final rule should allow manufacturers to establish a 'soft top' speed limiter that would allow the driver to exceed the speed limit setting for short distances or short periods of time (e.g., in vehicle-passing or safety-related situations). In either case, GEM should be upgraded to allow manufacturers to input the parameters of the specific 'expiration date' and/or 'soft top' features, so it can adjust the modeled CO_2 emissions benefits to account for the use of those features. [EPA-HQ-OAR-2010-0162-1940.1, p.27]

Organization: UPS

UPS voluntarily uses speed limiters on its 16,000 Class 7 and 8 heavy tractors nationwide and has done so for over a decade, not only for safety reasons, but also as an effective means of improving fuel economy. With certain limited exceptions, these are set at 68 miles per hour. Our fuel tests show that for each mile per hour increase in speed above 60 miles per hour, a heavy truck loses one-tenth of a mile per gallon. On a heavy truck achieving only several miles per gallon, that is a considerable degradation in fuel economy with speed. [EPA-HQ-OAR-2010-0162-1763.1, p.1]

We believe that greater penetration of speed limiters in the truck fleet would significantly reduce national fuel consumption and engine emissions. As national fuel consumption is reduced, U.S. oil imports diminish, so the use of truck speed limiters is truly an energy security and environmentally beneficial measure. [EPA-HQ-OAR-2010-0162-1763.1, p.1]

The proposed rule treats speed limiters as a fuel-saving technology, but in a unique way. The proposed rule assumes a penetration rate of zero percent on new heavy trucks. That is, the proposed standards do not assume that any speed limiters are included by the truck manufacturer on new trucks. Thus, the Greenhouse Gas Emission Model (GEM) includes no fuel economy or emissions credit for speed limiters. Rather the rule leaves it to the truck purchaser to decide whether to accept the speed limiter and presumably to determine the specific speed setting that will be permanently imposed on the truck. Once the truck purchaser opts for inclusion of the tamper-proof speed limiter and chooses a permanent speed limit, then this set point is fed into the GEM, resulting in reduced greenhouse gas emissions and higher fuel economy attributable to that truck. This unique treatment of purchaser input for speed limiters in the proposed rule presents an opportunity to incentivize greater voluntary adoption of speed limiters in heavy trucks. [EPA-HQ-OAR-2010-0162-1763.1, p.1]

The agency discussion on the proposed rule states that the GEM shows that a speed limiter set at 62 mph would provide a 4 percent reduction in fuel consumption and CO2 emissions over the prescribed test cycles over a baseline vehicle without a vehicle speed limiter or one set at above 65 mph. (See Fed. Reg. at 74217) Under the proposed rule, this 4% enhancement in attributable fuel economy constitutes a benefit to the purchaser, but also to the manufacturer, either in compliance cost, or in valuable bankable and tradable credits. If the rule is implemented in a transparent way so that truck purchasers could see in advance how much benefit they will provide the manufacturer by opting for the tamper-proof governor at various speed set points, then the purchaser could perhaps use this in negotiating a lower price for the truck and in deciding whether or not to opt for a speed limiter and its set speed. If the value of this leverage due to the speed limiter exceeded the estimated diminution in truck resale value due to the inclusion of this feature, then the rule might spur truck purchasers to opt for tamper-proof speed limiters. We urge EPA and NHTSA to implement the rule with the truck purchaser in mind by providing some quantitative indications of the fuel economy and emissions reductions under GEM that stem from speed limiters at various set points. [EPA-HQ-OAR-2010-0162-1763.1, pp.1-2]

We note NHTSA has accepted a petition by the American Trucking Association to commence a rulemaking in 2012 to make tamper-proof speed governors mandatory on heavy trucks. The proposal would set the speed limiter at no less than 68 mph. Even if this proposed NHTSA rule is adopted in 2012, there would still be potential fuel economy and greenhouse gas emissions benefits under the GEM, where the speed set limit was voluntarily set lower than 68 mph. [EPA-HQ-OAR-2010-0162-1763.1, p.2]

UPS Urges That The Final Rule Permit Truck Purchasers to Decide Whether to Order the Truck With A Speed Limiter, What the Speed Set Limit Is, and Whether to Opt for Tamper-proof Speed Limiters Within the Rule, Or Adjustable Speed Limiters Outside the Rule. [EPA-HQ-OAR-2010-0162-1763.1, p.2]

The acquisition of a speed limiter on a new heavy truck is available at little or no cost today, but the proposed rule would create a new cost for the truck owner. The rule requires that the speed limiter be tamper-proof. (Currently, UPS, not the driver, can adjust the speed governor on its trucks, but this is done only after an internal review process for each truck and is limited to certain time-sensitive routes. Less than a thousand out of our 16,000 heavy tractors are involved in this exception. Even then the speed governor is set at no more than 72 mph.) The tamper-proof requirement will reduce the resale value of the truck, as the subsequent owner may object to the presence of this feature or to the specific setting of the permanent speed limit. This resale penalty could be quite significant, although for UPS this is perhaps less of an issue than for other truck purchasers because of the long service life of UPS trucks. [EPA-HQ-OAR-2010-0162-1763.1, p.2]

The rule as proposed would put the decision on the truck purchaser, not the manufacturer, to opt for the tamperproof speed limiter, so the truck purchaser, like UPS who uses speed limiters, could still decide to continue to procure adjustable speed limiters and opt against inclusion of tamper-proof speed governors on new trucks subject to the rule. Of course, if the speed limiter is adjustable, then under the rule as proposed, the GEM would not reflect a fuel economy and emissions reduction due to the presence of the speed limiter. [EPA-HQ-OAR-2010-0162-1763.1, pp.2-3]

Organization: Daimler Trucks North America

Vehicle Speed Limiters (VSLs) Should Not Necessarily Be Fixed To One Vehicle Speed But Should Allow For Short Periods Of Higher Speed Operation For Safe Passing. [EPA-HQ-OAR-2010-0162-1818.1, p.98]

Manufacturers must be allowed to offer to its customers multispeed VSLs for which manufacturers would appropriately prorate certification credits. Multispeed VSLs improve safety by allowing an elevated speed for a period of time when the operator must pass another vehicle and a lower speed limit would make passing more difficult or impossible. The multispeed logic limits the cumulative time that an operator can engage the feature over a fixed operation interval. For example the logic can be calibrated to allow an elevated vehicle speed for no more than 15 minutes during an 8 hour period of operating time. For a vehicle programmed in this manner, the manufacturer would discount the associated credits by prorating them according to the minimum fraction of total operating time that the vehicle speed would be constrained (i.e. representing the operator that always takes full advantage of the feature). In this case the credit at the lower speed would be multiplied by the factor of (480 – 15)/480 and the higher speed weighted by 15/480. [EPA-HQ-OAR-2010-0162-1818.1, pp.98-99]

The Agencies' Program Would Benefit From Flexibility For Manufacturers To Reprogram Customers' VSLs To Higher Or Lower Settings At Various Points In The Vehicles' Useful Lives. Such Flexibility Should Be Coupled To Incentives For Lower VSL Settings. [EPA-HQ-OAR-2010-0162-1818.1, p.99]

In the same way that many passenger car customers reputedly buy a vehicle suitable for the most extreme operation they expect during the vehicle's lifetime (and in turn unnecessarily sacrifice fuel efficiency through the remainder of the vehicle's operation during its lifetime), so might a HDV customer choose a VSL setting suitable for his fastest travel – unless he were offered an option that incents long periods of low speed VSL settings yet with flexibility for his most extreme needs. At times in a vehicle's useful life, a customer might need to increase a vehicle speed, for example upon sale to a second owner with a different type of operation. Rather than worsening resale values for vehicles with lower VSLs by limiting the second owners to which a VSL-equipped vehicle can be sold (which would decrease vehicle manufacturers' ability to sell such vehicles and in turn would diminish the potential effectiveness of the Agencies' regulations), the Agencies should allow reprogramming of the VSL. To keep Agency models of CO2 and fuel savings consistent with actual savings, however, manufacturers should be required to submit to the Agencies information about any VSL changes. Moreover, manufacturers should be given a disincentive for increasing VSL settings: they should lose CO2 or fuel consumption credits (or alternatively increase their deficits) when they increase a VSL speed setting. To keep credits aligned with actual emission and fuel consumption, the credit loss should be prorated by the mileage during which the increased speed is allowed. In other words, if a manufacturer increases a VSL setting for one quarter of the vehicle's useful life, the manufacturer should only suffer a quarter of the penalty as if they had used that higher VSL setting for the entire useful life. Such a program will incent minimization of times with high VSL settings, while still recognizing the need for occasional higher speed operation. [EPA-HQ-OAR-2010-0162-1818.1, p.99]

Credit loss or deficit increases should be applied to the year when the VSL is changed. VSLs may be changed long after the three-year window during which a manufacturer must balance a year's credits. In turn, a manufacturer could be forced to keep revisiting past years, which is a waste of effort. Moreover, by applying deficits to the year when the vehicle is built, rather than the year when the VSL is changed, the Agencies would be trying to account for credits or deficits before they have occurred. Rather, the Agencies should minimize the burden of reopening past compliance years and maximize their accuracy by debiting manufacturers in the year that manufacturers make a change. [EPA-HQ-OAR-2010-0162-1818.1, p.99]

What applies for increases in VSL settings equally applies for decreases. Incenting manufacturers and operators to tighten VSL settings (i.e., lower speed limits) requires (1) flexibility throughout a vehicle's useful life, (2) credits for reductions, and (3) recognition that credits should be applied to the year when a reduction is made, as opposed to applied retroactively. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

The Agencies' GHG/FE Program Requirements Should Be Aligned With Those In Other DOT Programs. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

We recommend that the same requirements that apply to VSLs in the DOT's speed limiter rule also apply to VSLs in the NHTSA/EPA FE/GHG rule. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

The Agencies Request Comment On Whether Technology Penetration Tables Should Be Revised To Include VSLs. We Agree With The Agencies' Decision Not To Include VSLs In The Penetration Tables. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

VSLs settings are frequently changed during a vehicle's lifetime (e.g., when fuel prices change, such that owners are willing to tolerate a higher or lower speed, or when a vehicle is sold to a new owner). In turn, manufacturers may not have accurate information about in-use VSL settings, such that we cannot properly respond were the Agencies to propose a nonzero VSL penetration. In turn, we agree with the Agencies' current approach of, for now, assuming zero penetration. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

Organization: Volvo

In order to reduce customers' reluctance to purchase vehicle speed limiters which are fixed or locked for the full vehicle life, Volvo Group proposes the following:

- Pro-rated credit (GEM input) based on VSLs which are locked only for the useful life (or some preset life) of the vehicle

- Pro-rated credit for VSLs which allow for a short period of increased speed in order to pass. For example, this could be an additional 2-5 mph for a short period a limited number of times per day. Currently Volvo offers a "Performance Bonus," where the computer keeps track of the driver's behavior and fuel economy performance and awards them with limited periods of time that the driver may exceed the vehicle speed limiter to pass.

We also believe the vehicle drive cycle unrealistically limits vehicle speeds to a maximum of 65 MPH. The Agencies should provide some credit for speed limiters set at 65 up to 67 MPH. [EPA-HQ-OAR-2010-0162-1812.2, p.41]

Response:

After carefully considering the comments, the agencies have decided, for these final rules, to retain most of the elements in the proposal. Tractor manufacturers will be allowed to implement a fixed maximum governed vehicle speed through a VSL feature and to use the maximum governed vehicle speed as an input to the GEM for certification.

The agencies have decided to adopt commenters' suggestions to allow adjustable lower limits that can be set and governed by VSLs independent of the one governing the maximum certified speed limit to provide the desired flexibility requested by the trucking industry. We believe that this flexibility would not decrease the anticipated fuel consumption/CO_2 benefits of VSLs because the adjustable limits would be lower values. Issues identified by the commenters, including the ability to change delivery routes requiring lower governed speeds or when a fleet's business practices change resulting in a desire for greater fuel consumption savings, are not in conflict with the purpose and benefit of VSLs. As such, the agencies have decided to allow a manufacturer to install features for its fleet customers to set their own lower adjustable limits below the maximum VSL limit specified by the agencies. However, for this first phase of the HD National Program, the agencies have decided to not allow any additional benefit in GEM to a manufacturer for allowing a lower governed speed in-use than the certified maximum limit because we can only be certain that the VSL will be at the maximum setting.

Both agencies also agree that manufacturers can provide a "soft top" and expiration features to be programmed into PCMs to provide additional flexibility for fleet owners and so that fleets who purchase used vehicles have the ability to have different VSL policies than the original owner of the vehicle. Although the agencies considered limiting the soft top maximum level due to safety and fuel consumption/GHG benefit concerns, we have decided to allow the soft top maximum level to be set to any level higher than the maximum speed governed by the VSL. This approach will provide drivers with the ability to better navigate through traffic. However, the agencies are requiring that manufacturers providing a soft top feature must design the system so it cannot be modified by the fleets and will not decrement the vehicle speed limit causing the vehicle to decelerate while the driver is operating a vehicle above the normal governed vehicle speed limit. For example, if a manufacturer designs a vehicle speed limiter that has a normal governed speed limiter setting of 62 mph, and a "soft top" speed limiter value of 65 mph, the algorithm shall not cause the vehicle speed to decrement causing the vehicle to decelerate while the driver is operating the vehicle at a speed greater that 62 mph (between 62 and 65 mph). The agencies are concerned that a forced deceleration when a driver is attempting to pass or maneuver could have an adverse impact on safety.

In using a soft top feature, a tractor manufacturer will be required to provide to the agencies a functional description of the "soft top" control strategy including calibration values, the speed setting for both the hard limit and the soft top and the maximum time per day the control strategy could allow the vehicle to operate at the "soft top" speed limit at the time of certification. This information will be used to derive a factor to discount the VSL input used in GEM modeling to determine the fuel consumption and GHG emissions performance of the vehicle. The agencies also agree with comments that VSLs should be adjustable so as not to potentially limit a vehicle's resale value. However, manufacturers choosing the option to override the VSL after a specified number of miles would be required to discount the benefit of the VSL relative to the tractor's full lifetime miles.

6.2.2.5. Tractor Weight

Organizations Included in this Section:

Motor & Equipment Manufacturers Association
Daimler Trucks North America
New York State Department of Transportation and Environmental Conservation
New York State Energy Research and Development Authority
American Chemistry Council
Volvo Group
Bendix Commercial Vehicle Systems, LLC
American Trucking Associations, Inc.
Hydro Aluminum
American Automotive Policy Council
ArvinMeritor, Inc.
Motor & Equipment Manufacturers Association

Organization: Motor & Equipment Manufacturers Association (MEMA)

The agencies should revisit the present assumptions relative to weight savings and to the cost of implementation. Based on information from an industry supplier of lightweight wheels, Figure II-1 documents the following weight data that are well-recognized and accepted by the commercial vehicle industry. Please note the comparison of the wheel weights provided in the Draft Regulatory Impact Analysis to the wheel weights as recognized by MEMA. (Note: For confirmation, these proposed weights were reviewed with OEMs and each concurred with following weight assessment.) [EPA-HQ-OAR-2010-0162-1752.1, p.9]

[Figure II-1 can be found on page 10 of this comment.]

Organization: Daimler Trucks North America (DTNA)

On 75 Fed. Reg. 74222, the Agencies seem to indicate that they will credit up to 670 lb for weight reduction. However, in the proposed regulatory text provides only up to 648 lb. §1037.520 at 75 Fed. Reg. 74393. [EPA-HQ-OAR-2010-0162-1818.1, p.95]

DTNA Agrees With The Agencies' Proposal To Leave Unchanged The Emission Standards For Engines And Vehicles Going To Guam, American Samoa, and The Northern Mariana Islands. [EPA-HQ-OAR-2010-0162-1818.1, p.24]

The Agencies Need Additional Methods For Manufacturers To Get Credit For Real Weight Reduction Measures, Because The Currently Proposed Regulations Incentivize Certain Weight Increases. [EPA-HQ-OAR-2010-0162-1818.1, p.95]

As discussed above in regard to aerodynamics, the currently proposed regulations could drive toward larger, heavier vehicles albeit with lower Cd's. Until the Agencies develop a program that fairly credits manufacturers for their vehicle's tare weight yet does not drive customers into improperly small vehicles, we recommend a measure analogous to that currently proposed for the weight of wheels and tires. If a manufacturer sells a tractor model with two Cd's coupled to two sizes of the same brand of engine, then the manufacturer should be able to petition the Agencies to always use the lower Cd, in recognition of the fact that the manufacturer will steer a customer to the higher Cd version of the vehicle in combination with the lower weight version of the engine. [EPA-HQ-OAR-2010-0162-1818.1, p.95]

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

New York State has two concerns regarding the implementation of single-wide tires; one involves safety and the other involves the effects on pavement integrity. Effects of single-wide tires on pavement are still being researched (TPF-5097) - The Impact of Wide-Base Tires on Pavement Damage: A National Study). Until research is concluded, design and use of single-wide tires should be minimized to prevent any large-scale damage to pavements beyond what is currently known to occur due to dual-tire use. A large-scale introduction of these tires might cause premature pavement disintegration and burden states and localities with increases in cost for pavement repairs. While New York State supports the introduction of fuel-saving tire assemblages for heavy-duty vehicles, these assemblages must not compromise the pavement because this result would be costly and result in greenhouse gas emissions from reconstruction and pavement repair activities and traffic detours. While the effect of single-wide tires on pavement is still being researched, NHTSA and EPA should formulate alternative credits for low-rolling resistance dual-tire assemblies. It is expected that research results will be available by 2013 and a more informed pathway on the topic can be made. Low-rolling resistance tires also are available in dual-tire assemblies and should be pursued as a viable option under the standards. [EPA-HQ-OAR-2010-0162-2047.1, pp.3-4]

One advantage of single-wide tires is reduced weight, resulting in fuel savings through greater cargo capacity and resultant mileage savings through trip reduction. NHTSA and EPA have not discussed weight savings obtained through weight reductions of other truck and trailer parts. With greater fuel efficiency, trucks may be able to operate with reduced fuel tank sizes. In New York State's opinion, the industry should be given incentives to obtain weight reduction measures on its own. [EPA-HQ-OAR-2010-0162-2047.1, p.4]

Organization: American Chemistry Council

Through agency support for basic research, emphasis programs, material standards and specifications, and statements of policy support, EPA and NHTSA should encourage the use of plastic and composites for light-weighting purposes in the rulemaking for medium and heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1631.1, p.2]

Lightweighting vehicles is one of the proposed strategies to achieve reduced GHG emissions and fuel consumption. We believe that this is an area where lightweight plastic composites can play a significant role in designing new medium- and heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1631.1, p.2]

Composites are a combination of tough plastic resins, reinforced with glass, carbon fibers and other materials. These plastic composites are lighter weight than traditional automobile materials, yet maintain high levels of strength and a high resistance to corrosion. Plastic and composite materials provide a new way to lighten vehicles while maintaining passenger safety and the integrity of the vehicle. Additional properties of plastics and composites – including strength to weight ratio, energy absorption and flexible design – make these materials ideal for use in the manufacturing of medium- and heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1631.1, p.2]

Illustrated in the chart below, the outstanding specific strength and stiffness of plastic and composites, functions of density, are beneficial qualities that provide the necessary long-term support for fleets of trucks and tractors. Graphite epoxy, also known as carbon fiber reinforced plastic, is commonly used in vehicles to replace traditionally heavier materials, such as steel. [EPA-HQ-OAR-2010-0162-1631.1, p.3]

[See p.3 of this comment summary for a chart displaying Strength and Modulus as a function of Density]

Even with the exhibition of increased strength and modulus in plastic and composites, the level of density is notably lower than that of its competitors. In fact, the density of graphite epoxy composites is about one fifth that of steel and half that of aluminum. Refer to the chart below for additional density comparisons among automotive materials. [EPA-HQ-OAR-2010-0162-1631.1, p.3]

[See p.4 of this comment summary for a chart displaying Density Comparison]

As vehicles across the board begin reducing weight to comply with the new GHG emissions standards and fuel efficiency standards proposed by this rulemaking, we will see new lightweight vehicle architectures emerge. Lightweight plastic and composites have the characteristics needed to deliver energy saving results while supporting innovative designs that satisfy consumer preference. [EPA-HQ-OAR-2010-0162-1631.1, p.4]

[For additional comments pertaining to plastics: Current Applications, Aerodynamic Benefits of Lightweight Plastic and Composites, and Delivering Safety see pp.4-6 of this comment summary]

Organization: Volvo Group

Volvo Group also disagrees with the assumption in Section II(B)(2)(a)(iii) of the NPRM preamble, which states that a 400-lb weight reduction estimate is appropriate. *See* 75 FR 74152, 74223. Without the use of single wide drive tires, a 6x4 tractor will have a maximum weight reduction of 300 pounds if the customer selects all ten wheels to be outfitted with light weight aluminum wheels. This is a very costly option for no measurable benefit. Through extensive testing and experience, Volvo Group has determined that to achieve an increase in fuel economy of 1%, the weight of a tractor must be reduced by approximately 3,000 lb (maintaining all other parameters), and that customers typically cannot measure fuel consumption improvements of less than 1%. [EPA-HQ-OAR-2010-0162-1812.2, p.15]

Section II(B) of the NPRM preamble, as well as sections 523.8 and 523.9 of the proposed rule, state that all vehicles with sleeper cabs will be classified as tractors. *See* 75 FR 74152, 74175 and 74437. Volvo Group objects to this generalization since many vocational straight trucks use sleeper cabs to comply with the DOT hours of service regulations. In fact, it is impossible to treat a straight truck as a tractor within the provisions of the rule, which require a tractor to be coupled with a specific trailer for aerodynamic evaluation. [EPA-HQ-OAR-2010-0162-1812.2, p.15]

Volvo Group believes that the vehicle weight reduction modeling input must take in to consideration a vehicle's axle configuration. In the case of a 4x2 tractor, there is significant weight reduction over a customer selecting a 6x4 tractor which is not credited. For example, if the end user specified a 4x2 tractor with all light-weight aluminum wheels and super single drive tires, the weight savings would only be credited as 354 lbs (from table 4 to 1037.520: 2 x 147 lbs for the rear axle and 2 x 30 lbs for the front axle), where the actual weight reduction over a comparable 6x4 tractor would be in excess of an additional 1,000 lbs due the removal of the rear axle, associated suspension components, rear tires and rims, and intermediate drive shaft and a shorter frame. In addition, many customers' applications require the addition of drop axles or additional drive or steer axles. In the situations where a customer must have the additional weight carrying capacity of additional axles to legally operate, there are additional weight savings that should be credited for the additional wheels that are on the vehicle (it is unclear whether this is credited in the model). It is the same for tire rolling resistance. If a customer specifies a 4x2 versus a 6x4 there is reduced rolling resistance which should be credited. As well, if the customer requires additional axles to operate legally the greater reduction in CO2 emissions and fuel consumption due to lowered rolling resistance on the additional axles should be credited. [EPA-HQ-OAR-2010-0162-1812.2, p.41]

Organization: Bendix Commercial Vehicle Systems LLC (Bendix)

Today's standard 46,000 lb GVWR or 52,000 lb GVWR Class 8 line-haul tractors use 15-inch diameter x 4-inch wide stamped steel "spider" drum brakes on the steer axle and a 16.5-inch x 7-inch stamped spider drum brake on the drive axle. As of August 2011, reduced stopping distance (RSD) will require that all 6x4 tractors with a GVWR under 59,600 lbs will have the larger brakes to meet the stopping distance requirements. There are air disc brake solutions that can offer a weight savings over these wider brakes. [EPA-HQ-OAR-2010-0162-1888.1, p.3]

The RSD drum brake configuration utilizes: 16.5-inch x 5-inch cast spider steer axle drum brakes and 16.5-inch x 7-inch stamped spider drive axle drum brakes, aluminum hubs and cast steel drums. [EPA-HQ-OAR-2010-0162-1888.1, p.3]

The air disc brake configuration (available today as well as for reduced stopping distance) utilizes: air disc brakes on all wheel ends, cast torque plates (instead of the spider a drum brake uses), aluminum hubs and splined disc rotors. [EPA-HQ-OAR-2010-0162-1888.1, p.3]

When comparing the drum braked vehicle that can meet reduced stopping distance with the air disc braked vehicle that can also meet the reduced stopping distance, the air disc brake equipped vehicle solution can offer 60 lbs of weight savings. Each vehicle configuration can vary in weight savings slightly, but the weight savings can be significant. [EPA-HQ-OAR-2010-0162-1888.1, p.3]

Organization: American Trucking Associations, Inc. (ATA)

The Preamble states that a 400-pound weight reduction estimate is an appropriate assumption per tractor if light-weight aluminum steer wheels and aluminum single-wide drive wheels and tire packages are utilized. Without the use of single wide drive tires, a 6x4 tractor will have a maximum weight reduction of 300 pounds if the customer selects all 10 wheels to be outfitted with light-weight aluminum rims. This is a very costly option for no measurable benefit. Through extensive testing and experience, one OEM has determined that to achieve an increase in fuel economy of 1%, the weight of a tractor must be reduced by approximately 3,000 pounds (maintaining all other parameters), and that customers typically cannot measure fuel consumption improvements of less than 1%. [EPA-HQ-OAR-2010-0162-2263.1, p.13]

Organization: Hydro Aluminum (Hydro)

We believe that manufacturers should be given credit for any and all weight reduction. As proposed by the Aluminum Association's Automotive Transportation Group (ATG), OEMs not only could certify to the baseline weight included in the GEM simulation data, but also reduce weight further using aluminum or other lightweight materials, and should receive credit for the difference. We understand the rationale for limiting weight reduction opportunities in the NPRM and we understand that the agencies are interested in additional ways to allow OEM's to take advantage of weight reductions. [EPA-HQ-OAR-2010-0162-1869.1, p.1]

More specifically, with regard to Class 7 and 8 trucks, we believe that weight reduction opportunities should not be limited to tires and wheels. Working with the constructors, Hydro has been deeply involved in the design, engineering, and on-going supply of a wide range of aluminum components – cab doors, cab sides and backs, steps, cab underbodies and frame rails, cooling fan shrouds, etc. – in order to improve economy, durability and load. These are proven light-weighting and performance enhancing solutions, yet there certainly are more on the horizon. [EPA-HQ-OAR-2010-0162-1869.1, p.1]

We believe that weight reduction using high-strength, low-weight materials such as aluminum offers real fuel economy and emissions benefits for the trucking industry, for shippers and for our nation. The NPRM represents a good start in recognizing those benefits. We urge the agency to give full consideration to the suggestions offered by the ATG, and other industry stakeholders in order to reap even greater savings in the final rule to be issued next year. [EPA-HQ-OAR-2010-0162-1869.1, p.1]

Organization: American Automotive Policy Council

The GEM model-based compliance method for Class 7-8 Tractors includes inputs for tire rolling resistance analogous to those for vocational vehicles. AAPC shares most of the same concerns and recommendations expressed above for the use of the input for Vocational Vehicles. [EPA-HQ-OAR-2010-0162-1762.1, p.21]

GEM model inputs for Class 7-8 tractors also include a weight reduction input that is exclusively related to wheel weight. This model input is a discrete value that is a function of wheel material type. AAPC recommends that the model be revised to allow for actual wheel weight to be input rather than simply a material type. This improved methodology would provide manufacturers with a more appropriate incentive to consider all possible ways to reduce the weight of their truck wheels. [EPA-HQ-OAR-2010-0162-1762.1, p.21]

Organization: ArvinMeritor, Inc.

Weight Reduction Options – The regulations generally do not account for lightweight vehicle options that (1) reduce rolling resistance due to lower tire loads; or (2) increase freight hauling capability, which translates into higher "freight efficiency." Discussions with EPA and several OEMs indicate that overall vehicle weight was eliminated as an input parameter due to the wide variation of weights even within a particular vehicle model. This is attributable to the common practice of offering many different engine, transmission, suspension, axle, and cab options, all of which affect vehicle weight. The objective of simplifying the regulations has the unintended consequence of eliminating a potentially significant parameter. [EPA-HQ-OAR-2010-0162-1605.1, pp.4-5]

Notably, weight differences in wheel and tire configurations are included as an input parameter. The apparent rationale is that tire and wheel options (such as a wide base single vs. traditional dual wheel) could apply to any manufacturer's truck regardless of the baseline weight. The "delta" or weight difference associated with a particular wheel and tire configuration is used to modify the generic vehicle weight coded into the simulation program. [EPA-HQ-OAR-2010-0162-1605.1, p.5]

ArvinMeritor believes that the means of dealing with tire and wheel weights was a simple but effective means of factoring lightweight options into the simulation. We believe that a similar approach could be taken for other lightweight options commonly used in heavy-duty commercial vehicles, including:

o Aluminum clutch housings

o Aluminum transmission cases

o Aluminum axle differential carrier case

o Aluminum hubs

o Lightweight, composite brake drums [EPA-HQ-OAR-2010-0162-1605.1, p.5]

We strongly recommend consideration be given to expanding the number of lightweight components considered in the GEM simulation program. Note that this approach does not consider the absolute weight of a particular OEM vehicle, so any concerns about the unintended consequence of penalizing a heavier than average tractor in the commercial marketplace are avoided. There would be no de facto pressure to move towards an aluminum cab versus the more common steel construction. [EPA-HQ-OAR-2010-0162-1605.1, p.5]

Organization: Motor & Equipment Manufacturers Association (MEMA)

MEMA applauds the agencies for including weight reduction via lightweight wheels and tires in the NPRM. However, there are additional weight-saving technologies available in the market today that have been ignored in the proposal and should be considered. As noted in the NPRM, the wide variety of options on a truck makes it difficult to create a baseline from which to measure. However, ultimately, truck manufacturers should receive credit in the GEM model for any and all weight reductions that do not compromise function and reliability. Without an incentive for implementing, these light weighting technologies may never make it on a commercial vehicle. [EPA-HQ-OAR-2010-0162-1752.1, p.9]

While all commercial vehicles are different, general assumptions can be made for additional components such as cab structures, frame rails and cross members, as well as fifth wheels. The GEM simulation model could then include a drop down menu, allowing for lightweight versions of these technologies to be selected so that the manufacturers receive credit. Admittedly, this might not be an exact measurement due to variances in design; however, applying a credit for a typical weight savings would serve the goal of the rulemaking in lieu of not allowing any credit at all. [EPA-HQ-OAR-2010-0162-1752.1, p.9]

Response:

In response to the above summarized comments, the agencies evaluated whether additional materials and components could be used as GEM inputs for compliance with the tractor weight reduction through the primary program. The agencies reviewed comments and data received in response to the NPRM and additional studies cited by commenters. A summary of this review is provided in the following paragraphs.

TIAX, in their report to the NAS, cited information from Alcoa identifying several mass reduction opportunities from material substitution in the tractor cab components which were similar to the ones identified by the Aluminum Association in their comments to this rulemaking.[46] TIAX included studies submitted by Alcoa showing the potential to reduce the weight of a tractor-trailer combination by 3,500 to 4,500 pounds.[47] In addition, The U.S. Department of Energy has several projects underway to improve the freight efficiency of Class 8 trucks which provide relevant data:[48] DOE reviewed prospective lightweighting alternative materials and found that aluminum has a potential to reduce mass by 40 to 60 percent, which is in line with the estimates of mass reductions of various components provided by Alcoa, and by the Aluminum Association in their comments and as cited in the TIAX report. These combined studies, comments, and additional data provided information on specific components that could be replaced with aluminum components.

With regard to high strength steel, the Iron and Steel Institute found that the use of high strength steel and redesign can reduce the weight of light duty trucks by 25 percent.[49] Approximately 10 percent of this reduction results from material substitution and 15 percent

[46] TIAX, LLC. "Assessment of Fuel Economy Technologies for Medium- and Heavy-Duty Vehicles," November 19, 2009. Pages 4-62 through 4-64.
[47] Alcoa. "Improving Sustainability of Transport: Aluminum is Part of the Solution." 2009
[48] Schutte, Carol. U.S. Department of Energy, Vehicle Technologies Program. "Losing Weight – an enabler for a Systems Level Technology Development, Integration, and Demonstration for Efficient Class 8 Trucks (SuperTruck) and Advanced Technology Powertrains for Light-Duty Vehicles"
[49] American Iron and Steel Institute. "A Cost Benefit Analysis Report to the North American Steel Industry on Improved Materials and Powertrain Architectures for 21st Century Trucks."

from vehicle re-design. While this study evaluated light-duty trucks, the agencies believe that a similar reduction could be achieved in heavy-duty trucks since the reductions from material substitution would likely be similar in heavy-trucks as in light-trucks. U.S. DOE, in the report noted above, identified opportunities to reduce mass by 10 percent through high strength steel.[50] This study was also for light-duty vehicles.

The agencies considered other materials such as plastic composites and magnesium substitutes but were not able to obtain weights for specific components made from these materials. We have therefore not included components made from these materials as possible substitutes in the primary program, but they may be considered through the innovative technology provisions. We may consider including these materials as direct inputs in a subsequent regulation if data become available.

Based on this analysis, the agencies developed an expanded list of weight reduction opportunities for direct inputs to the GEM in the final rulemaking, as listed in §1037.520 of the regulations. The list includes additional components, but not materials, from those proposed in the NPRM. For high strength steel, the weight reduction value is equal to 10 percent of the presumed baseline component weight, as the agencies used a conservative value based on the DOE report. We recognize that there may be additional potential for weight reduction in new high strength steel components which combine the reduction due to the material substitution along with improvements in redesign, as evidenced by the studies done for light duty vehicles. In the development of the high strength steel component weights, we are only assuming a reduction from material substitution and no weight reduction from redesign, since we do not have any data specific to redesign of heavy-duty components nor do we have a regulatory mechanism to differentiate between material substitution and improved design. We are finalizing for wheels that both aluminum and light weight aluminum are eligible to be used as light-weight materials – that is, tractor OEMs can input values for use of aluminum and light-weight aluminum directly into GEM. Aluminum, but not light-weight aluminum, can be used as a light-weight material for other components. The reason for this is data was available for light weight aluminum for wheels but was not available for other components.

Regarding the comment that single wide tires may impact pavement life, we would note as summarized later in this document that single wide tires are but one potential method to achieve weight reduction and low rolling resistance performance. Manufacturers can also comply using low rolling resistance single wide tires, or in fact, using a whole range of technologies to achieve the overall performance based standards.

The agencies received comments on the proposal from the American Chemistry Council highlighting the role of plastics and composites in heavy-duty vehicles. As they stated,

[50] Schutte, Carol. U.S. Department of Energy, Vehicle Technologies Program. "Losing Weight – an enabler for a Systems Level Technology Development, Integration, and Demonstration for Efficient Class 8 Trucks (SuperTruck) and Advanced Technology Powertrains for Light-Duty Vehicles"

composites can be low density while having high strength and are currently used in applications such as oil pans and buses. The DOE mass reduction program demonstrated for heavy vehicles proof of concept designs for hybrid composite doors with an overall mass savings of 40 percent; 30 percent mass reduction of a hood system with carbon fiber sheet molding compound; 50 percent mass reduction from composite tie rods, trailing arms, and axles; and superplastically formed aluminum body panels.[51] While the agencies recognize these opportunities, we do not believe the technologies have advanced far enough to quantify the benefits of these materials because they are very dependent on the actual composite material. The agencies may consider such lightweighting opportunities in future actions, but are not including them as part of this primary program. Tractor manufacturers which opt to pursue composite and plastic material substitutions may pursue credits through the innovative technology provisions.

With regard to Volvo's request that manufacturers be allowed to receive credit for trucks with fewer axles, the agencies recognize that truck options exist today which have less mass than other options. However, we believe the decisions to add or subtract such components will be made based on the intended use of the vehicle and not based on a crediting for the mass difference in our compliance program. It is not our intention to create a tradeoff between the right truck to serve a need (e.g. one with more or fewer axles) and compliance with our final standards. Therefore, we are not including provisions to credit (or penalize) vehicle performance based on the subtraction (or addition) of specific vehicle components.

The agencies continue to believe that the 400 pound weight target is appropriate for setting the final combination tractor CO_2 emissions and fuel consumption standards. The agencies agree with the commenter that 400 pounds of weight reduction without the use of single wide tires may not be achievable for all tractor configurations. The agencies have extended the list of weight reduction components which can be directly input to GEM in order to provide the manufacturers with additional means to comply with the combination tractors and to further encourage reductions in vehicle weight. The agencies considered increasing the target value beyond 400 pounds given the additional reduction potential identified in the expanded technology list; however, lacking information on the capacity for the industry to change to these light weight components across the board by the 2014 model year, we have decided to maintain the 400 pound target. The agencies intend to continue to study the potential for additional weight reductions in our future work considering a second phase of truck fuel efficiency and GHG regulations.

6.2.2.6. Strengthen Tractor Stringency

<u>Organizations Included in this Section:</u>

[51] Schutte, Carol. U.S. Department of Energy, Vehicle Technologies Program. "Losing Weight – an enabler for a Systems Level Technology Development, Integration, and Demonstration for Efficient Class 8 Trucks (SuperTruck) and Advanced Technology Powertrains for Light-Duty Vehicles"

Investor Network on Climate Risk
Union of Concerned Scientists
Investor Network on Climate Risk
Lim, Daniel
Business for Innovative Climate & Energy Policy
Clean Air Task Force

Organization: Investor Network on Climate Risk

In sum, we urge EPA and NHTSA to require the reduction of fuel use from long-haul trucks pulling van trailers by 35% by 2017. Standards for all other trucks should be set based on the technologies available to improve fuel economy across the entire vehicle. Such standards would help get our economy back on track by creating jobs and catalyzing investment in high efficiency truck manufacturing, as well as promoting energy security and reducing climate risk. It is time to move forward aggressively with policies that will optimize private investment in a low carbon economy. [EPA-HQ-OAR-2010-0162-3142.1, p.3]

Organization: Union of Concerned Scientists (UCS)

I urge you to finalize the strongest possible fuel economy and emissions standards for new trucks, utilizing all available technology to save fuel and cut pollution. With its 'UCS Convoy' model, the Union of Concerned Scientists has shown that truckers stand to gain tens of thousands of dollars in net savings if improvements are made to all of the components of trucks, including engines, trailers, tractors, and tires. And all Americans stand to gain from a significant reduction in oil use and pollution from this part of our transportation market. [EPA-HQ-OAR-2010-0162-0372_Mass, p.1]

- Maximize Benefits Standards should dramatically improve fuel efficiency of medium and heavy-duty vehicles to improve the nation’s energy security and reduce the threat of climate change. [EPA-HQ-OAR-2010-0162-1764.1, p.4]

Establishing strong standards will help drive technology innovation, move existing technologies broadly into the new vehicle fleet, increase jobs across the nation, and save truck owners money at the pump. The following recommendations would achieve greater fuel savings and emission reductions from the proposed tractor-trailer vehicle standards. [EPA-HQ-OAR-2010-0162-1764.1, p.7]

Organization: Investor Network on Climate Risk (INCR)

We commend EPA and NHTSA for the proposals under consideration, but by using existing and emerging technologies, we could realize even greater benefits in terms of economic growth and oil savings. We thus urge EPA and NHTSA to take into account all available technologies across the vehicle in setting standards, and to require a 35% reduction in fuel use by long-haul trucks pulling van trailers by 2017. We also urge the agencies to move aggressively to set standards for trailers for model year 2014, which will result in significant overall fuel savings for combination tractors. [EPA-HQ-OAR-2010-0162-1946.1, pp.1-2]

In sum, we urge EPA and NHTSA to require the reduction of fuel use from long-haul trucks pulling van trailers by 35% by 2017. Standards for all other trucks should be set based on the technologies available to improve fuel economy across the entire vehicle. Such standards would help get our economy back on track by creating jobs and catalyzing investment in high efficiency truck manufacturing, as well as promoting energy security and reducing climate risk. It is time to move forward aggressively with policies that will optimize private investment in a low carbon economy. [EPA-HQ-OAR-2010-0162-1946.1, p.3]

We thus urge EPA and NHTSA to take into account all available technologies across the vehicle in setting standards, and to require a 35% reduction in fuel use by long-haul trucks pulling van trailers by 2017. [EPA-HQ-OAR-2010-0162-3142.1, p.1]

Organization: Lim, Daniel

Technology is available to reduce pollution and fuel consumption for long haul freight trucks by as much as 35%. It is important that the new standards ensure the continued development and deployment of advanced technologies including engines, transmissions and hybrid systems.[EPA-HQ-OAR-2010-0162-3297_Mass, p.1]

Further, it is critical that standards for all vehicles, from large pickups to delivery vans to tractor trailers, be set at the strongest level possible. [EPA-HQ-OAR-2010-0162-3297_Mass, p.1]

Organization: Business for Innovative Climate & Energy Policy (BICEP)

In sum, we urge EPA and NHTSA to require the reduction of fuel use from long-haul trucks pulling van trailers by 35% by 2017. Standards for all other trucks should be set based on the technologies available to improve fuel economy across the entire vehicle. Such standards would help get our economy back on track by creating jobs and saving businesses money, as well as promoting energy security and reducing climate risk. [EPA-HQ-OAR-2010-0162-2165.1, p.2]

Organization: Clean Air Task Force (CATF)

We urge EPA to strengthen its proposal by taking full advantage of technology options to reduce fuel consumption and greenhouse gas emissions from heavy-duty highway vehicles, including those that are described in the recent comprehensive report by the National Academy of Sciences. In evaluating the technologies available to reduce fuel use and GHG emissions from heavy-duty engines and vehicles, EPA relied heavily on the NAS report, as well as other published reports and confidential discussions with engine and vehicle manufacturers. To a large extent EPA evaluated the same technologies evaluated by the NAS panel, but came to different conclusions about the potential fuel savings that would be available in the 2015 – 2018 time frame. [EPA-HQ-OAR-2010-0162-2734.1, pp.3-4]

A comparison of the NAS panel findings on the fuel savings potential for various types of trucks to EPA's proposed stringency levels for MY2018 (% reduction for MY2018 trucks compared to MY2010 trucks) in the HD GHG Rule is shown in Figure 1 below. As shown, EPA's proposed stringency levels are significantly lower than what the NAS panel indicated was possible. Thus: [EPA-HQ-OAR-2010-0162-2734.1, p.4]

[Figure 1 can be found on page 5 of this comment.]

- the NAS panel indicated that fuel use from combination trucks could be reduced by 50% in the 2015 – 2020 time frame, while the proposed Rule is mandating only a 20% reduction for MY2018; [EPA-HQ-OAR-2010-0162-2734.1, p.4]

- the NAS panel indicated that fuel use from vocational trucks could be reduced by 40-50% in the 2015 – 2020 time frame, while the proposed Rule is mandating only a 10% reduction for MY2018; and similarly, [EPA-HQ-OAR-2010-0162-2734.1, p.4]

These differences are attributable to two primary factors: 1) EPA judged some of the technologies included in the NAS report to not be technically feasible and/or cost effective for implementation by MY2018, and 2) to arrive at the potential fuel reduction figures the NAS report assumes essentially 100% penetration of all listed technologies fleet-wide, while EPA's proposed fleet average stringency levels assume more limited penetration rates for some technologies. [EPA-HQ-OAR-2010-0162-2734.1, p.4]

The NAS panel concluded that vehicle-based technologies, chiefly improved aerodynamics and reduced rolling resistance for both the truck and the trailer, could reduce fuel use from a combination truck by approximately 25%. Some of this benefit would also come from improved transmissions and hybridization, with hybrid benefits primarily based on reduction of over-night idling by sleeper cab-equipped trucks. By comparison, EPA is proposing to mandate approximately a 15% reduction in fuel use from these trucks based on application of vehicle technologies. These long-haul trucks are responsible for about two-thirds of the GHG emissions and fuel usage from the heavy-duty highway fleet, and therefore reductions from these trucks are especially important. [EPA-HQ-OAR-2010-0162-2734.1, p.6]

The other difference between EPA's proposed standards and what the NAS panel indicated was possible is that the NAS panel assumed virtually 100% penetration rates for the best available technologies. EPA assumes much lower penetration rates for MY2017. For sleeper cab-equipped trucks the relatively low assumed penetration rate of 10 -20% for the best aerodynamic technologies (Advanced SmartWay) is based on “limited lead time for the program and the need for these more advanced technologies to be developed and demonstrated before being applied across a wider fraction of the fleet.” We believe that EPA can and should use a much higher penetration rate for these technologies, since manufacturers will have 5 – 6 years to develop and test them prior to MY2017. [EPA-HQ-OAR-2010-0162-2734.1, p.7]

Response:

The agencies recognize that it is possible with additional lead time for manufacturers to achieve greater reductions. The agencies believe that it is more effective to drive improvements using existing technologies sooner, beginning in the 2014 model year, and follow up with later phases of a rulemaking to address additional improvements.

As discussed in preamble Section III and in earlier comment responses in this section dealing specifically with availability of waste heat recovery systems, the agencies do not believe that the technologies, such as waste heat recovery systems on engines and hybrid powertrains will be available for production by 2017 model year because they are still in the research and development phase. In addition, the agencies believe that certain technologies assumed in the NAS report to achieve the 35 percent reduction cited by commenters are already in the baseline assumed by the agencies (such as SCR aftertreatment), are outside the scope of this rulemaking (such as driver training), and would have required improvements from the trailers (such as aerodynamics and rolling resistance). Finally, we note the NAS analysis is in the context of the period through 2020 and focuses on single examples of vehicle classes rather than the wide range of actual vehicle applications. The NAS has effectively said here is what one tractor can accomplish by 2020. The NAS has not suggested that all tractors can accomplish this level of performance. The NAS did not directly consider the issue of mix use tractors for refuse or agricultural applications and the appropriateness of the technology packages for those vehicles. In essence, the NAS report shows what might be achievable for the best vehicles in the most ideal applications. The agencies however must make broader determinations regarding what the new fleet on whole can accomplish reflecting both the ideal applications (true coast to coast line haul operations) and the less than ideal (urban delivery and mix use offroad).

6.2.2.7. Tractor Technologies

Organization: National Automobile Dealers Association (NADA)

ATD is primarily concerned with the structure and application of the proposed standards for combination tractors, not with their stringency. In short, the proposal for this vehicle group aims to phase-in between MY 2012-17 engine and vehicle standards designed to achieve a 7-20 percent reduction in GHG emissions and fuel consumption over a 2010 baseline. The proposal tailors 18 standards to 9 categories of on-road combination tractors designed to pull box trailers.

These nine attribute-based categories reflect low-, mid-, and high-roof versions of Class 7 and Class 8 day cab tractors and Class 8 sleeper cabs. In addition, the proposal also phases-in 4 engine-only standards for medium-heavy-duty (MHD) and heavy-heavy-duty (HHD) engines. [EPA-HQ-OAR-2010-0162-2705, p.6]

The proposal contemplates that engine and chassis manufacturers will use existing technologies to meet the 18 attribute-based targets, at least in the early years. These technologies include advanced engine designs, anti-idling controls, aerodynamic cab designs, tractor weight reductions, and improved cab A/C systems. In theory, each time a tractor is sold, the chassis manufacturer will enter the vehicle's relevant characteristics into a GHG emissions model (GEM) which will then output data for use in calculating compliance. An average $6,000 per unit cost is associated with the combination tractor standards. [EPA-HQ-OAR-2010-0162-2705, p.6]

While most if not all major manufacturers indicate that they will have little difficulty achieving compliance with the proposed standards for this group in MY 2014, some apprehension is being expressed for the out years of the phase-in. As such, NADA/ATD requests that the rule provide for a mid-term "reality check" review aimed at determining if the standards continue to be appropriate, cost-effective, and technologically feasible. [EPA-HQ-OAR-2010-0162-2705, p.6]

Response:

EPA has adopted approaches such as a mid-term review for programs where we project long term standards. However, this program is focused on the near term reductions which can be achieved with existing technologies, and therefore, we believe that such a review is not necessary and could possibly create unintended uncertainty in the market.

Organization: Volvo

Mid-roof day cab tractors should have a higher GHG/FE target than low-roof day cab tractors based on increased frontal area resulting in increased drag *See* 75 FR 74383. While Volvo Group recognizes that these types of tractors currently do not exist in significant numbers, the standard should still be appropriate should a manufacturer decide to make such a product offering. In addition as we have discussed elsewhere, vehicle families are overly burdensome and irrelevant and vocational tractor standards must be considered. [EPA-HQ-OAR-2010-0162-1812.2, p.35]

Proposed 40 CFR § 1037.140(c) states that the roof height on an adjustable fairing should be taken with "the fairing in its lowest setting." *See* 75 FR 74152,74385. Adjustable roof fairings which allow aerodynamic optimization based on varying trailer height should get credit in these regulations. However, requiring roof height to be at the lowest setting means the tractor must meet the most stringent standard and receives no incentive for dynamic aero treatments. It is assumed that, since these technologies are currently available, they would not be treated as innovative technologies. In addition, EPA should clarify that a low or mid-roof tractor with a full height roof deflector is measured against the high roof bins. [EPA-HQ-OAR-2010-0162-1812.2, p.37]

In proposed 40 CFR § 1037.520(b)(2) and (3) Volvo Group opposes the use of the mean value of an aerodynamic bin. Instead, Volvo Group proposes use of the actual Cd value. "Good engineering judgment" is also not acceptable in proposed 40 CFR § 1037.520(b)(4). If the Agencies are to reject a Cd value determined from an alternate procedure it is imperative that manufacturers understand what criteria will be used for evaluation of the alternate procedure. Given the extreme importance of aerodynamics to a manufacturer's ability to meet the standard Volvo believes this deserves significant detail. [EPA-HQ-OAR-2010-0162-1812.2, p.37]

The aerodynamic bins in proposed 40 CFR § 1037.141 (75 FR 74385, 74386) are inconsistent with Cd tables in 75 FR 74182 and 74392 in that some vehicles that are Smartway certified can range up to the Advanced Smartway II bin without any additional technologies. In addition, it is not clear what is meant by a "fully enclosed roof fairing". If this is intended to mean that the rear of the fairing is closed, that would only be appropriate on a sleeper cab with an interior roof height matching the exterior outline of the fairing. [EPA-HQ-OAR-2010-0162-1812.2, p.37]

There are also significant issues with the way that the aerodynamic bins are defined. *See* 75 FR 74152, 74181-74182. The process for defining aero bins is based on first looking at the description of the vehicle (Conventional, Smartway, etc). The manufacturer is then required to perform testing to compare to the Agencies' expectations. There are three potential outcomes of this comparison:

- Predicted (table description) performance matches the observed (tested), the manufacturer uses the Cd value from the table.

- Observed is worse than predicted, the manufacturer uses the observed value. [EPA-HQ-OAR-2010-0162-1812.2, p.37]

- Observed is better than predicted, manufacturer must prove to the Agencies that they used "good engineering judgment" before the Agency will allow use of the better value.

- "if a manufacturer's test methods consistently produce Cd values that are better than projected by the Agencies, EPA and NHTSA can use this information to further scrutinize the manufacturer's test procedure, helping to ensure that all manufacturers are competing on a level playing field." [EPA-HQ-OAR-2010-0162-1812.2, p.38]

It is already known that many vehicles fall one to two bins better than the Agencies' expected values based on manufacturer test methods and this inconsistency between bins and industry measures results in a risk that there will not be a level playing field as noted previously. [EPA-HQ-OAR-2010-0162-1812.2, p.38]

Volvo Group therefore feels that the quantified bounds of each bin need to be revisited and redefined based on a methodology to be agreed on by the industry and EPA and discussed earlier. The bin definitions should be based on a percentage Cd difference rather than absolute Cd measure and, as noted elsewhere, actual vehicle frontal area should be used to establish a vehicles Cd, not a presumed frontal area. As also noted elsewhere, additional detail is needed in defining trailers to be used in the aero assessments in order to ensure commonality between OEM measures. In addition, it is important that manufacturers show clear engineering justifications showing proper correlation between analysis predictions and test methods. [EPA-HQ-OAR-2010-0162-1812.2, p.38]

Also, Volvo Group asks that proposed 40 CFR § 1037.105 and 1037.106 be clarified to say that any 2014 model year truck will be treated as if it uses a 2014 certified engine regardless of actual engine used. This is not clear in the rule. [EPA-HQ-OAR-2010-0162-1812.2, p.38]

Response:

The agencies have adopted a separate regulatory subcategory for mid roof day cabs because we agree with the commenter's concern that mid roof tractors inherently have a higher GHG emissions and fuel consumption due to their size relative to low roof tractors.

The agencies are requiring that aerodynamic determination of tractors with adjustable roof fairings be determined with the roof height at the lowest setting. The commenter is mistaken to assume that the tractor must meet the most stringent standard. The low roof tractors are required to achieve less reduction than high roof tractors, as shown in preamble RIA Chapter 2.5.8.2. Dynamic aero treatments may be considered in the innovative technology provisions, if it is not in common use in tractors in the 2010 model year.

The agencies have revised the aerodynamic bins and aerodynamic test procedures for the final rulemaking. The agencies continue to believe that it is appropriate to use aerodynamic bins where the Cd input for the GEM is predefined by the agencies to account for the relative precision of the aerodynamic test procedures. The final aerodynamic test procedures will not include the use of "aerodynamic descriptions" for determining the bin. Instead, manufacturers will either use the agencies' reference aerodynamic method or use an alternate method using a prescribed correlation factor, as described in preamble Section V.D.3.d. Also, the agencies have altered the aerodynamic bins such that the aerodynamic drag in terms of Cd*A will be used to determine the appropriate bin instead of using a predefined frontal area.

Lastly, the GEM has been developed such that 2014MY and beyond trucks (both tractors and vocational vehicles) use a fuel map which is reflective of a 2014 model year engine. Therefore, the actual engine used does not impact how the truck is evaluated.

Organization: International Council on Clean Transportation (ICCT)

The proposed rule states that "conventional" high-roof sleeper trucks have Cd values between 0.63 and 0.72, and the baseline is set at 0.69. Results from other studies suggest that this proposed baseline value of 0.69 may be too high. Figure 13 in the Society of Automotive Engineers paper, "Truck Aerodynamics Reborn – Lessons from the Past" shows full-scale wind tunnel tests that measure a baseline tractor and a 28-foot box trailer as having a Cd on the order of 0.55. The Rocky Mountain Institute's RMI's "Transformational Truck Study" assumed 0.6 as a baseline Cd value. A collaborative research effort by the Northeast States Center for a Clean Air Future, the Southwest Research Institute, TIAX, and the ICCT used 0.62 as a baseline coefficient of drag. [EPA-HQ-OAR-2010-0162-1945.1, p.18]

If the agencies elect to retain the current GEM methodology of inputting Cd values, these research studies suggest that a baseline of 0.69 may be 10 – 15% too high, which may be counterproductive to the goal of forcing more aerodynamic tractors into the market. [EPA-HQ-OAR-2010-0162-1945.1, p.18]

Response:

The Cd value is dependent on the test procedure used to develop it and therefore it is not appropriate to compare Cd values that are not correlated to each other with a consistent test method, which is why the agencies are adopting an adjustment factor to correlate methods in the final rulemaking. The agencies provide results from a recent aerodynamic test program which evaluated the aerodynamics of the same tractor using coastdown, full scale wind tunnel, reduced scale wind tunnel, and computational fluid dynamics (see RIA Chapter 3.2.2.1). The results showed a significant difference in Cd value, depending on the method used to determine it. Thus, the values from wind-tunnel tests cited in the comment are not directly comparable to the values from coastdown testing. The baseline Cd values used in the rulemaking were determined using the prescribed enhanced coastdown procedure to be consistent with the method that will be used by manufacturers to determine compliance with the rules.

Organization: American Trucking Associations, Inc. (ATA)

In the opinion of ATA, the technology application rates in Table III-4 present some of the most critical information in the Preamble. These application rates form the cornerstone of the rule. If these market penetration rates are set too high, OEM's will be facing an uphill battle from the start in meeting their targets. [EPA-HQ-OAR-2010-0162-2263.1, pp.14-15]

The proposed technology application rates appear to be on the high end. If such information was acquired using historical data from the EPA SmartWay program, the numbers may be somewhat more in line. However, SmartWay data should not be the source relied upon given that SmartWay partners tend to purchase more efficient tractors and trailers. The preferred, and more representative, approach is to use market sales across the entire trucking industry. [EPA-HQ-OAR-2010-0162-2263.1, p.15]

Discussions with manufacturers and suppliers indicate that the current market penetration rates of aerodynamic packages for Class 7 and 8 vehicles fall more in the range of 7-10% today. Under the proposed rule, the technology application rate for aerodynamic packages in 2014 will be SmartWay (70%) or Advanced SmartWay (20%). ATA urges EPA to work more closely with the OEM's and ensure that these market application rates are more likely than not to occur in a mere two years when we see model year 2014 equipment entering the marketplace. [EPA-HQ-OAR-2010-0162-2263.1, p.15]

Response:

The agencies have considered the comments received regarding the application rates and stringency levels of the combination tractor standards. The agencies did not receive any comments from stakeholders which indicated that specific aerodynamic technologies could not be included in the combination tractors, or which would otherwise indicate that the proposed penetration rates were too high. Nor do the assumed application rates reflect examination of just the SmartWay fleet. The agencies evaluated what aerodynamic technologies could be applied to the entire combination tractor fleet. See Section III.B.2.a.iii and RIA Chapter 2.5.8.2.

Organization: Sinhatech

One important area is reducing aerodynamic drag. The benefits of reducing aero-drag towards reducing fuel consumption and emission reduction are obvious. What is not so obvious is the impact of aero add-ons on trucking operations and the methods to assess them accurately under real operational conditions. As a technology developer I have specific experience ranging from the science all the way to implementation in truck fleets. In particular I would also like to offer our cost effective "virtual streamlining" solutions (www.sinhadeturb.com) based on adaptation of our patented flexible-skin turbulence reduction technology. It lowers the TCO even after taking periodic replacement costs into account especially for open trailer hauling with varying geometry loads. [EPA-HQ-OAR-2010-0162-1606.1, p.4]

Response:

The agencies appreciate the comment. The final rulemaking includes provisions for innovative technology credits.

Organization: California Air Resources Board (ARB)

Because the proposal does not contain provisions that would ensure low-friction lubricants are replaced with lubricants of the same or better properties, ARB staff does not believe it would be appropriate to include a low-friction lubricant input in GEM. Because manufacturers/builders could receive credits through GEM and the averaging, banking, and trading program (ABT), GEM inputs should be limited to permanent vehicle components only. Therefore, ARB staff urges the agencies to establish, instead, a requirement for low-friction lubricants outside of GEM and ABT. The agencies should also require manufacturers/builders to include language in service documentation and/or labeling that encourages the use of suitable replacement lubricants. [EPA-HQ-OAR-2010-0162-2354.1, pp. 5-6]

Response:

The agencies have hesitated to set specific technology mandates such as the requirement to use low friction lubricants preferring instead performance based metrics such as fuel consumption over a defined drive cycle as a more appropriate way to reduce fuel consumption and CO2 emissions. In the case of low friction lubricants, this is even more challenging since we lack both a definition for what constitutes low friction lubricants (is it low viscosity or literally low friction?) and a test procedure to evaluate lubricants against. For these reasons, the agencies did not include low friction lubricants, such as transmission fluid or axle lubricants, in the technology paths used to develop the combination tractor and vocational vehicle standards. We do recognize that low friction lubricants can play a role in a more comprehensive performance based standard, and we intend to continue to evaluate their use as we begin work on the next phase of heavy-duty regulations.

Organization: Rubber Manufacturers Association (RMA)

In the NPRM, EPA and NHTSA provide proposed technology application rates for aerodynamics, steer tires, drive tires, weight reduction, extended idle reduction and vehicle speed limiter. With regard to steer tires and drive tires, EPA and NHTSA do not assume 100 percent application rates of SmartWayTM or Advanced SmartWayTM tires. According to Table III_4, EPA and NHTSA propose that between 50 and 70 percent of both steer and drive tires be SmartWayTM verified products, while 10 to 20 percent of the market should be comprised of Advanced SmartWayTM tires. [EPA-HQ-OAR-2010-0162-1963.1, p.2]

However, the proposed standards do not take into account which models of tires are currently SmartWayTM verified technologies. In fact, the vast majority of current mileage drive tires, regional steer and drive tires, and traction drive tires do not meet the targets for the SmartWayTM verified technologies program. These tire classes include some of the highest volume tires in the marketplace. [EPA-HQ-OAR-2010-0162-1963.1, p.2]

It is important to note that the SmartWayTM verified technologies program was designed to address tires in one market segment – the long haul Class 8 vehicle segment. Tires that meet SmartWayTM targets are appropriate for this class of vehicles, not the other subcategories of Class 7 and Class 8 vehicles that EPA and NHTSA are proposing to regulate using SmartWayTM verified technologies program data as a basis. It is inappropriate to use SmartWayTM verified technologies program data as a basis for standards for vehicle segments other than Class 8 long haul, since verified tires are not appropriate for these vehicles. Tires for long haul Class 8 vehicle applications have been the focus of rolling resistance design innovation, since the fuel economy payback on these vehicles is significant due to the typical long haul drive cycle, due to the significant percentage of highway miles these vehicles see. Other regional and local Class 7 and Class 8 vehicles see fewer highway miles, and demands on tires focus more on wear and traction attributes, since these vehicles see high scrub, stop and go drive cycles. These vehicles will see more significant fuel losses due to engines losses, and the tire contribution is less significant. [EPA-HQ-OAR-2010-0162-1963.1, pp.2-3]

The SmartWayTM verified technologies program has recognized that more data is needed to characterize the tire market for non-long haul tire applications for Class 2B through Class 7. SmartWayTM verified technologies program has conducted tire testing in these vehicle segments for the last several months to begin to understand tire rolling resistance performance in these segments. RMA members believe that due to the significantly different demands required of non-long haul tires, EPA should only base standards for Class 8 long haul applications on current SmartWayTM verified technologies program data. For other non-long haul applications, EPA should coordinate with SmartWayTM verified technologies program to incorporate the new data they have collected for non-long haul applications. As well, EPA should revise its application rates for non-long haul applications to reflect the fact that there is currently little if any market focus on low rolling resistance tires, either by tire manufacturers or tire purchasers, due to the other performance needs of these vehicles. [EPA-HQ-OAR-2010-0162-1963.1, p.3]

The NPRM recognizes that tires wear while in service on vehicles and need to be replaced several times during the life of the vehicle. Original equipment tires are replaced by both retreaded tires and new replacement tires. Low rolling resistance options exist both in the retread market and the new replacement tire market. The NPRM assumes that truck owners and fleets will replace their original equipment low rolling resistance tires with low rolling resistance replacement tires. After the advent of the SmartWayTM program, several large fleets have made the investment and commitment to purchasing SmartWayTM verified tires. This demonstrates that if the fuel savings are significant, an investment in new technologies will make sense economically.[EPA-HQ-OAR-2010-0162-1963.1, p.9]

Response:

The agencies conducted a tire evaluation program this year to obtain additional rolling resistance information using the ISO 28580 test procedure proposed in the NPRM. The agencies found the majority of the steer tires used in Class 7 and 8 tractors were below the target used to set the final tractor standards. See response in Section 6.2.2.1 above for additional responses. In addition, there are drive tires in the tractor market today which have lower rolling resistance than the level used to set the combination tractor standards. Furthermore, the agencies have set combination tractor performance standards after documenting a technology path by which the standards can be achieved in the lead time provided. Tractor manufacturers have the ability to use many combinations of technologies, in addition to the flexibility provisions such as ABT, to manage their product lines.

Organization: Heavy-Duty Fuel Efficiency Leadership Group

Utilize Existing Technologies to Achieve Substantial Timely Gains: Improved engine and transmission efficiency, reduced rolling resistance, improved aerodynamics and axle configuration are among the existing and emerging technologies that can help achieve substantial fuel efficiency gains in the 2014-2020 timeframe. The rule should emphasize the prompt deployment of existing cost-effective technologies while recognizing and accounting for fleet diversity limitations. [EPA-HQ-OAR-2010-0162-1620.1, pp.2-3]

The EPA/NHTSA proposal wisely focuses on rapid deployment of existing technologies which are not cost prohibitive while providing important incentives for advanced and innovative technologies which can drive higher GHG and fuel reduction benefits with early market penetration. [EPA-HQ-OAR-2010-0162-1620.1, p.3]

Response:

The agency appreciates the comment.

Organization: Daimler Trucks North America

The Agencies propose not to make the 2017 vehicle standards more stringent based on the application of additional truck technologies because projected application rates of truck technologies used in setting the 2014 model year truck standard already reflect the maximum application rates that the Agencies believe appropriate for these vehicles given their specific use patterns. The Agencies considered setting more stringent standards for Class 7 and 8 tractors based on the application of more advanced aerodynamic systems, such as self-compensating side extenders or other advanced aerodynamic technologies, but concluded that those technologies would not be fully developed in the necessary lead time. The Agencies request comment on this decision. (75 Fed. Reg. 74175) Daimler agrees with the Agencies' analysis. It is too early to know what technologies will be available in the 2017 timeframe and what would be the appropriate market penetrations of each technology. [EPA-HQ-OAR-2010-0162-1818.1, p.49]

If The Agencies Change Details Of The Vehicle Regulations, The Agencies Must Go Back And Recalculate Emission And Fuel Consumption Limit Values. [EPA-HQ-OAR-2010-0162-1818.1, p.50]

The Agencies’ limit values for CO2 and FE depend on GEM outputs and vehicle penetration rates with no deterioration (i.e., a DF of zero, additive, or one, multiplicative). If any portion of the program changes, then that change could result in different limit values than those in the NPRM. In turn, the Agencies must go back and recalculate those limit values. [EPA-HQ-OAR-2010-0162-1818.1, p.50]

On page (75 Fed. Reg. 74241), the Agencies state that they had considered regulating transmissions but decided not to do so. The Agencies seek (1) comment on their decision and (2) suggestions on how to reflect improvement in transmission technologies in the regulatory program. Regarding question (1), we think that the Agencies are right. Regulating transmissions is too complex for this stage of a regulatory program. Different transmissions and drivetrain configurations are appropriate for various customers, depending on their vehicles' applications. In turn, the simplified program that the Agencies have proposed (simplified meaning, for example, one drive cycle for all vehicles) would likely lead to anomalous results such as customers being driven for regulatory reasons to a transmission that does not suit their actual operation. Regarding question (2), we believe that the Agencies have created a program to reflect improvement in transmission technologies in the regulatory program: the innovative technology program. We believe that this program, as the Agencies have proposed it, gives us the opportunity to take credit for (for example) transmissions with reduced losses. [EPA-HQ-OAR-2010-0162-1818.1, p.50]

Response:

The agencies have finalized many of the proposed provisions mentioned by the commenter and believe that the final standards remain feasible and appropriate.

Organization: Bridgestone

One of the most environmentally friendly aspects of tire production is retreading. Approximately 50% of replacement tire truck sales are retreads (See Figure #2 in Appendix).Tire industry sources estimate that producing retreaded tires only takes approximately 30% of the amount of oil necessary to produce a new tire. Several major RMA tire companies have retread operations in the US (see Figure #3 in the Appendix). [EPA-HQ-OAR-2010-0162-2120.1, p.3]

The proposed rule utilizes a switch to wide base tires versus the conventional dual tire arrangement, (See Figure #1 below) as a significant contributor to vehicle weight reduction in establishing the proposed Greenhouse Gas Emissions and Fuel Consumption standards; however conventional duals represent 96% of the total market. [EPA-HQ-OAR-2010-0162-2120.1, p.4]

[See p.4 of this comment summary for Figure 1: wide base vs. conventional duals (drive and trailer positions)]

If market penetration of wide base tires is forced to increase via regulation, the trucking industry will be impacted by the following: [EPA-HQ-OAR-2010-0162-2120.1, p.4]

Reduction of interchangeability of wheels on all positions [EPA-HQ-OAR-2010-0162-2120.1, p.4]

Lack of flexibility in the use of retread casings. There will be a loss of use of steer casings for retread application to the drive and trailer positions for long haul and regional haul applications if market penetration of wide base tires is increased, since if wide base tires are utilized on the drive and trailer positions, only (new or) retreaded wide base tires can be used on those positions. This further complicates the retread casing market which is currently facing casing supply shortages. [EPA-HQ-OAR-2010-0162-2120.1, p.4]

Response:

The agencies, in response to comments, have increased the number of technologies available in the program as GEM inputs for weight reduction. Thus, single wide tires are not the only technology available to the manufacturers for weight reduction as a GEM input. As noted in the response in Section 6.2.2.1 above, the agencies conducted a tire rolling resistance evaluation of tires used in the market and found many dual tire models available which met or exceeded the rolling resistance targets used to set the standards. Therefore, single wide tires, which often have low rolling resistance, are not the only type of tires which can be used to meet the rolling resistance targets. Thus, the agencies cannot conclude that the regulations will be driving an increase in market penetration of single wide tires.

Organization: ArvinMeritor, Inc.

Ancillary Systems That Affect Fuel Economy – There are a number of ancillary/optional systems available that can benefit fuel economy, and the GEM simulation program can probably not be configured to consider all options available. Such flexibility is likely better served by the "innovative technology credits" approach that is discussed elsewhere in these comments. That said, several systems scheduled to be available during the regulatory period should be considered for integration into the simulation process: [EPA-HQ-OAR-2010-0162-1605.1, p.5]

o Tire Pressure Management System – This system ensures that all tires are maintained at optimum tire pressure, which will result in a consistent, minimum tire rolling resistance. Testing suggests that tires under inflated by 10 psi can lower fuel economy by 1.5 percent. Though maintenance practices vary widely by fleet, studies have shown that at any given time a substantial portion of commercial vehicle truck tires are under-inflated. Tire Pressure Management avoids unnecessary fuel consumption increases caused by low tire pressure. An improvement factor for the GEM simulation program could be based on results of studies showing the percentage of tires that are underinflated and the average under-inflation pressure. One such study has previously been conducted by DOT. The data could be used to calculate a nominal or average improvement in fuel economy due to the inclusion of tire pressure management. [EPA-HQ-OAR-2010-0162-1605.1, pp.5-6]

Response:

The agencies recognize that proper tire inflation pressure can be maintained with a rigorous tire inspection and maintenance program or with the use of tire pressure and inflation systems. Most fleet operators require pre-route vehicle inspections by drivers. These inspections typically include air pressure checks, not only to help with the fuel efficiency benefits of proper tire inflation pressures, but also to help ensure safe vehicle operational characteristics. The tire pressure and inflation systems monitor tire pressure; some also automatically keep tires inflated to a specific level. While the agencies recognize that such devices could have a beneficial effect on fuel efficiency, their use is not included in this regulatory framework. Some of the impact of proper air pressure maintenance is already built into the baseline because of inspection and maintenance programs used by fleets and vehicle owners and operators. At this time, we cannot quantify the baseline value or an estimate of the fuel savings not reflected already through these maintenance programs and instead from the use of automatic tire inflation systems with enough certainty to evaluate the fuel efficiency losses associated with under-inflated tires in assessing environmental benefits achievable under the various alternatives outlined in the EIS and in the final rules. Meanwhile, the agencies will continue to rely on the SmartWay program, which provides information on proper tire inflation pressure and on tire inflation and tire inflation pressure monitoring systems.

Organization: Bendix Commercial Vehicle Systems LLC (Bendix)

There are various advanced transmission drivetrain technologies being developed. Generally speaking, these technologies can optimize gear shifting that reduces fuel consumption and extend component service life. In most cases, the technology can provide fuel cost reductions that provide a return on investment that is acceptable to fleets in the commercial vehicle market, which typically ranges 18-24 months. [EPA-HQ-OAR-2010-0162-1888.1, p.3]

The mechanism for fuel economy improvement is a reduction in average engine speed of a vehicle during its drive cycle. The method of achieving the savings differs based on whether an automatic or automated manual transmission (AMT) is utilized. [EPA-HQ-OAR-2010-0162-1888.1, p.3]

[For additional comments pertaining to weight: Revised Shift Strategies for Automated Manual Transmissions (ATM's) and Revised Final Drive Ratio's for Automatic Transmissions see pp.3-4 of this comment summary]

An adaptive cruise control system can help drivers stay at cruise speeds longer which can result in significant fuel savings while also maintaining a safe following distance. Fleet reports to Bendix have indicated that active cruise control systems can save anywhere from 1% upwards of 10% depending upon existing driving behaviors. [EPA-HQ-OAR-2010-0162-1888.1, p.4]

[See pp.4-5 of this comment summary for additional comments pertaining to Engines: Naturally Aspirated and Turbocharged Air Compressors with Clutch, Electrical Accessories, and Engine Boosting Assist Technologies]

Response:

Advanced drivetrain and adaptive cruise control technologies could be considered under the innovative technology credit provisions as these technologies are not in general use in the existing combination tractor fleet and can be associated with GHG emission reductions and fuel consumption improvements. However, because items such as driver training and coaching are difficult to quantify and are linked to driver behavior, the agencies consider these strategies to be outside the scope of this rulemaking. Programs, such as the SmartWay Transport Partnership, encourage reductions of GHG emissions and fuel consumption through strategies such as these.

Organization: Center for Biological Diversity

The Agencies' Phase-In Schedules Are Overly Long, Thereby Failing to Achieve Maximum Feasible Results Throughout the rulemaking, the Agencies propose to delay implementation of certain technologies until the last year of the rulemaking period, or take them off the table entirely because of concerns that there is insufficient lead time to implement them at all. /18/ As set forth above, these delays violate the technology-forcing mandates of the statutes. However, they also ignore the fact that a full six years will pass between the finalization of the Proposed Rule in 2011 and the last rulemaking year, which begins in 2017. Structuring a fuel efficiency improvement rulemaking based on the assumption that HD Vehicle manufacturers cannot accomplish even modest progress during a six year period simply fosters the continuing decline in American competitiveness. /19/ [EPA-HQ-OAR-2010-0162-2506.1, p.5]

That precisely the opposite is true – i.e., that vehicle manufacturers can and will successfully adjust to rulemakings requiring much more rapid progress – is proven by the fact that heavy-duty engine manufacturers have already changed their entire redesign cycles to adjust to EPA's criteria pollutant program for these engines. As the Agencies state:

Recently, EPA's heavy-duty highway engine program for criteria pollutants provided new emissions standards for the industry in three year increments. Largely, the heavy-duty engine and truck manufacturer product plans have fallen into three years cycles to reflect this regulatory environment. [EPA-HQ-OAR-2010-0162-2506.1, p.6]

In light of the Agencies' insistence over many years of corporate average fuel efficiency rulemaking that fuel efficiency improvements are axiomatically constrained by sacrosanct five year industry vehicle redesign cycles, this admission is stunning. As the Center has repeatedly pointed out, unquestioning deference to these artificial constraints without analysis of the costs and benefits flowing from their alteration violates the Agencies' statutory obligation. Plainly, technology-forcing rulemakings can and do succeed, change industry performance and result in more advanced, fuel efficient products in a cost-efficient manner, whereas regulations designed to accommodate business-as-usual simply perpetuate business-as-usual. [EPA-HQ-OAR-2010-0162-2506.1, p.6]

In the case of HD Vehicle engines, the Agencies further admit that during the period from 2014-2017, "engine manufacturers are expected to redesign and upgrade their products. Over these four model years there will be an opportunity for manufacturers to evaluate almost every one of their engine models and add technology in a cost-effective way, consistent with existing redesign schedules, to control GHG emissions ad reduce fuel consumption." Thus, for example, no perceived redesign cycle constraints stand in the way of the adoption of bottoming cycle technology during the rulemaking period. As pointed out in our January 3, 2011 Comment Letter, this technology is especially promising and should and can be implemented. [EPA-HQ-OAR-2010-0162-2506.1, p.6]

In several instances, the Agencies present a "suite" of presently available and feasible technologies, but expressly do not require that each technology within the "suite" be applied. For example, in discussing the use of idle reduction technologies, the Agencies state that, "as with all technology inputs discussed in this section, the agencies are not mandating the use of idle reductions or idle shutdown, but rather allowing their use as one part of a suite of technologies feasible for reducing fuel consumption and meeting the proposed standards.' In other words, the Agencies allow manufacturers to choose among some proven, available, feasible and efficiency improvements measures, leaving some of them unused (or used only to obtain voluntary credits). However, in every instance where such "optional" technologies would add to a vehicle's fuel efficiency, the failure to require their implementation violates the mandates of EPCA and EISA to produce the "maximum feasible" fuel efficiency improvements. We urge the Agencies instead to adopt efficiency standards that incorporate the use of every one of the technologies now allocated to an optional technology "suite", excepting only those that create no additionality. [EPA-HQ-OAR-2010-0162-2506.1, p.4]

The Agencies' failure to drive toward maximum feasible results, and its substitution of inappropriate, non-statutory goals to lead its decision-making is apparent in many instances. For example, they state that "[b]y focusing on existing technologies and well-developed regulatory tools, the agencies are able to propose rules that we believe will produce real and important reductions in GHG emissions and fuel consumption within only a few years." Constructing standards based on existing and well-developed technologies takes no account of the technology forcing mandate of EPCA, EISA and the CAA. The relevant statutes do not call for fuel efficiency improvements that are "real and important," but for maximum feasible improvements. [EPA-HQ-OAR-2010-0162-2506.1, p.4]

Another example of unsupported implementation delay is the proposed schedule for tire improvements for vocational vehicles. The six-year incremental phase-in schedule is not justified by a full analysis, leaving unexplained why presently available tire improvements cannot be presently implemented. We urge the Agencies to address this shortcoming. [EPA-HQ-OAR-2010-0162-2506.1, p.6]

As to tractors, the Agencies have based their standards on the assumption that only 20 percent of aerodynamic improvements available through Advanced SmartWay technologies should be required through the end of the rulemaking period because of the "limited lead time for the program and the need for these more advanced technologies to be developed and demonstrated before being applied across a wider fraction of the fleet." As discussed above, this approach is indefensible in light of the fact that these technologies do exist or have progressed far in the developmental stage, that a lead time of six years for full deployment is more than ample, and that Congress intended the Agencies to ask industry to do even "what seems impossible at the present time." [EPA-HQ-OAR-2010-0162-2506.1, pp.6-7]

In our January 3, 2011 Comment Letter, we have already urged the Agencies to set standards based on the use of speed governors, whose potential to limit fuel consumption is highly significant since fuel consumption and CO2 emissions increase proportional to the square of vehicle speed. Moreover, speed governors are already used in the industry and are inexpensive. The Agencies base their decision not to assume the use of speed governors on their stated concern that they lack jurisdiction to require them; however, we note here that the Agencies already require speed limiters' use where manufacturers seek to qualify their tractors as "off-road" to qualify them for an exemption to the rulemaking . . . If the Agencies can mandate the use of a technology as a condition to obtaining a statutory exemption, they can adopt standards that are premised on their use as well. [NHTSA-2010-0079-0112; 0081]

We note that in rejecting consideration of the 60 mile-per-gallon speed regulator, the Agencies have indicated that they believe they lack the statutory authority to require manufacturers to reduce vehicle speed. However, the statute contains no such restriction. Instead, it instructs NHTSA to examine the fuel efficiency of HD Vehicles and determine "the range of factors, including, without limitation, design, functionality, use, duty cycle, infrastructure, and total overall energy consumption and operating costs that affect [HD Vehicles'] fuel efficiency," and then to implement "fuel economy standards" that are "appropriate, cost-effective, and technologically feasible" for HD Vehicles. Speed undoubtedly is a "factor" in fuel efficiency, and a speed regulator is a technology that is feasible (and already in use), cost effective, and appropriate, and will create immediate and significant fuel efficiency gains. But even if the Agencies simply require a regulator set at existing maximum speed limits to avoid any jurisdictional concerns, speeding and its attending fuel consumption would be eliminated. We urge the Agencies to reconsider their position and adopt a speed limitation technology. [Footnotes omitted].

/18/ The need to reduce greenhouse gases sooner rather than later could not be more clear and urgent, as the world's ability to cap emissions to keep temperature rises even at 2ºC above pre-industrial levels are fading fast. As the chief economist for the International Energy Agency stated recently, "As we stand now, we're only a few meters away from saying goodbye to the 2-degree target." Scenario to Cap World Emissions by 2020 is Fading Fast, Warns IEA Economist, CLIMATE WIRE , Jan. 14, 2011, available at http://www.eenews.net/climatewire/2011/01/24/archive/1?terms=Fatih+Birol [EPA-HQ-OAR-2010-0162-2506.1, p.5]

/19/ Ambitious health and safety regulations which require more U.S. manufacturers to meet somewhat more stringent standards than those in place in other countries create a competitive advantage for U.S. industry by continually spurring the innovation that is so critical to success in today's global economy. Porter, M. and Claas van der Linde, Toward a New Conception of the Environment-Competitiveness Relationship, 9 Journal of Economic Perspectives 97, 97-118 (1995), available at www.greengrowth.org/download/green...pub/.../Porter.pdf. Furthermore, while it is often wrongly asserted that more ambitious health and safety rules will create a competitive disadvantage for U.S. industry, no such substantial impact has been demonstrated. EPA, Clean Air Act, and U.S. Manufacturing, WORLD RESOURCES INSTITUTE, November, 2010 ("WRI 2010(a)"), available at www.wri.org/stories/2010/.../epa-clean-air-act-and-us-manufacturing; Goodstein, E., et al., Climate Policy and Jobs: An Update on What Economists Know, ECONOMICS FOR EQUITY AND THE ENVIRONMENT NETWORK (2010). [EPA-HQ-OAR-2010-0162-2506.1, pp.5-6]

Response:

NHTSA recognizes that Congress intended EPCA (and by extension, EISA, which amended it) to be technology-forcing. However, NHTSA believes it is important to distinguish between setting "maximum feasible" standards, as EPCA/EISA requires, and "maximum technologically feasible" standards, as the commenter suggests.

Both agencies must weigh all of the statutory factors in setting fuel efficiency standards, and therefore may not weigh one statutory factor in isolation. Neither EPCA nor EISA define "maximum feasible" in the context of setting fuel efficiency standards. Instead, NHTSA is directed to consider three factors when determining what the maximum feasible standards are – "appropriateness, cost effectiveness, and technological feasibility." 49 U.S.C. § 32902(k)(2). It is within the agency's discretion to weigh and balance the factors laid out in 32902(k) in a way that is technology-forcing, as evidenced by the alternatives analyzed, but that stops short of requiring the application of all available technology or technology not yet in existence, as the commenters suggested.

Further, for most fuel efficiency technologies that NHTSA evaluated in its analysis, the agency applied phase-in constraints that made less limited assumptions, while continuing to recognize that most technologies must still be applied as part of a vehicle freshening or redesign. NHTSA believes that the phase-in schedule provides an appropriate balance between the technology-forcing purpose of the statute and EISA-mandated considerations of economic practicability. NHTSA is sensitive to the unique production demands of manufacturers of medium- and heavy-duty engines and vehicles, and believes that a phase-in schedule is necessary in order to provide manufacturers enough flexibility to incorporate the proposed technologies into their production schedules. The degree of work required to go from a demonstrated concept to a production product is far greater than many people realize. As highlighted in comments by Navistar summarized below there are a myriad of steps to the process which must be completed in order to deliver a quality product. The phase-in schedules are both necessary and sufficient for the industry to produce quality products in compliance with these standards.

With respect to the EPA rules, CBD's premise that EPA must adopt "technology-forcing" standards for heavy duty vehicles and engines is wrong. A technology-forcing standard is one that is to be based on standards which will be available, rather than technology which is presently available. NRDC v. Thomas, 805 F. 2d 410, 429 (D.C. Cir. 1986). Clean Air Act provisions requiring "the greatest degree of emission reduction achievable through the application of technology which the Administrator determines will be available" are technology-forcing. See e.g. CAA sections 202 (a)(3)(1); 213 (a)(3). Section 202(a) (1) standards are technology-based, but not technology-forcing, requiring EPA to issue standards for a vehicle's useful life "after providing such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period." See NACAA v. EPA, 489 F. 3d 1221, 1230 (D.C. Cir. 2007) upholding EPA's interpretation of similar language in CAA section 231 (a) as providing even greater leeway to weigh the statutory factors than if the provision were technology-forcing. See generally 74 FR at 49464-465 (Sept. 28. 2009); 75 FR at 74171.

Section 202 (a)(1) of course allows EPA to consider application of technologies which will be available as well as those presently available, id., and EPA exercised that discretion here. For example, as shown below, the agencies carefully considered application of hybrid technologies and bottoming cycle technologies for a number of the standards. Thus, the critical issue is whether EPA's choice of technology penetration on which the standards are premised is reasonable considering the statutory factors, the key ones being technology feasibility, technology availability in the 2014-2018 model years (i.e. adequacy of lead time), and technology cost and cost-effectiveness. EPA has considerable discretion to weigh these factors in a reasonable manner (even for provisions which are explicitly technology-forcing, see Sierra Club v. EPA, 325 F. 3d 374, 378 (D.C. Cir. 2003)), and has done so here.

The commenter also indicates that the agencies did not predicate standards on use of VSLs because of perceived lack of statutory authority. This is incorrect. The reasons for the agencies not basing standards on use of VSLs is that the agencies continue to believe that we are not in a position to determine how many additional vehicles would benefit from the use of a VSL with a setting of less than 65 mph (a VSL with a speed set at or above 65 mph will show no CO_2 emissions or fuel consumption benefit on the drive cycles included in this program), not a lack of authority. See Preamble to the final rules at section II.B.3.g.

The commenter also maintains, incorrectly, that standards predicated on use of LRR tires are phased in over the years of the standard. This is not correct. All such standards are in effect in full starting with MY 2014 vehicles.

In response to the comment that the agencies present a "suite" of presently available and feasible technologies, but expressly do not require that each technology within the "suite" be applied we believe the commenter misses two key aspects of the agencies approach to these standards. First, in each case we have expressed the standards not as particular technology mandates but rather as performance standards predicated on the capability of a particular mix of technologies on average but for which compliance can be met in any number of ways on a per vehicle basis. In many cases, this technology mandate is based on a 100 percent application rate of a specific technology but in other cases the application rate is something less for example 70 percent for some aerodynamic packages. In the cases where the application rate assumed in setting the standard is less than 100 percent, this has been done not to provide the manufacturers with additional flexibility (we have other provisions for that) but to account for vehicle applications were the application of the technology is either infeasible (low ground clearance fairings for tractors used in refuse applications will break on the ground) or ineffective (aerodynamic fairings add little value to vehicles that drive primarily at low average speeds in stop and go traffic). Hence, these performance standards reflect the maximum technology penetration rates the agencies believe appropriate giving consideration to the technical effectiveness and appropriateness of the technology for the fleet on whole. As explained in the preamble, the agencies have used estimates of the fraction of tractors used in various vocations to determine the appropriate technology penetration rates..

6.2.2.8. Fuel Neutral Standards

Organizations Included in this Section:

Edison Electric Institute
Cummins, Inc.
Engine Manufacturers and Truck Manufacturers Associations
National Automobile Dealers Association
Truck Renting and Leasing Association
UPS
Motor & Equipment Manufacturers Association

Organization: Edison Electric Institute

Any future HD Program emissions standards should use fuel neutral metrics. [EPA-HQ-OAR-2010-0162-2114.1, p.3]

Future Emissions Standards and Regulations Should be Fuel Neutral. [EPA-HQ-OAR-2010-0162-2114.1, p.9]

As EPA develops future HD Program regulations for model years 2018 and beyond, the Agency should ensure that EVs can play the crucial rule the Agency expects of them by crafting fuel-neutral standards. Any standards expressed in gallon per 100 bhp-hr or gallon per ton-mile or gallon per 1,000 ton-mile, also should allow for use of a gallon equivalent per 100 bhp-hr, per ton-mile, or per 1000 ton-mile figure or other equivalencies, such as kWh per ton-mile or per 100 bhp-hr or per 100 miles (or per the maximum electric range of the vehicle). For the light duty vehicle market, EPA/DOT has already incorporated the use of “gallon equivalent” for alternatively fueled vehicles in 2011 fuel economy labels that appear on new vehicles and on the www.fueleconomy.gov web site. The use of “gallon equivalent” metric, based on the energy consumption by the vehicle (without any consideration of “upstream” energy losses) should also be used for the HD program. [EPA-HQ-OAR-2010-0162-2114.1, p.9]

Organization: Cummins, Inc.

Maintain fuel neutrality – The GHG/FC standards should be performance-based and should neither dictate nor differentiate between specific technologies or fuel types. [EPA-HQ-OAR-2010-0162-1765.1, p.8]

The proposal establishes different gasoline and diesel engine standards. Figure 1 below illustrates these differences. Gasoline engine CO2 performance starts out 5% worse than LHD/MHD diesel on the 2010 baseline, but this disparity grows to 8.9% when the rule is completely phased-in. The proposed regulation moves in the wrong direction of creating a greater disparity over time instead of bringing diesel and gasoline engines to equivalent standards by 2017. [EPA-HQ-OAR-2010-0162-1765.1, p.23]

[Figure 1 can be found on page 24 of this comment.]

Cummins is concerned that this will result in the unintended consequence of shifting diesel engine sales to gasoline engines – which will not provide the full GHG/FC benefits envisioned under this rulemaking. [EPA-HQ-OAR-2010-0162-1765.1, p.24]

In accordance with our core principle and the existing criteria pollutants program, Cummins believes that the regulation should be fuel neutral. The Agencies should treat different fuel types equally. Several studies have identified significant improvement potential for gasoline engines which should be considered:

- Roberts, C., J.C. Snyder, C.H. Stovell, L. Dodge, T. Ryan and R. Stanglmaier (2004), 'The Heavy-Duty Gasoline Engine - An alternative to meet emissions standards of tomorrow', SAE Paper 2004-01-0984

- Alger, T., S. Hahne, C. Roberts and T. Ryan (2005), 'The Heavy Duty Gasoline Engine – A Multi-Cylinder Study of a High Efficiency, Low Emission Technology', SAE Paper 2005-01-1135

- Alger, T., J. Gingrich and B. Mangold (2007), 'The Effect of Hydrogen Enrichment on EGR Tolerance in Spark Ignited Engines', SAE Paper 2007- 01-0475

- Alger, T., Mangold, B., (2009), 'Dedicated EGR: A New Concept in High Efficiency Engines', SAE Paper 2009-01-0694 [EPA-HQ-OAR-2010-0162-1765.1, p.24]

- Cairns, A., H. Blaxill and G. Irlam (2006), 'Exhaust Gas Recirculation for Improved Part and Full Load Fuel Economy in a Turbocharged Gasoline Engine', SAE Paper 2006-01-0047

- Duchaussoy, Y., A. Lefebvre and R. Bonetto (2003), 'Dilution Interest on Turbocharged SI Engine Combustion', SAE Paper 2003-01-0629

Cummins urges the Agencies to finalize common standard levels for gasoline and diesel engines. [EPA-HQ-OAR-2010-0162-1765.1, p.25]

Cummins does not support different standards and timelines for gasoline-derived and diesel-derived natural gas fueled engines

Traditionally, natural gas engine criteria pollutants certification has been linked to the base engine from which it is derived, as described in 59 FR 48476, dated September 21, 1994:

Although there are other factors to consider, in general an Otto-cycle engine is considered to be one that is throttled during normal operation whereas a diesel is not. The Agency recognizes, however, that in some cases this criterion may not be adequate or appropriate to determine a vehicle's classification. For example, a gaseous-fueled engine which is derived from a particular Ottocycle or diesel base engine, and is expected to be used in similar applications as the base engine, would most appropriately be classified the same as the base engine from which it was derived. In such cases the Administrator will take into account other relevant factors, such as compression ratio, combustion and thermodynamic characteristics, or intended in-use duty cycle when classifying the vehicle. [EPA-HQ-OAR-2010-0162-1765.1, p.25]

As specified in § 1036.150(c), the Agencies intend to link the CO2 and fuel consumption requirements to the base engine in the same manner as the criteria pollutants. If there are consistent standards and timelines for diesel and gasoline engines, there is no issue. However, the proposed divergence in diesel and gasoline CO2 standards would lead to a less stringent standard for a gasoline-derived versus a diesel-derived natural gas engine. This is another reason that Cummins urges the Agencies to promulgate standards for gasoline and diesel engines that have both common standard levels and timelines. [EPA-HQ-OAR-2010-0162-1765.1, p.25]

Organization: Engine Manufacturers and Truck Manufacturers Associations

Greenhouse gas emissions result from the combustion of any fuel, including gasoline, diesel and natural gas. The environment sees no difference between diesel-derived GHG, gasoline-derived GHG, or natural gas-derived GHG, and neither should the Proposed GHG/FE Standards. The same holds true with respect to any other criteria pollutant, which is why the

Associations agree with EPA's long-standing policy of fuel-neutrality when proposing emission standards for HD vehicles and engines. [EPA-HQ-OAR-2010-0162-1940.1, p.14]

Organization: National Automobile Dealers Association (NADA)

At the same time, the rule should strive to be fuel and technology "neutral," leaving it to the new vehicle marketplace to largely determine what works best. [EPA-HQ-OAR-2010-0162-2705, p.10]

As drafted, the proposal appears to disadvantage natural gas and other alternative-fueled vehicles. Corrections and adjustments should be provided for to promote fuel neutrality. [EPA-HQ-OAR-2010-0162-2705, p.10]

Organization: Truck Renting and Leasing Association (TRALA)

Currently, NHTSA intends to use fuel consumption factors that are based upon diesel fuel energy content data. One unfortunate consequence of that approach is that the use of natural gas could be disadvantaged because of natural gas' lower energy content in comparison to diesel fuel. We encourage NHTSA to follow a fuel neutral approach to the extent possible. With respect to the fuel consumption factors, NHTSA could do so by using fuel carbon content instead of fuel energy content. [EPA-HQ-OAR-2010-0162-1816.1, p.6]

Organization: UPS

We urge EPA/NHTSA to write and implement the rule in a manner that is fuel/technology neutral, so as to avoid favoring one alternative fuel or technology over another. [EPA-HQ-OAR-2010-0162-1763.1, p.3]

With respect to alternative fuels, UPS is fuel neutral. We have in service over 1900 alternative fuel/technology vehicles in what we call our "rolling laboratory" to determine the economics, performance, and required maintenance for a wide array of these alternative fuel vehicles. (We had a fleet of plug-in electric delivery vehicles in service in New York City in 1936.) We are testing in real world service compressed natural gas (CNG) vehicles, liquid natural gas (LNG) vehicles, propane powered vehicles, diesel hybrid electric vehicles, plug-in electric vehicles, and we have tested and are procuring more hydraulic electric hybrid vehicles. A number of our trucks are using blends of diesel and bio-diesel fuel. [EPA-HQ-OAR-2010-0162-1763.1, p.3]

Our experience shows that the mission of the truck, that is, the distance traveled per day, the amount of stopping, the payload, the initial purchase price and the operating costs all affect which of these technologies is suitable. Some may be suitable in some missions, and quite unsuitable in others. It is very important that the rule's standards be even handed among the technology and fuel options. [EPA-HQ-OAR-2010-0162-1763.1, p.3]

Organization: Motor & Equipment Manufacturers Association (MEMA)

Under EPA's proposed Section 1036.108(a)(1)(ii), the GHG standard for a MY2016 light HD diesel engine used in a Class 2b-5 vocational vehicle would be 600 g/hp-hr (dropping to 576 g/hphr in MY2017), whereas for a MY2016 gasoline engine used in the same type of vehicle, the standard would be 627 g/hp-hr (with no decrease in MY2017).17 Additionally, light HD diesel engines used in MY2014 and MY2015 vocational vehicles would be subject to the same 600 g/hp-hr standard, while gasoline engines used in MY2014 and MY2015 vocational vehicles would not be subject to any GHG emissions standard because the 627 g/hp-hr level would not take effect until MY2016. This difference in standards could result in an unintended shift in market share leading to an increase in overall GHG emissions. EPA and NHTSA state that they "are not basing the proposed standards on a targeted switch in the mix of diesel and gasoline vehicles," and that "the proposed program does not force, nor does it discourage, changes in a manufacturer's fleet mix between gasoline and diesel vehicles." MEMA appreciates these remarks and the technology timeline driving the different standards for this rulemaking, but reiterates that the proposed standards are not equivalent, nor do they converge toward a common value. [EPA-HQ-OAR-2010-0162-1752.1, p.14]

In the next and all future rulemakings to amend the HD National Program that results from this first rulemaking, EPA and NHTSA should work to establish common, performance-based GHG and fuel consumption standards, as is the case with the light-duty vehicle National Program. MEMA maintains that instituting performance-based standards is the best way to ensure that (a) unintended market shifts do not in fact occur because of the standards, and (b) the overarching and important objectives of reducing GHG emissions and improving fuel efficiency are not unintentionally compromised. [EPA-HQ-OAR-2010-0162-1752.1, pp.14-15

Response:

The agencies evaluated the current level of fuel consumption and GHG emissions from spark ignition and compression ignition engines separately and found a clear difference in baseline levels. In addition, the agencies analyzed the technologies available to reduce GHG emissions and fuel consumption from both types of engines and found that there are different technology paths and levels of reductions that are achievable in the timeframe of this rulemaking. Therefore, the agencies are adopting different standards for HD engines and HD pickup trucks and vans for gasoline and diesel engines reflecting these differences. The agencies will conduct a new analysis of technologies in future rulemakings to determine the appropriate stringency levels at that time.

The agencies have generally set standards in the past that do not distinguish between fuel types, and continue to believe that this approach is preferable where technological or market-based reasons do not strongly argue otherwise. As stated above, these technological differences do exist presently between gasoline and diesel engines. The agencies emphasize, however, that they are not committed to perpetuating separate GHG and fuel consumption standards for gasoline and diesel heavy-duty vehicles and engines, and expect to reexamine the need for separate gasoline/diesel standards in the next rulemaking. This current rulemaking differs from other recent rulemakings in this regard in that we are regulating GHGs and fuel consumption for the heavy-duty sector for the first time, and so believe that the goal of fuel-neutrality is best met by setting standards based on the market/technology situation as it exists today. We believe that both diesel and gasoline engine types have roughly equivalent redesign burdens as evidenced by the feasibility and cost analysis in RIA Chapter 2.

Organization: Sinhatech

The NAS study on which the proposed standards are based excluded maintenance and replacement costs of aero devices when arriving at breakeven fuel price. All aero devices suffer degradation and damage during commercial operations of vehicles and need to be replaced as needed to maintain performance. The statement on page 74271 of the draft regulation, “These features are expected to last the full life of the vehicle without becoming detached, cracked/broken, misaligned, or otherwise not in the original state” does not represent real life trucking operations. Therefore, using only the initial cost to manufacture and install an aero device grossly underestimates the “total cost of ownership.” Fleet owners and truck operators usually discover this during in-operation evaluations. Based on my interactions with truck fleets I have discovered that this has had the unintended consequence of them (i.e., purchasing decision makers) disbelieving any fuel saving projections put forward by the government. It has also raised additional barriers for technology providers like Sinhatech. Overall, any fuel saving solution is believed to increase total cost. Solutions, such as installation of our aero-drag reducing products are wrongly included in this category even though in-use test results have clearly demonstrated their ability to reduce total cost for the fleet. [EPA-HQ-OAR-2010-0162-1606.1, p.3]

In order to expedite acceptance the regulations should begin with mandating only those solutions which the market will support regardless of tax, credits or other incentives. This will also require demonstrating actual savings to purchasing decision makers in a manner they find credible. This should include making critical resources available to technology innovators so more “effective solutions” continue to be developed to be implemented within the time frame covered as per the findings of the NAS Report. [EPA-HQ-OAR-2010-0162-1606.1, p.3]

My recommendation and offer: The proposed rule needs substantial input from studies involving in-fleet fuel usage data collection and statistical analysis as cited by the NAS Report. Uncertainties with appropriate confidence levels associated with this data can be used to include the effect of “uncontrolled factors”. The method relies on treating a certain number of “sample vehicles” and using the remaining untreated vehicles as control. The feasibility of this method has been demonstrated in our recent SAE Paper (SAE Paper 2010-01-2038, footnote 1). We would like to an opportunity to demonstrate this method to NHTSA as well as EPA. [EPA-HQ-OAR-2010-0162-1606.1, pp.3-4]

Response:

The agencies have set the technology penetration rates for aerodynamic packages to differentiate between operations where fairing damage is likely (mixed use off-road operations) and where fairing damage should be rare (line-haul operation). Further, our cost and benefits estimates include a vehicle scrappage rate that includes vehicle losses due to accidents. Having applied fairings only where failure is unlikely and having already accounted for accidents, we believe the number of unaccounted fairing failures will be so few as to be de minimus in calculating the cost of the program.

As discussed in Section VIII.D of the preamble to the final rulemaking, the majority of vehicles will see a payback period of less than one year, while others, especially those with lower annual miles travelled, will experience payback periods of up to two years.

The agencies appreciate the offer for in-fleet data collection.

6.2.2.9. Alternatives

Organizations Included in this Section:

Chew, Yuli
Anonymous Public Comment
American Lung Association & Environmental Defense Fund
New York State Department of Transportation and Environmental Conservation
New York State Energy Research and Development Authority
Center for Biological Diversity
Institute for Policy Integrity

Organization: Chew, Yuli

Basing on the analysis, I think that the Alternative 8 can be achieved with current market technologies. [EPA-HQ-OAR-2010-0162-0558.1, p.2]

Organization: Anonymous Public Comment

However, the program could go even further to combat climate change by creating stricter fuel efficiency standards. The proposed rule should require a plan for fifty percent fuel efficiency on all these types of vehicles. The program should take a strict stance now because this will provide companies with even greater incentive to improve engine technologies for medium and heavy-duty vehicles. In fact, technology is available to take these aggressive steps now (see Yan Engines Comment). Because heavy-duty vehicles are responsible for nineteen percent of all greenhouse gas emissions from mobile sources, imposing greater fuel efficiency standards will decrease the environmental impact of these vehicles more quickly and at a higher level. [EPA-HQ-OAR-2010-0162-1330.1, p.1]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

EDF and ALA strongly encourage the agencies to ensure that the final standards reflect the greatest emissions reductions feasible, leveraging existing technologies and driving advanced technologies to protect human health and the environment from air pollution. [EPA-HQ-OAR-2010-0162-3129.1, p.11]

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

Although these proposed rules are making a necessary and important step in reducing fuel consumption by the medium- and heavy-duty truck transportation sector, the industry should be encouraged to innovate and to seek ways to reduce fuel consumption further. Although NHTSA and EPA have chosen Alternative 6 (Engines, Tractors and Class 2b Through 8 Trucks) as the preferred alternative, New York State would like, at a minimum, to see the alternative expanded to include incentives for greater penetration of advanced hybrid powertrain technology for vocational vehicles, pickups and vans as addressed in Alternative 8. [EPA-HQ-OAR-2010-0162-2047.1, p.2]

Alternative 8 is the only alternative that includes the application of hybrid drive trains. In Alternative 8, the market penetration of hybrid drive trains into the heavy-duty pickup and vocational vehicle classes is 50 percent and the penetration rate for the combination truck sector is 0 percent. EPA and NHTSA acknowledge that it is not possible to achieve hybrid technology penetration rates at or even near these levels in the time frame of this rule-making. Accordingly, New York State requests that EPA and NHTSA explain why other hybrid drive train penetration rates (such as 10-25 percent for pickup and vocational and 0-10 percent for combination trucks) are not considered to be feasible alternatives. While the cost analyses suggest the hybrid technology will involve higher incremental costs than more conventional technologies, hybrid technologies are demonstrated to achieve significant fuel economy and greenhouse gas emission benefits. These benefits are clearly demonstrated. A greater use of hybrid technology in vocational vehicles also would reduce occupational exposure to diesel exhaust, and hybrid school buses would reduce the exposure of school children to particulate matter emitted by idling. [EPA-HQ-OAR-2010-0162-2047.1, p.2]

New York State recognizes that the application of hybrid technologies is a compliance option for the industry in the proposed regulation. The industry can obtain fleet credit through hybrid technologies (or other advanced and innovative technologies) through the advanced and innovative technology credit process. New York State recommends that NHTSA and EPA use this information and market penetration of the technologies to set future standards that are in line with Alternative 8. [EPA-HQ-OAR-2010-0162-2047.1, p.2]

The proposed rule-making should also consider hybrid technology for trucks used in construction applications. Idling by construction vehicles can be reduced significantly, if warning signals, arrow signs and other accessory equipment could be powered through auxiliary batteries. For example, reducing the electric load of these accessories through light- emitting diode lighting would further relieve reliance on engine power. [EPA-HQ-OAR-2010-0162-2047.1, p.4]

Organization: Center for Biological Diversity

None of the ten alternative stringencies the Agencies present in the Proposed Rule and the accompanying DEIS contains all of the available technologies to reduce fuel consumption and greenhouse gas emissions. Although Alternative No. 8 – presented as the most stringent alternative – adds hybrid powertrain technologies for vocational vehicles and heavy-duty pickups and vans, it excludes, at a minimum, both the use of bottoming cycles for Class 7 and 8 tractors and weight reduction of 10 percent for heavy-duty pickups and vans (technology additions assumed for Alternative 6b). Moreover, the Agencies have not calculated the monetized net benefits associated with either Alternative 6b or Alternative 8. This omission deprives the public and decision-makers of crucial information required to compare and weigh the Agencies' preferred alternative (Alternative 6) against either of these two alternatives, both of which would achieve significantly better greenhouse gas emissions and fuel efficiency. We urge the Agencies to provide complete information and a truly technology-forcing alternative. [EPA-HQ-OAR-2010-0162-2506.1, p.9]

We strongly urge the Agencies to adopt an alternative not depicted here: a combination of Alternative 6b with the additional technologies added in Alternative 8 and other technologies discussed here and in our earlier comment letters but which have been rejected by the Agencies. A full cost-benefit analysis which does not improperly put the thumb on one side of the scale will undoubtedly prove that alternative to remain highly cost-effective. [EPA-HQ-OAR-2010-0162-2506.1, p.9]

Organization: Institute for Policy Integrity

Where it would maximize net benefits, the agencies should increase the proposed scope and stringency of the regulations. In particular, the agencies should regulate trailers, reconsider the small business exemptions, explore more stringent alternatives, study options for reducing air conditioning leakage within the overbroad category of vocational vehicles, and respond to petitions for the regulation of currently uncovered sources. [EPA-HQ-OAR-2010-0162-1895.1, p.2]

Agencies Should Carefully Consider More Stringent Alternatives [EPA-HQ-OAR-2010-0162-1895.1, p.4]

Besides an option that includes trailer regulation (Alternative #7, which the agencies reject), the agencies only consider two policies more stringent than their preferred choice: a 20% increase in stringency (Alternative #6b), and a standard based on a hypothetical increase in the market penetration of hybrid technologies (Alternative #8). The agencies also reject both of those alternatives. [EPA-HQ-OAR-2010-0162-1895.1, p.4]

Agencies generally are required to assess the costs and benefits of all reasonable alternatives, including those suggested by the public, as well as alternatives for all “key attributes or provisions.” However, the choices made in defining and assessing the agencies’ two more stringent alternatives seem somewhat arbitrary. For example, the 20%-increase alternative assumes the addition of a heat recovery system to combination tractors, a 10% mass reduction in pickups and vans, and an 8% increase in hybrid powertrain application to vocational vehicles. But the agencies do not consider any lesser increase in the latter two categories, or whether any greater increase might be possible for certain classes of vocational vehicles, a potentially overbroad category in this regard. [EPA-HQ-OAR-2010-0162-1895.1, pp.4-5]

Similarly, in the hybrid-based alternative, the agencies imagine a hypothetical 13,000% increase in the annual sales of hybrid units (from under 5,000 units per year projected in 2010, to 650,000 units per year starting in 2017). The agencies do not consider whether a more modest, but still ambitious rate of market penetration might be more feasible. Additionally, when assessing the costs of such alternatives, the agencies calculate a $30,000 premium based on one estimate for applying hybrid technology to a refuse truck. The agencies do not explain why technology costs would not decrease (due to economies of scale and learning) as market share increases from 5,000 units to 650,000 units. [EPA-HQ-OAR-2010-0162-1895.1, p.5]

The agencies must consider whether additional alternative policy arrangements and additional cost estimates might be appropriate. After assessing all feasible alternatives, the agencies must select the option that maximizes net benefits. [EPA-HQ-OAR-2010-0162-1895.1, p.5]

Executive Orders 12,866 and 13,563 instruct agencies to “select, in choosing among alternative regulatory approaches, those approaches that maximize net benefits,” to the extent permitted by law. Under the Energy Independence and Security Act of 2007, NHTSA must set “appropriate, cost-effective” fuel economy standards that achieve the “maximum feasible improvement” for commercial heavy-duty vehicles. Under the Clean Air Act, EPA must set standards for motor vehicle emissions that endanger public health and welfare, giving appropriate consideration to the costs of compliance. That kind of broad statutory language generally permits agencies to weigh regulatory costs and benefits. Given their broad statutory authority to regulate heavy-duty truck emissions, the agencies should follow the precepts of Executive Orders 12,866 and 13,563 by assessing the costs and benefits of all reasonable policy alternatives and selecting the approach that maximizes net benefits. [EPA-HQ-OAR-2010-0162-1895.1, p.2]

Response:

The agencies have refined the alternatives for this final rulemaking in response to the comments received. No commenter supported the inclusion of any alternative which did not set standards for all three of the major categories – HD pickup trucks and vans, vocational vehicles, and combination tractors and engines installed in these vehicles and tractors. Therefore, the agencies removed the proposed Alternatives 2 through 5 and reduced the overall number of alternatives to five for the final rulemaking.

Alternative 4 sets proposed fuel efficiency standards for heavy-duty pickup trucks and vans, Class 2b through 8 vocational vehicles, and combination tractors and the engines installed in them. This alternative represents a stringency level which is 20 percent more stringent than the agency proposed Preferred Alternative standard. To achieve this stringency, the proposed combination tractor standard would be based on the addition of Rankine waste heat recovery and 100 percent application of Bin IV aerodynamics to high roof sleeper cab combination tractors. For heavy-duty pickup trucks and vans, the standard would include the addition of turbo downsized gasoline engine technology, and for vocational vehicles, the standard would be based on the addition of hybrid powertrains to 6 percent of the vocational vehicles.

The agencies received several comments related to the proposed Alternative 8, the maximum technology scenario. Alternative 5 (proposed Alternative 8) sets GHG emissions and fuel efficiency standards for heavy-duty pickup trucks and vans, Class 2b through 8 vocational vehicles, and combination tractors and the engines installed in them, but also includes the regulation of trailers. This alternative adds hybrid powertrains to the heavy-duty pickup trucks and vans, vocational vehicles, and tractors. In addition, the agencies applied aerodynamic technologies to commercial box trailers, along with tire technologies for all commercial trailers. In response to IPI's comment, the agencies do not believe that it is possible to achieve hybrid technology penetration rates at or even near these levels included in Alternative 5 in the timeframe of this rulemaking. However, we believe it is useful to consider what a future standard based on the use of such advanced technologies could achieve. CBD noted that the proposed Alternative 8 did not include all of the technologies used in the proposed Alternative 6b. In response, the agencies developed Alternative 5, the maximum technology scenario in the final rulemaking, to include all technologies assumed in Alternative 4 and added greater hybrid powertrain application rates and a performance standard for commercial trailers. In response to New York DOT's comment suggesting the addition of hybrid powertrains for combination tractors, the agencies added a 5 percent penetration rate beginning in the 2017 model year for combination tractors in Alternative 5. The agencies also note that the presentation of the costs and benefits of each alternative broken down by vehicle category allows decision makers to interpolate between Alternatives to evaluate other levels of technology penetrations, such as those included in New York DOT and IPI's comments.

In response to IPI's comment about the technology costs for hybrid technologies and similar comments about bottoming cycle engines, we do not believe that the technologies included in Alternatives 4 and 5 can be developed and introduced in the timeframe of this rulemaking. Reflecting that given unlimited resources it might be possible to introduce these technologies in this timeframe, but our inability to estimate what those real costs might be (e.g. to build new factories in only one to two years), we have denoted the cost for these alternatives with a +c. The +c is intended to make clear that the cost estimates we are showing do not include additional costs related to pulling ahead the development and expanding manufacturing base for these technologies. In the cases where we are unable to estimate the total cost for compliance for the reasons described here, we are likewise unable to calculate the net benefit for the alternative. If the agencies set future standards reflecting the use of hybrid powertrains, we will conduct a thorough cost analysis of the technology, including the application of indirect cost multipliers and learning curves.

The agencies have carefully balanced the statutory factors in setting forth alternatives under consideration in this rulemaking, with the goal of setting standards pursuant to each agency's respective statutory mandate. . In doing so, the agencies determined appropriate engine and vehicle technologies for each vehicle sector that would achieve the maximum feasible level within the regulatory timeframe covered by this rulemaking. The agencies believe that the alternatives selected represent a reasonable range of alternatives, and that the selection of technologies within each alternative is appropriate, cost-effective, and technologically feasible for the diverse and broad range of vehicle configurations and applications being regulated within the heavy-duty fleet. The agencies believe that requiring increased technology penetration beyond what the agency has modeled would exceed maximum feasibility.

As discussed above and in the feasibility discussion in Section III, we are not finalizing Alternative 4 or 5 because we do not believe that these technologies can be developed and introduced in the timeframe of this rulemaking.

6.2.3. **Timing**

6.2.3.1. Start Time

Organizations Included in this Section:

Rubber Manufacturers Association
Cummins, Inc
American Automotive Policy Council
Navistar, Inc.
Daimler Trucks North America
Center for Neighborhood Technology
Volvo Group

Organization: Rubber Manufacturers Association (RMA)

2014 MY vehicle component specifications are usually finalized in the 4th quarter of 2012 because production typically would start in the 2nd quarter of 2013. This does not provide sufficient time to make significant changes. Tires are already being developed for 2014 MY vehicles. If the OEM’s require reduced rolling resistance, significant changes may need to occur to the tire to achieve the proper balance of performance which in some cases would result in a total redevelopment of the tire and could take as long as 5 years to accomplish. Rolling resistance test data will be in high demand and difficult to obtain quickly. As described in detail in section V below, issues relating to tire testing will not facilitate meaningful tire measurements to be made pursuant to the proposed requirements until the end of 2011 or early 2012. [EPA-HQ-OAR-2010-0162-1963.1, p.5]

Organization: Cummins, Inc

In May 2010, several companies, including Cummins, wrote Administrator Lisa Jackson and Secretary Ray LaHood in support of a national program comprised of GHG emission standards and fuel efficiency standards for years 2014-2018.5 Further, and as noted previously, Cummins stood with President Obama on May 21, 2010 in support of this program, and we remain committed to it today. [EPA-HQ-OAR-2010-0162-1765.1, p.10]

However, this is an ambitious program with compressed leadtime and stability periods. Programs of this type typically require no less than four years of leadtime and three years of stability. These time schedules are specifically included in both the Clean Air Act and the Energy Independence and Security Act. Under the proposed timeline, only two years of leadtime are provided from when the rule is finalized to the new standards take effect. In addition, HD engine manufacturers must comply with new Onboard Diagnostics (OBD) requirements in 2013 and 2016 as part of the criteria pollutant program. Meeting these requirements is a significant challenge with a great deal of development work that should not be understated relative to meeting new GHG standards just one year later in 2014 and 2017, much shorter than the three year stability period required by law. [EPA-HQ-OAR-2010-0162-1765.1, p.10]

Despite these issues, Cummins is willing to work with the Agencies to achieve the timeline set out by the President. We believe it is important to begin achieving the environmental, economic and energy security benefits of this program. However, any subsequent rulemaking needs to recognize the necessity of four years leadtime and three years stability. Leadtime and stability periods for future GHG/FC regulations must not be considered independent of criteria pollutant requirements including OBD. [EPA-HQ-OAR-2010-0162-1765.1, p.10]

Organization: American Automotive Policy Council

Even though the 2014 model year initial implementation is not consistent with the Clean Air Act requirements for adequate lead time, in the spirit of our common interest in reducing greenhouse gas emissions and fuel consumption, we are willing to support the implementation timing of the proposal. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

Organization: Navistar, Inc.

Flexibility and lead time are key. Adequate flexibility and necessary lead time will increase the range of technologies that will be available for implementation in MY 2014. As EPA is well aware, for each technology:

- Manufacturers must develop system, subsystem, and component concepts.

- Manufacturers must choose among the various system, subsystem, and component concepts which ones to carry forward.

- Manufacturers must develop the concept choices into designs.

- Manufacturers must develop and test the concept choices in bench tests and/or prototypes. This step can include iterations.

- Manufacturers must convey system, subsystem, and/or component specifications to suppliers through requirements documents.

- Suppliers must retool and perform other pre-production activities to prepare for production.

- Manufacturers must conduct testing for product integrity and reliability. This step can include iterations.

- Manufacturers must develop and implement marketing, dealer training, quality, manufacturing, and supply chain readiness.

- Manufacturers must complete certification testing and application processes.

- Manufacturers must produce road-ready engines and/or vehicles for sale. [EPA-HQ-OAR-2010-0162-1871.1, pp.5-6]

Organization: Daimler Trucks North America

Two of the core principles are that the new GHG regulation would start in 2014 and that it would recognize the needs of the commercial needs of the trucking industry. (See 75 Fed. Reg. at 74156.) Manufacturers should not be required to meet the new standards for vehicles built before January 1, 2014 nor should they be required to change their normal well established business practice to preserve the 2014 effective date. The proposed regulation, however, is effective for “model year” 2014 vehicles. Tying the effective date of the regulation to a vehicle model year designation creates an artificial constraint on the heavy-duty industry that helps no one, produces no emission benefit, and does nothing to decrease GHG emissions. In the HDV industry, model years are not tightly linked to vehicle build year. A HDV model year generally starts early in the preceding year: February, March, or April, as permitted in the provisions of 49 CFR Part 565 and established by long-standing industry practice. HDV model year designations, while somewhat arbitrary, serve as marketing tools. For example, the change of the model year usually coincides with a major trade show in the prior year. Whether a vehicle manufacturer defines its 2014 model year as starting in April of 2013 or January 2014 will not affect vehicles’ emissions and should not create a constraint on compliance with GHG standards nor should the GHG standards that are to be effective in 2014 require the vehicle manufactures to change their long standing model year practices. [EPA-HQ-OAR-2010-0162-1818.1, p.47]

Vehicle model years are not linked to engine model years and only loosely linked to vehicle build dates. By using model year 2014 as the effective date for the regulation, EPA will force manufacturers to certify vehicles in early 2013 or change the way they normally operate with respect to model year designations. Further, and even more troubling, if the EPA defines the start date as model year 2014 manufactures will be forced to certify in the beginning of 2012 (model year 2013 vehicles) if they want to generate early credits. Daimler will not accept a program that requires it to certify its vehicles in 2013 or that forces it to change the way it uses model year designations. The current system of model year designations works for the industry and the Agencies should not force an unnecessary change to the longstanding model year practice governed by 49 CFR Part 565. Instead, the regulation should be applicable for vehicles manufactured after January 1, 2014 and any vehicles certified before that date would be certified early, regardless of model year designation. [EPA-HQ-OAR-2010-0162-1818.1, p.47]

Organization: Center for Neighborhood Technology

Given the lifecycle of heavy duty vehicles and the fleet turnover rate (the typical transit bus on the road today is 7.5 years old); we would encourage the earliest adoption of these standards possible to help communities meet greenhouse gas targets for the years 2020 and earlier. We would urge EPA and NHTSA to implement the rule for model years 2012 and beyond. [EPA-HQ-OAR-2010-0162-2261.1, p.1]

Organization: Volvo Group

Because medium- and heavy-duty vehicles are uniquely built for specific applications, we understand that it will not be feasible to develop regulatory protocols that can accurately predict efficiency in each application duty cycle, the number of which must be limited to enable compliance and enforcement of the regulation. This trade-off compromises in-use effectiveness in order to reduce regulatory complexity. It is vital that such compromises consider the potential for unintended or negative consequences in parts of the market. [EPA-HQ-OAR-2010-0162-1812.2, p.3]

Volvo Group opposes implementation of mandatory requirements starting in model year (MY) 2014. Due to the onerous burdens placed on manufacturers in the current regulatory framework in regards to compliance demonstration and conformance certification, the inconsistency between the NPRM preamble and proposed regulatory language, and the fact that these requirements are new to heavy-duty vehicle manufacturers, implementation with MY 2014 would be premature and difficult to meet. [EPA-HQ-OAR-2010-0162-1812.2, p.4]

Though there is some flexibility in a manufacturer's model year timing, commercial considerations limit the ability of manufacturers to move back this timing. In particular, price increases are tied to model year introductions and are difficult to achieve at any other time during the year. Such increases are necessary to cover cost of improvements to the vehicles, inflation, and other costs. The HD truck industry has become accustomed to model change-over early in the year prior to the model year, typically in January. MY designation also impacts vehicle residual value since vehicles are valued based on model year. Moving the model year from the beginning of the year to near the end of the year in order to provide adequate time to prepare for this rule would essentially eliminate a model year and the economic impact would be very large. [EPA-HQ-OAR-2010-0162-1812.2, p.4]

In addition, given the complexity and newness of GHG/FE regulations for heavy-duty vehicles, it would be appropriate to phase in compliance. In such a scenario, all manufacturers would comply with model year implementation timing and begin certifying and reporting with model year 2014. However, compliance would not become mandatory and manufacturers would not be subject to penalty until model year 2016. This phase in would align with the DOT fuel economy implementation schedule prescribed by the Energy Independence Security Act (EISA), and would allow for resolution of difficulties in the certification and compliance processes, as well as needed correction of regulatory inconsistencies prior to penalties being applied. A less desirable alternative to a phased-in regulation, is a regulatory period beginning January 1 of calendar year 2014 instead of with model year 2014. Such position is consistent with the May 20 Letter of Principles. [EPA-HQ-OAR-2010-0162-1812.2, p.4]

Response:

We are addressing the concerns that the proposed dates used to specify the model year would inappropriately shorten needed lead time by providing that only vehicles and engines produced after January1 , 2014 would have to be certified to the MY 2014 GHG standards. Vehicles and engines produced before this date could be certified to the MY 2014 standards at the manufacturer's option. Thus, a manufacturer could produce uncertified model year 2014 vehicles through December 31, 2013. This provision is codified in §1037.150(g).

6.2.3.2. Model Year Definition

Organizations Included in this Section:

Navistar, Inc.
Daimler Trucks North America
Volvo Group
Engine Manufacturers and Truck Manufacturers Associations

Organization: Navistar, Inc.

EPA's proposal to change the definition of "model year" for heavy-duty engines is not in compliance with the CAA or EPA's long-standing regulations. Specifically, EPA proposes to depart from the long-standing definition of model year in part 86 by, inter alia, adding a sentence to the part 1036 definition that states manufacturers must "not adjust model years to circumvent or delay compliance with the emission standards or to avoid the obligation to certify annually." EPA provides no discussion of the meaning of this addition, its purpose, the reasons or need for the change, its authority for implementation, how this new standard might be applied, nor what consequences if any EPA believes may result from the modification. EPA is completely silent on this significant addition. As a result, Navistar is not only uncertain what is meant by the additional sentence, Navistar finds itself in the untenable position of trying to comment on a provision that EPA has apparently given little thought to (and no explanation for) in its notice of proposed rulemaking. [EPA-HQ-OAR-2010-0162-1871.1, p.47]

From the little that can be gleaned from the face of the provision, this new definition of "model year" is, at minimum, unnecessary and in all likelihood will result in confusion and conflict among the various regulatory provisions applicable to heavy-duty engines and vehicles. The sentence is unnecessary because the prior part of the definition clearly indicates that a model year must end on the last day of the named year. For example, the MY 2014 must end no later than December 31, 2014. If new standards take effect in 2015, engines produced after that date would have to meet model year 2015 standards. This appears to prevent the potential instance in which a model year where an emission standard first applies could be put off by extending a previous model year. Thus, it is unnecessary to add the language regarding "circumvention." Rote application of the definition leaves no wiggle room on either end of "model year." [EPA-HQ-OAR-2010-0162-1871.1, pp.47-48]

Moreover, there appears to be serious potential for confusion and conflict between the various provisions that address transitions to new emission standards. For instance, integrated heavy-duty vehicle and engine manufacturers will be subject to different "model year" meanings depending on the type of the pollutant (part 86 v. part 1036) and whether it's an engine, vehicle or both (parts 86, 1036 v. part 1037). Because EPA offers no discussion of the interplay of these provisions, the regulated community has no notice of the rules that will apply or how they will work together. And, as discussed immediately below, there is some confusion about the applicability of part 1068 and, if applicable, the appropriateness for doing so. In particular, there are two provisions in part 1068 that apply to transitions between emission standards. Given the proposed change in the "model year" definition for engines in part 1036, it appears that as many as three different provisions may potentially apply depending on the circumstance. [EPA-HQ-OAR-2010-0162-1871.1, p.48]

EPA also provides no explanation of its phrase discussing the potential "to avoid an obligation to certify annually." In some circumstances, manufacturers have historically set model years such that one model year might be skipped. This in no way impacts emissions compliance. For instance, if an emission standard came into effect in MY 2014, it would not impact emissions compliance if a manufacturer went from the MY 2013 to MY 2015 beginning in early 2014. The standards would still apply to anything certified in 2014 and beyond. [EPA-HQ-OAR-2010-0162-1871.1, p.48]

In the CAA, Congress defined "model year" to mean "the manufacturer's annual production period ... which includes January 1 of such calendar year [or i]f the manufacturer has no annual production period, the term 'model year' shall mean the calendar year." 42 U.S.C. § 7521(b)(3)(A)(i). Although Congress gave EPA discretion to revise the definition in limited circumstances, EPA has not done so previously for heavy-duty engines. See 40 CFR § 86.082-2. Moreover, EPA's longstanding position has been that it is permissible to "bank" sufficient engines from one model year for use in the next model year with a new emissions standard in order to meet "normal lead time requirements" and consistent with "normal business practices." Corresp. dated Nov. 22, 1989, from EPA's Mary T. Smith to Buddy Cox, at 1 ("The sale of 1990 model year heavy-duty diesel engines for use in 1991 model year heavy-duty vehicles is not in itself a violation of the Clean Air Act or of any regulations under the Act."). [EPA-HQ-OAR-2010-0162-1871.1, p.51]

However, NHTSA and EPA are proposing a definition of "model year" for vehicles that is inconsistent with the CAA and EPA's longstanding heavy-duty engine policy. Similarly, the proposed new definition also substantively deviates from the definition currently set forth in NHTSA's safety regulations which defines "month and year of manufacture" as "the time during which work was completed at the place of main assembly of the vehicle." See 49 CFR § 567.4(g)(2). According to NHTSA and EPA, for heavy-duty vehicles "[a] manufacturer must use the date on which a vehicle is shipped from the factory in which the assembly process is finished as the date of manufacture for determining model year." That has never been a requirement under the CAA or EPA's heavy-duty engine policies, which expressly recognize the need to "bank" engines and vehicles to comply with production lead times and business practices, or NHTSA's safety regulations. [EPA-HQ-OAR-2010-0162-1871.1, p.51]

The inclusion of the "ship" date in the definition will create significant difficulty and uncertainty in establishing the model year for particular engines and vehicles. It is not unlikely that engines will qualify as one model year but vehicles will be the following model year. During years between which a new emissions gate takes effect (e.g., 2016-2017), manufacturers may find themselves subject to conflicting GHG and fuel consumption standards. Likewise, while production schedules for vehicles are somewhat rigid, the date of shipment depends on a host of factors outside the manufacturer's control including customer and supplier requirements. For instance, if a component is not delivered on time, the main assembly may be completed, but the vehicle will be placed "off-line" for completion. Also, final assembly may not be completed until late customer-specified changes are made at a post-production facility. These unpredictable changes to the date of shipment are not workable. [EPA-HQ-OAR-2010-0162-1871.1, pp.51-52]

Moreover, it is unclear how the "model year" that manufacturers will use for GHG regulatory purposes will correlate with the "model year" manufacturers advertise to customers for sales and marketing purposes. The latter can change frequently. Compliance should be driven by the actual date of manufacturer as under the current rules. For program harmonization as well as what is legally required, EPA and NHTSA must revise their definitions of model year for vehicles to be consistent with longstanding rules and policies. [EPA-HQ-OAR-2010-0162-1871.1, p.52]

Organization: Daimler Trucks North America

Third, this definition of model year is problematic, because it fails to recognize the way that our industry works. Post manufacturing activities often occur after a vehicle is shipped from a main production plant but before a vehicle is shipped to a customer. For example a customer may request installation of some feature like an APU that we only install at our post-assembly inspection facility. Post-production upgrades could change the vehicle production date, per the Agencies' proposed definition, yet it is not something we can easily predict when we order the frame rails and must stamp the VIN or when we must design into the particular vehicle the fuel saving components that might be necessary for compliance. In short, the Agencies' definition of model year does not keep with current practice, is inconsistent with manufacturers' capabilities, and needs to be revised. In 40 CFR § 1068.30, the EPA defines a non-road chassis' manufacturing date to be "the date on which the engine is installed…." That is a better definition. Alternatively, the date on which frame rails are placed on the assembly line for production is a date certain for manufacturers and would eliminate concerns about manufacturing delays. So it too is a better definition. We recommend that the Agencies use those definitions rather than the one they proposed. [EPA-HQ-OAR-2010-0162-1818.1, pp.48-49]

Organization: Volvo Group

Because medium- and heavy-duty vehicles are uniquely built for specific applications, we understand that it will not be feasible to develop regulatory protocols that can accurately predict efficiency in each application duty cycle, the number of which must be limited to enable compliance and enforcement of the regulation. This trade-off compromises in-use effectiveness in order to reduce regulatory complexity. It is vital that such compromises consider the potential for unintended or negative consequences in parts of the market. [EPA-HQ-OAR-2010-0162-1812.2, p.3]

The Agencies' Definition Of Vehicle Model Year Is Problematic And Must Be Changed To A Definition That Keeps With Current Industry Practice. Moreover, Consistent With Our

Comments Elsewhere, Vehicles Should Be Regulated By The Year In Which They Are Built. [EPA-HQ-OAR-2010-0162-1818.1, p.48]

The Agencies define vehicle model year by “the date on which a vehicle is shipped from the factory in which the assembly process is finished.” (75 Fed. Reg. 74401 and 74439.) Under this definition, Daimler would not be able to predict the vehicle model year. This is problematic for several reasons. First, the model year shown in (for DTNA) the tenth digit of the vehicle’s identification number (VIN) defined by 49 CFR §565.23 will likely, for certain vehicles, conflict with the vehicle model year shown on EPA / NHTSA certification labels. This is problematic in that it could lead to confusion at the Agencies, among enforcement officers, or with our customers. [EPA-HQ-OAR-2010-0162-1818.1, p.48]

Second, this definition of model year is problematic, because we stamp frame rails prior to a vehicle build with a VIN, which includes the vehicle model year. To do this, we need to know the model year designation before the vehicle is built. We cannot leave this up to chance, like the chance that a vehicle will be started in one year and finished in the next. We must be able to maintain the long established industry practice of assigning model years in advance of vehicle builds. Separately under 49 CFR §565.23(j), in which the DOT regulates VINs, DOT defines a vehicle model year as “the year used to designate a discrete vehicle model, irrespective of the calendar year in which the vehicle was actually produced…” (emphasis added). A definition like this is better than the Agencies’ newly proposed definition. Under the Agencies’ proposed definition we could never be sure we will get the model year right. For example if one single component of a vehicle is missing, the main assembly of the vehicle can be complete, yet the truck will go into “off-line” for completion. We may have planned for a vehicle to be model year 2016, but because of manufacturing issues (many of which are not predictable and may be no fault of the manufacturer) the vehicle could be shipped in 2017. Thus, a simple miscalculation or delay could make frame rails wrong and could change a manufacturer’s predictions about what model year a vehicle falls into. Because model year affects compliance issues, vehicle design characteristics, and crucial credit balances we cannot have model year subject to simple miscalculations or parts shortages. [EPA-HQ-OAR-2010-0162-1818.1, p.48]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The 'model year' definitions proposed in §1037.801 and §535.3 are more restrictive than NHTSA's longstanding definition of model year in its Vehicle Identification Number ('VIN') requirements. (See 49 CFR §565.22G).) Therefore, with the proposed new definitions for model year, a manufacturer could produce a vehicle with one model year for the GHG/FE standards, and have a different model year in the VIN. To avoid this unnecessary and potentially confusing situation of having a vehicle with two different model years, the Agencies must align the definitions. [EPA-HQ-OAR-2010-0162-1940.1, p.19]

Furthermore, most HD vehicle manufacturers currently start each new model year during the early months of the preceding calendar year (e.g., production of model year 2011 vehicles began during March 2010, or even earlier), which would result in pulling forward the initial effective date of the Proposed GHG/FE Standards (the 2014 MY) by almost one full year, to early in calendar year 2013. That situation would represent an unacceptable reduction of what already is an extremely compressed leadtime for the implementation of the Proposed GHG/FE Standards. A manufacturer that typically changes model years in March would have only 19 months after the promulgation of the final rule (assuming it is published in July 2011) to implement the sweeping new GHG/FE regulations. [EPA-HQ-OAR-2010-0162-1940.1, pp.19-20]

To remedy this otherwise unacceptable situation and preserve the targeted 2014 implementation date, the Agencies should specify that manufacturers may continue to follow their current industry practices with respect to the early commencement of the 2014 model year (e.g., in March 2013) for all purposes other than emissions compliance. More specifically, the early commencement of the 2014 MY could still be tied to the industry's customary product upgrades, and marketing and sales practices. However, the Agencies also should specify that the Proposed GHG/FE Standards (for the 2014 MY and beyond) would not have to take effect until the beginning of the calendar year, not the model year (i.e., January 1, 2014, as opposed to March 2013 or even earlier). Thus, the Agencies should specify that manufacturers would have the option (and flexibility) of implementing the GHG/FE standards at the later of the commencement of their model year, or at the commencement of the calendar year. This optional bifurcation of model and calendar year (model year for ordinary commercial purposes, and calendar year for emissions regulation purposes) would make the implementation of the Proposed GHG/FE Standards workable. Accordingly, the Agencies should specifically authorize the option of linking the GHG/FE Standards to calendar years as opposed to model years. [EPA-HQ-OAR-2010-0162-1940.1, p.20]

In that regard, the Agencies also should state clearly that the current regulatory practices that apply when new emission standards begin to take effect -- the practices that account for the non-integrated HD vehicle market and that allow for the installation of prior model year engines in current model year vehicles (subject only to EPA's inventory provisions) -- will fully apply to the phase-in of the Proposed GHG/FE Standards. [EPA-HQ-OAR-2010-0162-1940.1, p.20]

The Proposed GHG/FE regulations define 'date of manufacture' for determining model year as 'the date on which a vehicle is shipped from the factory in which the assembly process is finished.' (See 75 FR at 74401, 74439.) By referencing the date the vehicle is shipped from the factory, the proposed new definition substantively deviates from the definition currently set forth in NHTSA's safety regulations which defines 'month and year of manufacture' as 'the time during which work was completed at the place of main assembly of the vehicle.' (See 49 CFR §567.4(g)(2).) In addition to being inconsistent with long-standing NHTSA requirements, the inclusion of the ship date in the definition would create significant difficulty and uncertainty in establishing the model year for particular vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.20]

While vehicle production build schedules are somewhat rigid, the actual date that the vehicle is shipped from the factory can vary greatly due to many factors. If a component is not delivered to the factory in time, the main assembly of the vehicle can be finished, yet the vehicle will be placed 'off-line' for completion. Also, in many cases, final vehicle assembly is not completed until late customer-specified changes are made (e.g., installation of additional components like mirrors or an auxiliary power unit, or paint or finishing modifications) at a post-production inspection facility. In those situations, the date of manufacture, and the model year, do not change under NHTSA's current definition; but they potentially would change under the proposed new definitions. The changes, and the corresponding uncertainty, would be the result of circumstances beyond the vehicle manufacturer's control. Those unpredictable changes to the date of vehicle manufacturer, and subsequently to the model year designation, are not workable and must be eliminated. [EPA-HQ-OAR-2010-0162-1940.1, pp.20-21]

Accordingly, the Agencies must modify the definitions of date of manufacturer to be consistent with the existing NHTSA definition by omitting the reference to the date that the vehicle is shipped from the factory. [EPA-HQ-OAR-2010-0162-1940.1, p.21]

Response:

Section 202(b)(3)(A) of the Clean Air Act (CAA) defines "model year" to mean " . . . the manufacturer's annual production period (as determined by the Administrator) which includes January 1 of such calendar year" or to mean calendar year if the manufacturer has no annual production period. Section 32901(a)(16) of EISA defines "model year" with almost identical language. Section 202(b)(3)(A) of the CAA also allows the EPA Administrator to define model year differently to assure ". . . that vehicles and engines manufactured before the beginning of a model year were not manufactured for purposes of circumventing the effective date of a standard . . ." Consistent with this statutory language, the NPRM proposed regulatory text to define "model year," in 40 CFR 1036.801, 40 CFR 1037.801 and 49 CFR 535.4. All three codified the primary CAA and EISA definition, but differed with respect to language intended to prevent circumvention of the standards. The proposed definition for engines was:

> *Model year* means the manufacturer's annual new model production period, except as restricted under this definition. It must include January 1 of the calendar year for which the model year is named, may not begin before January 2 of the previous calendar year, and it must end by December 31 of the named calendar year. Manufacturers may not adjust model years to circumvent or delay compliance with emission standards or to avoid the obligation to certify annually.

The proposed definition for vehicles was:

> *Model year* means the manufacturer's annual new model production period, except as restricted under this definition and 40 CFR part 85, subpart X. It must include January 1 of the calendar year for which the model year is named, may not begin before January 2 of the previous calendar year, and it must end by December 31 of the named calendar year. Use the

> date on which a vehicle is shipped from the factory in which you finish your assembly process as the date of manufacture for determining your model year. For example, where a certificate holder sells a cab-complete vehicle to a secondary vehicle manufacturer, the model year is based on the date the vehicle leaves the factory as a cab-complete vehicle.

EPA's and NHTSA's vehicle model year definitions differed slightly in wording but were essentially the same for §§ 1037.801 and 535.4. In creating the model year definition for vehicles, the agencies were mindful of the confusion chassis manufacturers may face in determining their model years in a given period of production, for example, due to manufacturing and shipping products at different levels of completion and involving multiple manufacturers. The agencies included the term "ship date" in order to provide chassis manufacturers a clear reference date ("in which you finish *your* assembly process"), as well as to decrease the risk of gaming that might occur if no reference date was specified and there were therefore no parameters on the choice of model year. The engine definition was chosen based on consistency with prior EPA definitions for other mobile source programs.

The agencies received comments on the definitions from EMA/TMA and Navistar expressing concern over the potential for unintended consequences. The commenters argued that the use of "ship date" for vehicles could create difficulty and uncertainty for manufacturers for whom the ship date can be delayed for reasons outside of their control, such as late-arriving components. They also argued that the differences between the vehicle and engine definitions would increase the likelihood that a single vehicle would be subject to different fuel efficiency requirements during certain years of transition in the standards, as it would not be unlikely that a vehicle would be a later model year than an engine. For example, during the 2016-2017 period, an engine may be model year 2016 while the vehicle is model year 2017.

NHTSA and EPA have considered further whether there are benefits to maintaining separate definitions for "model year" for the engine and vehicle standards based on these comments. We continue to believe that differences in manufacturing practices for engines and vehicles support the use of separate definitions. However, for this final rule, we have decided to modify the definitions to account for the above concerns, address circumstances of multiple manufacturers, and provide increased consistency and clarity. Thus, instead of "ship date," the vehicle definition for model year will refer to the date when the certifying manufacturer's "manufacturing operations were completed," within the specified year.—a factor within the manufacturer's exclusive control. The final definition also specifies that each vehicle must be assigned a model year before introduction into U.S. commerce, but allows a manufacturer to redesignate a later model year if it does not complete its manufacturing operations for the vehicle within the initial model year.

To further standardize with EPA definitions, NHTSA will add the EPA engine model year definition to its corresponding regulation 49 CFR 535.4. We believe that this will address the concerns raised by commenters because it will provide standardization, more specificity and account for current manufacturer practices.

The agencies are aware that the designation of a model year on a chassis for the purposes of this heavy duty truck emission and fuel consumption rule may result in a complete vehicle that has one model year associated with its chassis for emission/fuel consumption purposes and another model year designation in its vehicle identification number (VIN) for a motor vehicle's certification to Federal motor vehicle safety standards. However, as the chassis model year designation would only be used on the certificate of conformity by the responsible manufacturer for the purpose of complying with this rule, it would not contradict or conflict with the other purposes for which a VIN model year may be used.

6.2.3.3. Alignment with OBD Timing

Organizations Included in this Section:

Engine Manufacturers and Truck Manufacturers Associations
Cummins, Inc.
Daimler Trucks North America

Organization: Engine Manufacturers and Truck Manufacturers Associations

For both the engine and vehicle components of the HD National Program, the Proposed GHG/FE Standards are established by projecting improvements in the adoption rate of existing technologies. -Many available fuel efficiency technologies are not specified by all HD vehicle purchasers, and the proposed standards are intended to provide regulatory requirements and incentives to increase the use of those available technologies. Due to the short implementation leadtime, it is impossible for manufacturers to develop and bring to market new technological advances to meet the standards. Instead, the HD National Program calls for installing more of the existing technologies on vehicles. However, the technologies in question are not in production for all manufacturers, and certainly not with respect to all HD vehicle applications. Accordingly, just as the truncated leadtime for this rulemaking makes it impractical for manufacturers to bring new technologies to market, it also makes it impractical for certain manufacturers to bring to market 'existing' technologies that are not a part of their current production. [EPA-HQ-OAR-2010-0162-1940.1, pp.5-6]

As noted above, the CAA specifies that emission standards applicable to classes or categories of heavy-duty vehicles or engines 'shall apply for a period of no less than 3 model years [the stability period] beginning no earlier than the model year commencing 4 years after such revised standard is promulgated [the leadtime period].' (See §202(a)(3)(C); 42 U.S.C. §7521 (a)(3)(C).) EISA similarly mandates that any fuel economy standards that NHTSA adopts for HD commercial vehicles 'shall provide not less than 4 full model years of regulatory leadtime, and 3 full model years of regulatory stability.' (See 49 U.S.C. §32902(k)(3)(A).) In this rulemaking, however, the Agencies are not providing the requisite 4-years leadtime for the Proposed GHG/FE Standards, but instead are providing only 2 full years of leadtime.

Specifically, the Proposed GHG/FE Standards are slated to take effect in the 2014 model year, instead of the 2016 model year. [EPA-HQ-OAR-2010-0162-1940.1, p.7]

The fact that the Proposed GHG/FE Standards are based on a common set of core principles is a critical premise to the potential implementation of a rulemaking that affords less than the CAA- and EISA-mandated leadtime and stability. One of those core principles is particularly germane to the proposed truncation of the statutory leadtime period -- the foundational principle that the GHG/FE standards at issue are based on the increased development and utilization of existing technology options. Without the Agencies' faithful adherence to that core principle, the accelerated timeline for the Proposed GHG/FE Standards would not be possible. [EPA-HQ-OAR-2010-0162-1940.1, p.7]

Notwithstanding industry's potential willingness to accommodate the accelerated introduction of the Proposed GHG/FE Standards, there are hurdles to the 2014 MY implementation date that still need to be addressed. More specifically, the proposed commencement of the GHG emission standards with the 2014 model year will follow directly on the heels of the commencement of very challenging and labor-intensive heavy-duty engine onboard diagnostic ('HD OBD') requirements in the 2013 MY. Compliance with the HD OBD emission requirements in 2013 will be time-consuming and expensive for HD engine and vehicle manufacturers, and under ordinary circumstances, manufacturers should not have to redesign and recertify their products just one year later. Instead, emission requirements should be afforded the 3-year stability period mandated under the CAA and EISA to allow manufacturers a reasonable opportunity to recoup their capital investments toward compliance with the 2013 HD OBD requirements. [EPA-HQ-OAR-2010-0162-1940.1, p.7]

Here again, manufacturers are willing to work with the Agencies to preserve the targeted 2014 commencement date for the HD National Program. To make that feasible, however, the Agencies need to defer the effective date of the HD OBD requirements for one-year, to the 2014 MY (and similarly need to defer the 2016 OBD phase-in date by one year, to the 2017 My), to allow engine manufacturers to coordinate all of the planning and development work that will be required to successfully implement both the HD OBD program and the HD GHG/FE program. In addition, the Agencies need to work with the California Air Resources Board ('CARB') to ensure that CARB implements a similar deferral of its HD OBD program. Alignment of these two significant HD programs to commence with the 2014 model year would ease the otherwise inordinate and unacceptable burdens facing manufacturers over the next 3 years, and, just as important, would do so in a way that would cause no adverse impact on the environment. [EPA-HQ-OAR-2010-0162-1940.1, p.8]

There may be other ways to ease the burden of manufacturers having to launch a full range of OBD-compliant products in 2013, followed by a second launch and certification program one year later to meet the proposed GHG/FE emission standards in 2014. Specifically, the Agencies could do more to align the HD OBD requirements with the 2014 MY standards. For example, and as discussed as an option in the Preamble, instead of a CO2 standard for HHD Class 8 tractor engines of 475 g/bhp-hr in 2014, followed by a 460 g/bhp-hr standard in 2017, an option could be provided for a 485 g/bhp-hr standard in 2013, followed by a 460 g/bhp-hr standard in 2016. Other compliance options could be provided for the other categories of HD vehicles, as set forth in the following table: [EPA-HQ-OAR-2010-0162-1940.1, p.8]

[See p.8 of this comment summary for a table displaying: Other compliance options could be provided for the other categories of HD vehicles]

Accordingly, in order to allow for the accelerated implementation of the Proposed GHG/FE Standards, the Agencies should defer the implementation of the HD OBD requirements until the 2014 MY, or, alternatively, they should adopt an optional, more aligned phase-in schedule for the Proposed GHG/FE Standards as set forth above. The Agencies also will need to ensure the CARB takes similar steps to implement the necessary alignment between its HD OBD program and the HD GHG/FE program. Otherwise, the targeted implementation date for the GHG/FE standards will not be feasible or acceptable. [EPA-HQ-OAR-2010-0162-1940.1, p.8]

Beginning with the 2013 model year, manufacturers will be required to equip all heavy-duty engines with onboard diagnostics systems. As set forth above, the HD OBD requirements (including those adopted by CARB) should be deferred to 2014 to help ensure that the commencement date for the Proposed GHG/FE Standards is feasible. Assuming a 2014 MY start date for the HD OBD requirements, the Associations agree with the Agencies that the existing OBD requirements for 'components and systems for criteria pollutant emissions will have an equally beneficial effect on CO2 emissions' and that 'unique onboard diagnostic provisions for heavy-duty GHG emissions' are not necessary. (See 75 FR at 74269.) Expanding OBD requirements to GHG emissions and fuel consumption reduction technologies would impose unnecessary burdens on manufacturers, and would directly conflict with the core principles of the HD National Program -- that the program be implementable and spur the development and deployment of existing GHG/FE technologies. Thus, the Agencies should clearly reconfirm in the final rule that OBD provisions will not be required for GHG emissions. The Agencies also should work to ensure the CARB adopts the same position. [EPA-HQ-OAR-2010-0162-1940.1, p.11]

Organization: Cummins Inc.

In May 2010, several companies, including Cummins, wrote Administrator Lisa Jackson and Secretary Ray LaHood in support of a national program comprised of GHG emission standards and fuel efficiency standards for years 2014-2018.5 Further, and as noted previously, Cummins stood with President Obama on May 21, 2010 in support of this program, and we remain committed to it today. [EPA-HQ-OAR-2010-0162-1765.1, p.10]

However, this is an ambitious program with compressed leadtime and stability periods. Programs of this type typically require no less than four years of leadtime and three years of stability. These time schedules are specifically included in both the Clean Air Act and the Energy Independence and Security Act. Under the proposed timeline, only two years of leadtime are provided from when the rule is finalized to the new standards take effect. In addition, HD engine manufacturers must comply with new Onboard Diagnostics (OBD) requirements in 2013 and 2016 as part of the criteria pollutant program. Meeting these requirements is a significant challenge with a great deal of development work that should not be understated relative to meeting new GHG standards just one year later in 2014 and 2017, much shorter than the three year stability period required by law. [EPA-HQ-OAR-2010-0162-1765.1, p.10]

Despite these issues, Cummins is willing to work with the Agencies to achieve the timeline set out by the President. We believe it is important to begin achieving the environmental, economic and energy security benefits of this program. However, any subsequent rulemaking needs to recognize the necessity of four years leadtime and three years stability. Leadtime and stability periods for future GHG/FC regulations must not be considered independent of criteria pollutant requirements including OBD. [EPA-HQ-OAR-2010-0162-1765.1, p.10]

In general, Cummins supports flexibility in implementation of this first ever program for GHG/FC standards for HD engines and vehicles. The Agencies have requested comment (see 75 FR 74178) on whether to provide a defined phase-in schedule that explicitly aligns the GHG/FC standards with the OBD requirements which take effect in MY2013 and MY2016. Complying with the increasingly stringent OBD requirements will require much development effort and resources on the part of engine manufacturers, and it is not feasible to repeat a similar effort for another new product launch just one year later in both MY2014 and MY2017 to comply with GHG/FC standards. It is important to maintain a three year period of regulatory stability where possible. Therefore, Cummins supports the inclusion of an alternate phase-in schedule in the final rule. [EPA-HQ-OAR-2010-0162-1765.1, p.27]

In the Preamble, the Agencies gave an example of one possible alternate phase-in for HHD tractor engines with a standard of 485 g/bhp-hr CO2 for model years 2013- 2015, followed by a standard of 460 g/bhp-hr CO2 for model years 2016-2018 (with equivalent FC standards). We support this schedule, and patterned after the Agencies' example, propose the following additional alternate phase-in schedules and standards for the remaining engine subcategories:

HHD vocational engines

2013 - 577 g/bhp-hr CO2

2016 - 555 g/bhp-hr CO2

MHD tractor engines

2013 - 512 g/bhp-hr CO2

2016 - 487 g/bhp-hr CO2

MHD and LHD vocational engines

2013 - 618 g/bhp-hr CO2

2016 - 576 g/bhp-hr CO2 [EPA-HQ-OAR-2010-0162-1765.1, p.27]

The timing and standards in this alternative phase-in proposal will provide the same overall reductions in GHG/FC for the period from model years 2013-2018 compared to the primary program. [EPA-HQ-OAR-2010-0162-1765.1, p.28]

Organization: Daimler Trucks North America

As noted above, the CAA (at Section 202(a)(3)(C); 42 U.S.C. § 7521 (a)(3)(C)) specifies that emission standards applicable to classes or categories of heavy-duty vehicles or engines "shall apply for a period of no less than 3 model years [the stability period] beginning no earlier than the model year commencing 4 years after such revised standard is promulgated [the lead time period]." EISA similarly mandates (at 49 U.S.C. §32902(k)(3)(A)) that any fuel economy standards that NHTSA adopts for HD commercial vehicles "shall provide not less than 4 full model years of regulatory lead time, and 3 full model years of regulatory stability." In this rulemaking, however, the Agencies are not providing the requisite 4-years lead time for the Proposed GHG/FE Standards, but instead are providing only 2 full years of lead time. [EPA-HQ-OAR-2010-0162-1818.1, p.27]

Of great concern is that the proposed commencement of the GHG emission standards with the 2014 model year will follow directly on the heels of the commencement of very challenging and labor-intensive heavy-duty engine on-board diagnostic ("HD OBD") requirements in 2013. Compliance with the HD OBD emission requirements in 2013 will be time-consuming and expensive for HD engine and vehicle manufacturers, and under ordinary circumstances, manufacturers should not have to redesign and recertify their products just one year later. Instead, under ordinary circumstances, emission requirements should be afforded the 3-year stability period mandated under the CAA and EISA to allow manufacturers a reasonable opportunity to recoup their capital investments toward compliance with the 2013 HD OBD requirements. [EPA-HQ-OAR-2010-0162-1818.1, p.27]

While Daimler may be willing to accept less than the CAA-and EISA-mandated lead time in this rulemaking as a component of the collaborative process that has led to the development of the Proposed GHG/FE Standards, there are hurdles to the 2014 implementation date that still need to be addressed. Daimler expends considerable resources to validate product redesigns as mandated by affectivity dates of new regulations. Consequently we plan the bundling of new features to the best of our abilities so that these expensive and time consuming validation tests can be executed most efficiently by not needing to be repeated for each individual change. New features requiring validation are often driven by new regulations as will be the case for many new features required by GHG rules and by OBD rules. OBD rules will drive new features in virtually every model year 2013 on-highway family and extensive validation efforts are planned. This will be followed by further changes for model year 2016. To accommodate and make feasible the Agencies desire for a 2014 start date for this regulation Daimler requests that the Agencies defer the effective date of the HD OBD requirements for one-year, to 2014 (and similarly defer the 2016 OBD phase-in date by one year, to 2017), to allow Daimler to coordinate all of the planning and development work that will be required to successfully implement both the HD OBD program and the HD GHG/FE program. Alignment of these two significant programs to commence with the 2014 model year would ease the otherwise inordinate burdens facing manufacturers over the next 3 years, and, just as important, would do so in a way that would cause no adverse impact on the environment. [EPA-HQ-OAR-2010-0162-1818.1, pp.27-28]

If the agency is unwilling to extend the OBD implementation dates, the Agencies should adjust, as suggested in the preamble, the CO2 standards in a pulled-ahead schedule to provide identical emissions reductions as otherwise proposed in the 2013-18 model years. The table below similarly provides suggested standards for the various engine categories. This would limit the development [EPA-HQ-OAR-2010-0162-1818.1, p.28]

Category	Current Proposal	Suggested Revisions	
	Model Year 2014	Model Year 2013	Model Year 2016
HHDD Tractor	475	485	460
HHDD Vocational	567	577	555
MHDD Tractor	502	512	487
MHDD/LHDD Vocational	600	618	576

[EPA-HQ-OAR-2010-0162-1818.1, p.28]

burden in the OBD implementation years. Whether the Agencies elect to move the OBD implementation dates out or adjust the standards to ease the GHG compliance burden in 2013, the agencies should adjust the GHG implementation dates to coincide with OBD rule change dates. One additional benefit to doing this is the streamlining the OBD review process. With implementation of new systems and strategies to meet new or more stringent emissions requirements, extensive review of the newly introduced or modified designs is necessary to assess compliance with OBD requirements. Similarly, intensive review of OBD systems occurs with changes to stringency or newly introduced OBD requirements as is the case for model years 2013 and 2016. In order to avoid doubling the already exhausting OBD review process by scheduling back-to-back model year rule changes (each then requiring detailed OBD review), it is strongly urged that the agencies synchronize GHG and OBD implementation dates thereby facilitating a single combined OBD review of new GHG and OBD features. [EPA-HQ-OAR-2010-0162-1818.1, p.28]

Organization: Volvo Group

The CAA (at Section 202(a)(3)(C); 42 U.S.C. § 7521 (a)(3)(C)) specifies that emission standards applicable to classes or categories of heavy-duty vehicles or engines “shall apply for a period of no less than 3 model years [the stability period] beginning no earlier than the model year commencing 4 years after such revised standard is promulgated [the leadtime period].” EISA similarly mandates (at 49 U.S.C. §32902(k)(3)(A)) that any fuel economy standards that NHTSA adopts for HD commercial vehicles “shall provide not less than 4 full model years of regulatory leadtime, and 3 full model years of regulatory stability.” In this rulemaking, however, the Agencies are not providing the requisite 4-years leadtime for the Proposed GHG/FE Standards, but instead are providing only approximately 2 years of leadtime. Specifically, the Proposed GHG/FE Standards are slated to take effect in the 2014 model year, instead of the 2016 model year. [EPA-HQ-OAR-2010-0162-1812.2, p.33]

The proposed commencement of the GHG emission standards with the 2014 model year will follow directly on the heels of the commencement of very challenging and labor-intensive heavy-duty engine on-board diagnostic (“HD OBD”) requirements in 2013. Compliance with the HD OBD emission requirements in 2013 will be time-consuming and expensive for HD engine and vehicle manufacturers, and under ordinary circumstances, manufacturers should not have to redesign and recertify their products just one year later. Instead, under ordinary circumstances, emission requirements should be afforded the 3-year stability period mandated under the CAA and EISA to allow manufacturers a reasonable opportunity to recoup their capital investments toward compliance with the 2013 HD OBD requirements. [EPA-HQ-OAR-2010-0162-1812.2, p.33]

Accordingly, in order to allow for the accelerated implementation of the Proposed GHG/FE Standards, the Agencies should defer the implementation of the HD OBD requirements until 2014, or, alternatively they should adopt a more aligned phase-in schedule for the Proposed GHG/FE Standards as set forth by the Engine Manufacturers Association (EMA). [EPA-HQ-OAR-2010-0162-1812.2, p.33]

Accordingly, in light of the foregoing, and in furtherance of the stated goal to spur the increased deployment of HD hybrid vehicles, the Agencies should clarify that no OBD requirements will be required for hybrid systems at least until 2020. [EPA-HQ-OAR-2010-0162-1812.2, p.34]

Response:

As discussed in preamble Section II.B.2.b and II.D.2.b, the agencies recognize, however, that the schedule of changes for the final standards may not be the most cost-effective one for all manufacturers. The agencies also sought comment on whether an alternate phase-in schedule for the HD diesel engine standards for combination tractors should be considered. In developing the proposal, heavy-duty engine manufacturers stated that the phase-in of the GHG and fuel consumption standards should be aligned with the On Board Diagnostic (OBD) phase-in schedule, which includes new requirements for heavy-duty vehicles in the 2013 and 2016 model years. The agencies did not propose this option , explaining that the credit averaging, banking and trading provisions would provide manufacturers with considerable flexibility to manage their GHG and fuel efficiency standard compliance plans – including the phase-in of the new heavy-duty OBD requirements – but requested comment on whether EPA and NHTSA should provide an alternate phase-in schedules that would more explicitly accommodate this request in the event that manufacturers did not agree that the ABT provisions mitigated their concern about the GHG/fuel consumption standard phase-in. See 75 FR at 74178.

In order to provide additional flexibility for manufacturers looking to align their technology changes with multiple regulatory requirements, the agencies are finalizing an alternate "OBD phase-in" option for meeting the standards for LHD, MHD and HHD diesel engines installed in tractors and vocational vehicles, which delivers equivalent CO_2 emissions and fuel consumption reductions as the primary standards for the engines built in the 2013 through 2017 model years. See preamble at section II.B.2.b quantifying the equivalence of these reductions under the respective approaches. The optional OBD phase-in schedule requires that engines built in the 2013 and 2016 model years to achieve greater reductions than the engines built in those model years under the primary program, but less reductions for the engines built in the 2014 and 2015 model years. Finally, as explained in section 5 of this comment response document, the CO_2 standards are adopted pursuant to section 202 (a) which does not contain the lead time and stability provisions referred to by Volvo (and other commenters).

6.2.4. Useful life and Deterioration Factor (df)

6.2.4.1. Deterioration Factors

<u>Organizations Included in this Section:</u>

Natural Gas Vehicle Interests
Engine Manufacturers and Truck Manufacturers Associations
Volvo
Daimler Trucks North America

Organization: Natural Gas Vehicle Interests

CO2 DF. The HD Rule proposes that a zero additive/1.0 multiplicative deterioration factor ("DF") for CO2 will be used in certification for the pickup/van class (75 FR 74197), LHDs (75 FR 74265), and vocational vehicles classes 2b-5 (75 FR 74203). We agree, as we do not anticipate any deterioration of CO2 emissions or fuel consumption performance over the useful life of these NGVs. [EPA-HQ-OAR-2010-0162-2119.1, p.10]

However, the HD Rule proposes establishment of a non-zero additive/>1.0 multiplicative DF for the MHD and HHD segments because of their longer useful life. 75 FR 74265. We believe such a DF is equally inappropriate here, for two reasons. First, the fact that an engine has a longer useful life does not make it inherently more susceptible to performance deterioration. The longer useful life of an MHD or HHD engine is reflected in the design of the engine and aftertreatment system. Construction is different and lower thermal and mechanical limits are observed to reduce wear and maintain the performance of the system over the useful life. Therefore, there is no reason to suspect that the fuel consumption and CO2 of a MHD/HHD engine is more likely to deteriorate over the useful life than an LHD engine. [EPA-HQ-OAR-2010-0162-2119.1, p.10]

Second, a zero additive/1.0 multiplicative DF for CO2 is appropriate because the regulations are derived from baseline data from new engines, and the impact of deterioration is not included in that data. Applying reduced CO2 values derived from a new baseline to end-of-useful-life engines introduces a significant unknown that is not covered in the impact analysis or in the projected improvements in engine technology over the duration of the regulation. In addition, as the rule acknowledges, the required testing process “may be a significant cost to an engine manufacturer, mainly due to the amount of time and resources required to run the engine out to half or full useful life”, and thus “it may be impractical to expect manufacturers to have testing-based deterioration factors available for this proposal.” 75 FR 74267. And this “significant cost” is even more significant for the far smaller NGV manufacturers. [EPA-HQ-OAR-2010-0162-2119.1, pp.10-11]

CH4 and N2O DFs. The HD Rule also seeks information as to an appropriate DF for N2O and CH4 (75 FR 74208). [EPA-HQ-OAR-2010-0162-2119.1, p.11]

Given that this is the first-ever attempt to regulate emissions of these two compounds from MHD and HHD engines, the Natural Gas Vehicle Interests believe that a zero additive/1.0 multiplicative assigned DF is appropriate for this rule. As with the CO2 DF, the CH4 and N2O limits have been established on the basis of baseline data from new engines. Impact of deterioration is not included in the baseline data and so imposing reductions in from a new baseline to end-of-useful-life engines introduces a significant unknown that is not covered in the impact analysis or in the projected improvements in engine technology over the duration of the regulation. [EPA-HQ-OAR-2010-0162-2119.1, p.11]

Until a decision can be based on real-world emissions data, we believe that any attempt to establish a DF for N2O or CH4 is premature. In particular, given the stringency of the proposed CH4 limit – requiring close to a 95% reduction in CH4 emissions – setting any DF should be done on the basis of actual data rather than guesswork. Only a large set of robust performance data from engines and vehicles subject to the proposed standards could justify establishing derived CH4 and N2O DF provisions, something that can obviously be revisited in future rulemakings. [EPA-HQ-OAR-2010-0162-2119.1, p.11]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The Agencies propose in §1036.241(c) that manufacturers need not apply deterioration factors ('DFs') to measured emission levels 'unless good engineering judgment indicates that significant emission deterioration will occur during the useful life.' (See 75 FR at 74370.) Such an ambiguous requirement leaves uncertain precisely how the Agencies might interpret what constitutes 'good engineering judgment' and what level of deterioration -- under what aging conditions -- the Agencies may deem to be 'significant emission deterioration.' That uncertainty is underscored by the fact that GHG emission deterioration data currently are very limited. In fact, the Agencies have established the Proposed GHG/FE Standards by analyzing emission data only from new engines. The Agencies did not apply a DF to that data. Consequently, the Agencies should not require a DF as part of a certification demonstration without having first incorporated a DF into the calculation of the baseline emission benchmark and the resulting emission standards. [EPA-HQ-OAR-2010-0162-1940.1, pp.13-14]

Accordingly, the Agencies should specify in the final rule an additive DF of 'zero,' or a multiplicative DF of 'one,' for CO2, N2O, and CH4 for existing GHG-reduction/FE-improvement engine technologies. [EPA-HQ-OAR-2010-0162-1940.1, p.14]

Organization: Volvo

The Agencies propose that manufacturers need not apply deterioration factors (“DFs”) to measured emission levels “unless good engineering judgment indicates that significant emission deterioration will occur during the useful life.” *See* 75 FR 74152,74370. Such an ambiguous requirement leaves uncertain precisely how the Agencies might interpret what constitutes “good engineering judgment” and what level of deterioration -- under what aging conditions -- the Agencies may deem to be “significant emission deterioration.” That uncertainty is underscored by the fact that GHG emission deterioration data currently is very limited and not well understood. In fact, since the Agencies established the Proposed GHG Standards by analyzing emission data from new engines, before any DF is applied to meet the standards using existing engine technologies, appropriate DFs must first be incorporated into the standards. [EPA-HQ-OAR-2010-0162-1812.2, pp.38-39]

Accordingly, Volvo Group recommends that the Agencies specify an additive DF of “zero,” and a multiplicative DF of “one,” for CO2, N2O, and CH4 for existing engine technologies. [EPA-HQ-OAR-2010-0162-1812.2, p.39]

Volvo Group agrees with the Agency opinion that normal engine wear will not have a significant negative impact on CO2 emissions. Deterioration demonstrations are a heavy burden for engine manufacturers and were not considered in the target setting for this rule. Furthermore, measurement accuracy for GHG gases is insufficient to allow reasonable determination of deterioration factors. EPA should therefore assign zero DF for existing engine and aftertreatment technologies. [EPA-HQ-OAR-2010-0162-1812.2, p.39]

Organization: Daimler Trucks North America

EPA and NHTSA state in the preamble that they do not currently anticipate notable deterioration of CO2 emissions or fuel consumption performance, and are therefore proposing assigned deterioration factors of zero (additive) or one (multiplicative) be applied at the time of certification. We agree that this is a reasonable approach for a number of reasons. First, findings from review and analysis of archived historic data recorded during prior deterioration factor tests on model year 2007 and 2010 engines support that degradation is negligible. Test results were evaluated from four engines each of which completed deterioration factor testing following procedures for establishing criteria pollutant deterioration factors. Test results varied from slightly negative DFs (emissions reducing over time) to slightly positive DFs. On the average over both the FTP and SET test cycles, deterioration was negligible, especially when considering the influence of and level of test variability as acknowledged by the Agencies. Daimler will provide results of tests conducted on a range of its engine families. (Because this is confidential business information, we will submit this information separately and directly to the EPA.) [EPA-HQ-OAR-2010-0162-1818.1, pp.41-42]

Second, manufacturers are driven by market demands to design engines that are not only efficient when new but also that they be durable and maintain their efficiency over time. Consequently considerable effort has been and will continue to be expended to ensure these characteristics in their engine designs. Last, the proposed standards were based on data from engines that had not been operated to the end of their useful lives, so it is appropriate that manufacturers demonstrate compliance on a non-deteriorated basis. [EPA-HQ-OAR-2010-0162-1818.1, p.42]

EPA describes that at this time they are not aware of deterioration mechanisms for N2O and CH4 emissions that would result in significant deterioration factors. We acknowledge that at this early stage we are similarly unaware of deterioration mechanisms that would lead to increasing N2O or CO2 emissions over time. Considering that knowledge of DF characteristics of these newly regulated emissions is very limited, it is appropriate to set standards based on what is known, namely the emissions levels of de-greened engine/ATD systems being tested today. As such for this stage of rulemaking it is appropriate to assign zero equivalent DFs for these emissions. Additionally, given the robust nature of engines and aftertreatment systems as demonstrated by negligible deterioration of criteria pollutants, it follows that N2O emissions and CH4 emissions degradation should similarly be expected to be negligible. [EPA-HQ-OAR-2010-0162-1818.1, p.42]

EPA and NHTSA note that they anticipate that the CO2 deterioration factor would be updated from time to time, as new data regarding emissions deterioration for CO2 are obtained and analyzed. We agree that over time, additional DF data will be generated and provided in future certification applications. In the process of conducting future DF tests the existing protocol for determining criteria pollutant deterioration factors is considered appropriate for use in determining GHG DFs and that it is appropriate to exercise good engineering judgment as noted in §1036.241 (c)(1)and (2) when assessing appropriateness of multiplicative or additive DFs. [EPA-HQ-OAR-2010-0162-1818.1, p.42]

We Agree With The Agencies' Proposal That The Deterioration Factor For Current Vehicle Technologies Be Zero. [EPA-HQ-OAR-2010-0162-1818.1, p.50]

Implicit in the Agencies' proposal and explicitly stated in conversation with the Agencies is that the DF for currently used vehicle technologies is zero-additive or one multiplicative. In other words, the Agencies assume no deterioration. This assumption is a crucial underlying assumption in the Agencies' determination of CO2 and FE limit values. We agree that, for technologies currently on vehicles, there should be considered no deterioration. We believe that this is appropriate because the types of components regulated – fuel saving features like aerodynamics fairings – are components (1) that primarily get damaged through unusual events like collisions or impact from large road debris and (2) that customers will have incentive to repair, insofar as they save the customers money. [EPA-HQ-OAR-2010-0162-1818.1, p.50]

The NPRM does not clarify how manufacturers are to demonstrate the deterioration factor (DF) of their hybrid systems. This is a crucial issue because of the time and expense required in demonstrating a DF. In numerous discussions with the Agencies, the Agencies clarified that they intend (1) that DFs be based on system performance, allowing for routine maintenance of components in the system, and (2) for current technologies to have no effective DF, i.e., a DF of zero additive or one multiplicative. We agree with this approach. By contrast, in the proposed §1037.241, the Agencies state that manufacturers "may need to apply a DF to address deterioration of battery performance for a hybrid-electric vehicle." (Re. 75 Fed. Reg. 74389.) Based on the limited time available for certification under the Agencies' aggressive timeline, and lacking lead time for full testing, we need a quick approach to hybrid HDV certification. In turn, we believe it reasonable to assume that hybrid owners will properly maintain their vehicles and engines such that the vehicles will continue to save fuel to the greatest extent possible, much as we observe with hybrids currently on the road. In other words, we agree with the Agencies' two intentions (above). We recommend that the Agencies clarify this intention in their regulatory text of §1037.241. [EPA-HQ-OAR-2010-0162-1818.1, p.83]

Stated another way, we, like Cummins, propose assigning a DF of zero additive or one multiplicative for hybrid systems while hybrid volumes are low and technology is evolving. During that time, requiring a DF for hybrid systems could place a significant burden on manufacturers. DF testing is expensive and time consuming. Additionally, ensuring DFs are applied consistently could be challenging for the Agencies as there is not yet consensus on appropriate DF testing for hybrid technology. The application of hybrid technology to heavy-duty vehicles is relatively new, and manufacturers are still learning how heavy-duty cycles will interact with component technologies – particularly in the case of energy storage devices. Requiring the development of a DF test for hybrids would add cost and potentially limit innovative applications of technology. Assigning a multiplicative DF of one in this first phase of the CO2 rule will help incentivize hybrids by keeping development costs low. This approach would be consistent with our recommendation for the conventional engine program. [EPA-HQ-OAR-2010-0162-1818.1, p.83]

We see no reason why the Agencies could not further investigate hybrid HDV DF in the upcoming years, but we think that it is unrealistic to do so within the context of the present rulemaking. [EPA-HQ-OAR-2010-0162-1818.1, p.83]

Response:

Before addressing the specific comments about deterioration factors (DFs), it is helpful to summarize how DFs are used in EPA's emission control programs. Under the Clean Air Act, EPA emission standards for motor vehicles apply throughout the full useful life of the vehicle and engine. DFs are used to allow manufacturers to use low-mileage test data to show that engines and vehicles will meet the applicable emission standards throughout the useful life. Without DFs, manufacturers would be required to submit test data collected throughout the useful life for each engine and vehicle family. Thus, EPA's allowance for certification based on DFs greatly reduces the testing burden that would otherwise be required. The most typical DFs represent the difference in emissions between the end of useful life emissions and emissions from a low mileage test point.[52] This type of DF is added to low-mileage emission rates. Thus a DF of zero would apply where there is no emission deterioration.

Historically, EPA has required manufacturers to perform durability testing on a small number of engines or vehicles and allowed manufacturers to carry those DFs across to multiple families and to carry them over to later model years. In certain circumstances, we have allowed manufacturers to use EPA-assigned deterioration factors (DFs) without performing their own durability emission tests or engineering analysis. When we have done so, we have generally assigned conservative DFs – that is, DFs that are more likely to overestimate deterioration than to underestimate it. However, the manufacturers are still required to meet the applicable standards in actual use without regard to whether the manufacturer used the assigned DFs.

The comments we received about DFs fall into the following five general categories:

1) Do emissions increase with time?

2) Did the agencies assume deterioration is setting the standards?

3) Proposed DF requirements.

---

[52] More precisely, the DF should represent the difference between the highest emission rate during the useful life and the low-mileage emissions. DFs can also be expressed as a ratio of emission rates which are multiplied by the low-mileage emission rates. While DFs are discussed as additive in this response, it applies equally for multiplicative DFs.

4) Recommendations.

5) DFs for hybrid vehicles.

With respect to the first issue, the commenters generally agreed with the agencies that there is no reason to expect CO_2 emissions from conventional engines to deteriorate in use. We continue to believe this to be a reasonable assumption. However, we do not believe it to be a reasonable assumption with respect to CO_2 emissions from advanced technologies or for N_2O and CH4 emissions. The comments do not provide any compelling reasons why this would be an appropriate assumption. Daimler Trucks stated that hybrid vehicles will be well maintained, but this does not mean there will be no deterioration. In fact, we think that some decline in battery performance will likely occur even with well maintained vehicles. Depending on how the vehicle is designed, such deterioration may or may not be significant. While they state that N_2O and CH_4 emissions deterioration will be negligible because criteria emissions deterioration is negligible, they admit that little is known about deterioration mechanisms for N_2O and CH_4. We believe that some deterioration in N_2O and CH_4 emissions may occur but that it would likely be very small if it does occur for the same reasons noted by Daimler. .

The commenters correctly point out that we based our engine emissions standards on baseline emissions data from undeteriorated new engines. We continue to believe this to be appropriate for CO_2 emissions because (as the commenters agreed) CO2 emissions from conventional engines (on which the standards are based) are likely at their highest when the engines are new. While CO_2 emissions may deteriorate for advanced technologies, the standards are not based on the use of such advanced technologies. For the N2O and CH4 engine emission baseline, we are revising the baseline to include 0.02 g/hp-hr emission deterioration premised on the inherently low deterioration rates projected above. We believe this estimate may in fact be high, and therefore, we will allow manufacturers to use lower DF values where they can demonstrate that a lower value is more appropriate.

There was some confusion about what the agencies proposed and how it would be implemented. NGVI mistakenly believed that we proposed to require non-zero DFs for MHD and HHD engines. However, we proposed the same approach for all service classes , allowing zero CO_2 DFs except in the case of advanced technologies. EMA questioned how EPA would implement the regulatory provision that allowed use of a zero DF for CO_2 unless good engineering judgment indicates that significant emission deterioration will occur during the useful life. Given this confusion, we have eliminated this language, and have replaced it with an interim provision in §1036.150.

The commenters recommended that EPA assign zero CO_2, N_2O, and CH_4 DFs for all engines. However, none of the commenters addressed the possibility of applying a zero DF in the case where the manufacturer and/or EPA know that that some deterioration will occur. The fundamental purpose of certification is for the manufacturer to demonstrate that the engine will comply with the standards throughout the useful life. Thus, we cannot allow certification with low mileage testing and a zero DF when we know actual in-use emissions will be higher. We are adopting an interim provision to allow the use of an assigned zero DF for CO_2 emissions from conventional engines because we are confident that there will not be significant CO_2 deterioration form conventional engines. We are not confident that there will be no N_2O or CH_4 deterioration form conventional engines. We do not fully understand the formation and deterioration mechanisms for these constituents and remain concerned that they may deteriorate in use. At this time, however, we believe that such deterioration will not exceed 0.02 g/hp-hr.

Finally, with respect to hybrids, we think that some emission deterioration may occur due to decreasing battery performance. Moreover, the extent to which decreasing battery performance will affect emissions will depend heavily on how the vehicle is designed. Therefore, we are not allowing the use of an assigned DF for hybrids and instead will require the manufacturers make a demonstration of the actual DF on a case-by-case basis.

6.2.4.2. Useful Life

Organizations Included in this Section:

Robert Bosch, LLC
Engine Manufacturers and Truck Manufacturers Associations
Daimler Trucks North America

Organization: Robert Bosch LLC

With respect to the engine standards, Bosch also agrees with EPA's proposal (see proposed section 1036.108(d)) to apply to the engines utilized in combination tractors (as well as those utilized in vocational vehicles) the useful life periods for criteria pollutants found in 40 C.F.R. Part 86; the 10 year/110,000 mile, 10 year/185,000 mile, and 10 year/435,000 mile periods for these engines are well-established and Robert Bosch LLC Comments EPA-HQ-OAR-2010-0162 Page 7 in place 8 Bosch observes, however, that EPA has offered no rationale for applying the existing useful periods in Part 86 to both combination tractors (proposed section 1037.106(d)) and vocational vehicles (proposed section 1037.105(e)) – that is, applying those useful life periods to the vehicles themselves. /9/ In this regard, Bosch notes that these HD vehicles are not currently subject to the criteria pollutant useful life periods in 40 C.F.R. section 86.004-2. Bosch understands the need to establish useful life periods for GHGs, but emphasizes that EPA should proffer at least some rationale or explanation for the various vehicle-specific periods it is proposing – 10 years/110,000 miles for Class 2b-5 vocational vehicles, 10 years/185,000 miles for Class 6-7 vocational vehicles and Class 7 tractors, and 10 years/435,000 miles for Class 8 vocational vehicles and tractors. /11/ Bosch elaborates on this issue further in section III.D below (i.e., in its discussion of the proposed warranty provisions). [EPA-HQ-OAR-2010-0162-1630.1, pp.6-7]

/9/ Bosch understands that an 11 year/120,00 mile useful life period already applies to PUVs by virtue of 40 C.F.R. section 86.1805-04(a) (see also 40 C.F.R. § 86.1805-12(a)) and the associated definition in section 86.1803-01 of the term "complete heavy-duty vehicle," although Bosch points out that this definition technically only encompasses "Otto-cycle heavy-duty vehicles of 14,000 pounds Gross Vehicle Weight Rating or less." 40 C.F.R. § 86.1803-01. [EPA-HQ-OAR-2010-0162-1630.1, p.7]

/11/ 40 C.F.R. Part 86 is lengthy and complex, so for ease of understanding, Bosch also suggests that EPA expressly reference the applicable Part 86 section (e.g., 40 C.F.R. § 86.004-2) in the final useful life period regulatory provisions for GHG emissions. [EPA-HQ-OAR-2010-0162-1630.1, p.7]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The useful life of an engine used in a hybrid system should be based on the useful life of the underlying engine, not on that of the vehicle in which the hybrid system is utilized. For example, some hybrid powertrains optimize fuel efficiency by downsizing the engine, or applying an engine to a heavier vehicle than is typical. More specifically, a medium heavy-duty engine might be installed in a Class 8 vehicle which otherwise would typically use a heavy heavy-duty engine. This is usually done because the downsized engine - which consumes less fuel - is more appropriate for the hybrid drivetrain due to the efficient torque management of the hybrid system. Since the medium heavy-duty engine is matched to the particular duty cycle, requiring it to have a useful life of a heavy heavy-duty engine would unnecessarily increase product cost. Accordingly, the Agencies should allow manufacturers to use good engineering judgment to determine the appropriate useful life classification of engines used in hybrid vehicles. Such flexibility would help incentivize hybrid vehicles by allowing manufacturers to use the engines sized to optimize powertrain efficiency, and also reduce development costs. [EPA-HQ-OAR-2010-0162-1940.1, p.31]

As set forth above, it is unlikely that all emission-related components in hybrid technology systems will be able to perform properly for the useful life period without maintenance. Rather than establishing one-off reduced allowable maintenance provisions for manufacturers by petition under §1037.125(c), EPA should by regulation adopt a reduced allowable maintenance interval applicable to all hybrid systems. Without that flexibility, the cost of maintenance will make it prohibitively expensive to purchase hybrid systems. [EPA-HQ-OAR-2010-0162-1940.1, p.32]

Organization: Daimler Trucks North America

EPA proposed that the useful life for engines with respect to GHG emissions be set equal to the useful life periods currently defined for criteria pollutants. We agree that for consistency the useful life period for GHG gas emissions be the same as that defined for criteria pollutants. [EPA-HQ-OAR-2010-0162-1818.1, p.41]

DTNA recommends that engines used in hybrid vehicles be treated as are all other engines the same primary intended engine class, per comments in the "Useful Life Requirements" section of our comments, below. [EPA-HQ-OAR-2010-0162-1818.1, p.82]

The Agencies Make Conflicting Statements On The Duration Of Applicability Of The Proposed Emission Standards. [EPA-HQ-OAR-2010-0162-1818.1, p.103]

The Clean Air Act Provides for emission standards to be applicable for an engine or vehicle's useful life (Re. CAA §202(a)(1)), and EPA regulations define the length of those "useful lives" (Re., e.g., 40 CFR §86.004-2 for criteria pollutants and 75 Fed. Reg. 74270 for GHGs), yet the Agencies indicate that they view standards as applicable beyond the useful life. (For example, the Agencies indicate that VSLs must be tamperproof – or, as we now understand the Agencies' intent, tamper-resistant through password protection or the like – but not for a period limited to the useful life.) We believe that it is appropriate for the Agencies to keep regulatory useful life definitions at the present level, because many of the vehicles in the various service classes will only be driven for these "useful length" mileages (although some may drive more and are capable of doing so). [EPA-HQ-OAR-2010-0162-1818.1, p.103]

In §1036.140 on pages 75 Fed. Reg. 74200 and 74368, the Agencies carry over the current definitions of engine primary intended service classes (applying them also to engine regulatory subcategories) and request comment on whether this is appropriate. We believe so. We understand the regulations to continue to allow vehicles of a primary intended service class to be used in other service classes. For example, it is currently the practice to allow a medium heavy-duty (MHD) to be used in heavy heavy-duty (HHD) vehicles, and the regulations as written indicate that this will still be allowed. Allowing this continued flexibility is important from a GHG-minimization (or fuel consumption-minimization) standpoint, in that the MHD engine is often used in lightweight vehicle applications where hauling capacity has been maximized and vehicle weight minimized. Were the EPA (and NHTSA) to reverse their position and not allow cross-class use of (e.g.) MHD engines, the Agencies would worsen fuel consumption in vehicles that can use an MHD engines but will be forced – either by regulations or by practical considerations – to use a larger and heavier HHD engines. In turn, were the Agencies to change position, the regulations would be problematic for two reasons: [EPA-HQ-OAR-2010-0162-1818.1, p.104]

• It may be that the hybrid duty cycle for the downsized engine is less aggressive than is typical for a conventional engine due to torque management by the hybrid system. So, the Agencies would be effectively forcing manufacturers to design to unnecessarily stringent useful life standards. [EPA-HQ-OAR-2010-0162-1818.1, p.104]

• Meeting more stringent useful life requirements will increase development cost - particularly in the low volumes expected for hybrids in the 2014 to 2017 timeframe. [EPA-HQ-OAR-2010-0162-1818.1, p.104]

Therefore, in all vehicles, and especially in hybrids, GHG emission and fuel consumption will be optimized if the Agencies continue to allow installation of the proper engine, regardless of the engine's primary intended service class and the vehicle's GVWR. Specifically, regulations currently in force and those proposed in the NPRM allow manufacturers to certify an engine in one primary intended service class like MHD but to use it in some HHD applications with no change to certification values, emission limits, DF requirements, maintenance requirements, etc. In turn, vehicle manufacturers can optimize individual vehicles. So, for example, a small fraction of light Class 8 vehicles contain MHD engines, lowering vehicle price and fuel consumption relative to the same vehicle with a heavier, larger engine. But if manufacturers had to use a HHD engine or if we had to recertify our MHD engine under HHD regulations (e.g., using the HHD engine DF), then we would drive unnecessary cost into engines and vehicles (i.e., certifying engines with a costly and lengthy test, yet selling only a small number of them) or would drive up fuel consumption. [EPA-HQ-OAR-2010-0162-1818.1, p.104]

To be clear: with hybrid vehicles, the need for (e.g.) MHD engines in HHD vehicles is even greater than in conventional vehicles. Many hybrid powertrains optimize fuel consumption reductions by downsizing the engine, relative to what a conventional vehicle would use. A requirement to match the engine service class to the vehicle GVWR could lead to the use of an engine to a heavier vehicle than is necessary for the application or to costly recertification of engines for the limited hybrid market, in turn driving hybrid costs still higher than they currently are. So long only a fraction of a family's engines are used in vehicle weight classes other than that corresponding to the engine's primary intended service class, we propose allowing the cross-service class use. In other words, we support the Agencies' allowing us the option to use a MHD engine in a hybrid powertrain in a HHD vehicle, and a LHD engine with a hybrid in a MHD application where good engineering judgment suggests is appropriate. To be clear, we recommend that these engines be treated as are other engines in the same primary intended service class. In other words, the Agencies should not require additional maintenance, tracking, or warranty burden for engines that are optimally sized and of light weight. We recommend that credits for MHD engines be treated identically, no matter whether the engine is used in HHD vehicles (and similar for other service classes). [EPA-HQ-OAR-2010-0162-1818.1, pp.104-105]

In short, we recommend that the Agencies not follow CARB's recent position on service class designation, in which the Board requires the costly replacement of lighter duty class engines in heavier class applications. (Re. CARB Mail-outs #MSC-09-14 and #MSC-09- 34, 2009.) It is not clear that the positions espoused in those mailouts are enforceable or were supported by adequate rulemaking, so we reserve the right to challenge their application. [EPA-HQ-OAR-2010-0162-1818.1, p.105]

This essentially drives manufacturers to for example replace a MHDD engine at 185,000 miles if its in a HHDD subject to 435,000 mile useful life. The vehicle owners already have incentive to repair or rebuild engines when the need arises, so CARB merely creates additional obstacles to the owners' use of the optimal engines. Beyond the problem of the added cost of the replacement engines, which make hybrid vehicle purchases much less financially feasible than hybrids were before (and hybrids already require tax credits for financial feasibility), the Board position is problematic because it drives manufacturers either (1) to using larger and heavier engines than are necessary for a given application or (2) to testing and certifying properly sized engines in a costly test procedure when those engines will have few sales. We believe the Agencies should not follow the CARB approach and should not erect obstacles to manufacturers' sale of hybrid powertrains. In turn, we believe that the Agencies were correct to use the flexible definitions of primary intended service class in §1036.140 and not to place any limitation on engine application by primary intended service class. [EPA-HQ-OAR-2010-0162-1818.1, p.105]

Response:

The concept of useful life serves two primary purposes in EPA's compliance program. First, it defines the period for which the manufacturer must design their engines and vehicles to meet the numerical emission standards. For example, where a durability demonstration is required, the manufacturer must demonstrate that the engine or vehicle measured emissions will be less than the emission standards throughout the useful life. Second, it is the period during which in-use engines and vehicles are subject to in-use testing for recall purposes.

We are revising the regulations from the proposal to treat useful lives differently for engines and vehicles. Useful lives for engines are based on the *primary intended* service class and useful lives for vehicles are based on the *actual* vehicle service class. Where the engine's useful life is shorter than the vehicle's useful life, there is no requirement to replace the engine at the end of its useful life.

For engines, the comments supported the proposal to apply the same useful lives for greenhouse gases as for criteria pollutants. Bosch questioned applying these periods to vehicles (without recommending shorter or longer periods). For light- and medium-heavy duty vehicles and engines, the useful life values for the engines were established based on the observed service lives of the corresponding vehicles, and can thus now be applied directly to vehicles. However, the heavy-heavy duty engine useful life was established based on the period of engine rebuild or scrappage if the vehicle was scrapped without rebuilding the engine. Thus heavy-heavy duty vehicle lives are probably somewhat longer than 435,000 miles. Nevertheless, we believe the proposed useful life for heavy-heavy duty vehicles is sufficient for the purposes of this initial phase of greenhouse gas regulation. We will reconsider this useful life value should we promulgate later year greenhouse gas emission standards for the heavy-duty sector.

Daimler Trucks questioned the agencies' application of standards beyond the useful life, especially for vehicle speed limiters. They appear to confuse the liability with respect to measure emission rates (which is limited to the useful life) with the more general applicability of the regulations. The regulations actually apply for the full service life of the vehicle, including time after the end of the *useful life* is reached.

Finally, with respect to hybrids, the regulations apply differently for hybrid systems depending on whether they are covered by engine certificates or vehicle certificates. Hybrid systems certified as engines are subject to the applicable useful life of the engine-hybrid system based on its primary intended service class. Hybrid systems certified as vehicles are subject to the applicable useful life of the vehicle based on its actual vehicle service class. However, the engines in hybrid vehicles certified as vehicles are subject to the useful applicable to the engine's primary intended service class. In either case, certifying manufacturers may base compliance on any amount of maintenance to the hybrid-specific components, provided they can justify that such maintenance will actually be performed in actual use (as specified inn §1037.125).

6.3. Pickup Trucks and Van Standards

6.3.1. Support for Proposed Standards, Timing, Approach

Organizations Included in this Section:

American Automotive Policy Council
Cummins, Inc.
International Council on Clean Transportation
Robert Bosch, LLC
Recreation Vehicle Industry Association

Organization: American Automotive Policy Council

We support EPA and NHTSA's attribute-based approach to medium-duty pick-up and van standards that recognizes the physical demands placed on these work vehicles. These standards recognize that the various products offered have differing degrees of load carrying, trailer towing, and off-road capabilities. [EPA-HQ-OAR-2010-0162-1762.1, p.Cover page 2]

The proposed weight-based 'work factor' attribute is an appropriate metric for determining tailpipe CO2 and fuel consumption targets for individual vehicles. As the agencies noted in the NPRM, the National Academies of Science report Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles ('NAS Report') found that the 'most meaningful metric of fuel efficiency will be in relation to the work performed, such as a fuel consumption per unit payload carried.' In the case of heavy-duty pickups and vans, the work capability of a vehicle is determined by its payload capacity, towing capacity, and its ability to operate off-road as enabled by four-wheel drive. [EPA-HQ-OAR-2010-0162-1762.1, p.1]

The agencies' approach to correlating CO2 emissions and fuel consumption to the work factor is appropriate. The agencies requested comment on the proposed approach to correlating CO2 emissions and fuel consumption to the work factor. AAPC agrees that a linear correlation across the spectrum of possible heavy-duty pickups and vans, without distinguishing between Class 2b and 3 vehicles or between pickups and vans is acceptable. Given that the design of heavy-duty pickups and vans in the Class 2b and 3 categories is generally similar, AAPC expects that a continuous linear function will provide a reasonable fit of the data for separate gasoline and diesel standard curves. [EPA-HQ-OAR-2010-0162-1762.1, p.2]

Future rules beyond 2018 MY should continue to respect this CO2 (or fuel consumption) vs. work factor relationship derived from the underlying physics of varying levels of vehicle capability. That is, the slope of the standard lines should remain constant (similar to the way the footprint lines are adjusted in the light-duty rule) when they are adjusted. [EPA-HQ-OAR-2010-0162-1762.1, p.2]

The agencies' proposed standards for heavy-duty pickup trucks and vans would result in greenhouse gas (“GHG”) and fuel consumption reductions of 10 percent for gasoline-powered vehicles and 15 percent for diesel-powered vehicles. Although some commenters at the public hearings stated that the stringency of these standards should be increased, there are multiple reasons supporting the agencies’ approach to this rulemaking:

Although AAPC members were able to provide a great deal of data specifying vehicle work factor attributes and volumes, much less data was available regarding the CO2 performance of the various vehicle configurations. The data upon which the agencies rely is primarily estimated and there are many concerns that it will not necessarily reflect real-world data generated by manufacturers for compliance with the regulations. Out of necessity, the agencies relied on 29 actual vehicle tests to model 1,108 unique vehicles using analytical adjustments. This expanded data set was then used to fit the linear correlation to determine baseline fleet performance. [EPA-HQ-OAR-2010-0162-1762.1, p.3]

The result of using a very small number of actual vehicle tests to model over 97% of the fleet upon which the agencies are relying to set standards is that the correlation between the CO2 / fuel consumption and the work factor is highly dependent on the assumptions the agencies used in their modeling. For example, changing the adjustment factors used to model most of the fleet could change both the slope and intercept of the correlation line, subsequently changing both the overall standards estimated as reasonable and the accuracy of the work factor adjustments to individual vehicle targets. [EPA-HQ-OAR-2010-0162-1762.1, p.3]

In addition to the potential errors introduced by basing a wide-ranging standard on extremely few tests, the accuracy of some of the actual test data used in the development of the baseline fleet was questionable, as discussed several times in meetings between EPA and AAPC member companies. Individual member companies may comment further on this aspect of the baseline fleet evaluation. [EPA-HQ-OAR-2010-0162-1762.1, p.3]

AAPC also has concerns with respect to how the stringency of future California LEV III and federal Tier 3 emissions standards will potentially affect both the availability of certain efficiency improving technologies and the resources available to do so. These sometimes contradictory requirements must be addressed in concert to ensure the appropriate balance between criteria emissions and GHG reductions. Along with the lack of data, this creates additional uncertainty. [EPA-HQ-OAR-2010-0162-1762.1, pp.3-4]

During the Public Hearings, several commenters representing various NGOs and private citizen members of those NGOs commented that they believed that the recent NAS report supported greater levels of CO2 and fuel consumption improvements than those proposed for Class 2b-3 complete and cab-complete vehicles. However, these commenters failed to consider several issues: [EPA-HQ-OAR-2010-0162-1762.1, p.4]

The baseline vehicles upon which the NAS Report is formulated had significantly lower technology levels than those used by the agencies for a baseline fleet, making larger improvements appear possible. In general, the vehicles used as a baseline in the NAS report represented 2008 or earlier model year vehicles as compared to the 2010-2011 model year baseline fleet used by the agencies. The NAS approach resulted in "potential" improvements that are already included in the agencies' baseline fleet. For example, the NAS baseline vehicle utilized a 4-speed automatic transmission whereas the agencies' baseline vehicles commonly utilized 5 to 6 speed transmissions. Further examples of improvement technologies used by the NAS in their evaluation, but already commonly available in the agencies' baseline fleet were friction reduction, variable valve timing, aerodynamic improvements, and advanced diesel after-treatment systems. [EPA-HQ-OAR-2010-0162-1762.1, p.4]

Although the NAS Report considered hybridization of Class 2b-3 vehicles as part of its evaluation (showing a potential benefit of 18%), such high cost technologies are generally not an economically viable option for consumers and manufacturers. For example, the NAS Report finds that if hybridization is included, the estimated break-even fuel price for Class 2b pickup improvements is $4.80/gallon. According to the U.S. Energy Information Administration, estimated 2020 fuel prices ($2009) are $3.382/gal and $3.526/gal for gasoline and diesel fuels respectively. [EPA-HQ-OAR-2010-0162-1762.1, p.4]

The NAS Report states that "some of the technologies evaluated in this report may be available later than expected, or at a lower level of performance than expected… regulators will need to allow for the fact that some technologies may not mature as expected." [EPA-HQ-OAR-2010-0162-1762.1, p.4]

Even though the 2014 model year initial implementation is not consistent with the Clean Air Act requirements for adequate lead time, in the spirit of our common interest in reducing greenhouse gas emissions and fuel consumption, we are willing to support the implementation timing of the proposal. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

Based on the proposed flexibility provisions for early credits and averaging/banking/trading, AAPC can support the phase-in of mandatory compliance beginning with the 2014 MY. [EPA-HQ-OAR-2010-0162-1762.1, p.5]

Both the Clean Air Act (as amended in 1990) ("CAA") and the Energy Independence and Security Act of 2007 ("EISA") require any new or revised heavy-duty vehicle or engine standards promulgated or revised to receive no less than 4 model years lead time and 3 years stability. [EPA-HQ-OAR-2010-0162-1762.1, p.5]

The agencies propose that the full greenhouse gas and fuel consumption standards take effect by either 2018 or 2019 model year with alternative phase-ins that include mandatory compliance prior to the model year of full implementation. EPA proposes two phase-in alternatives with mandatory compliance beginning in 2014 model year. Mandatory compliance starting in the 2014 model year provides only two years of regulatory lead-time. The AAPC does not believe a “phased-in” standard provides the mandated stability period; the statutorily-required stability period was intended to provide manufacturers with a constant (unchanging) standard to limit the amount of product development 'churn' driven by regulatory requirements.28 [EPA-HQ-OAR-2010-0162-1762.1, pp.5-6]

To place the aggressiveness of a 2014 model year start of mandatory compliance in context, at the time that this rulemaking is projected to be finalized, most manufacturers will be delivering 2012 model year product to market, and will be well on the way to certifying 2013 model year product. [EPA-HQ-OAR-2010-0162-1762.1, p.6]

The NHTSA alternatives provide for voluntary compliance in 2014-2015 model year, and mandatory compliance beginning in 2016 model year. AAPC recognizes that voluntary compliance provides additional flexibility while also harmonizing the fuel consumption standards with the much more rapid implementation of the greenhouse gas standards. [EPA-HQ-OAR-2010-0162-1762.1, p.6]

Although the 2014 MY implementation is clearly not consistent with the CAA requirements for adequate lead time, in the spirit of our common interest in reducing greenhouse gas emissions and fuel consumption, AAPC members are willing to support the implementation timing of the proposal. [EPA-HQ-OAR-2010-0162-1762.1, p.6]

The support of AAPC and its member companies for the agencies' proposed 2014-2018 phase-in plan does not constitute a waiver of the AAPC's position that the phase-in plan does not comport with CAA Section 202(a)(3)(C). AAPC expressly reserves the right to raise lead-time arguments based on Section 202(a)(3)(C) in connection with the final rule, if its lead time and phase-in provisions differ materially from those in the NPRM, as well as in connection with future heavy-duty GHG rulemakings. We urge the agencies to conform to the CAA and EISA heavy-duty vehicle lead time requirements in future rulemakings. [EPA-HQ-OAR-2010-0162-1762.1, p.6]

AAPC supports 100% phase-in of the standard in 2018-2019 MY; AAPC does not support a more aggressive phase-in: A program which is fully phased-in by 2018 model year, such as that proposed by the agencies in the NPRM, can be supported by AAPC. The alternative phase-in proposed in the modified Table II-8 of the NPRM, which provides three years of regulatory stability followed by full phase-in in 2019 MY can also be supported. Both of these alternatives, in combination with the proposed flexibilities, provide sufficient lead-time to make the changes necessary to meet the proposed standards. [EPA-HQ-OAR-2010-0162-1762.1, p.6]

These phase-ins recognize that, in the 2b-3 complete and cab-complete vehicle regulatory class, manufacturers typically have only two products (pickup derivatives and vans), and that product design life is frequently planned for much longer periods than similar light-duty vehicles. The limited number of products and long design life both constrain the opportunities to make product improvements in a logical, cost-effective manner. [EPA-HQ-OAR-2010-0162-1762.1, p.6]

A faster phase-in, as suggested by several commenters at the Public Hearings, is not appropriate and is opposed by AAPC. These commenters overlook the fact that year-to-year improvements that are typically seen in the light-duty market are typically supported by changes to a relatively small number of product lines while the majority of the fleet remains the same. Because of the large number of product lines and relatively shorter product development cycles, different product lines are typically improved each year, resulting in a reduction in fleet average greenhouse gas emissions and fuel consumption. The longer product cycles and minimal number of product lines in the 2b-3 complete and cab-complete regulatory classification are likely to result in manufacturers making larger, but less frequent fleet improvements. A faster phase-in to the proposed standards would greatly disrupt product and capital planning cycles and therefore cannot be supported. [EPA-HQ-OAR-2010-0162-1762.1, p.7]

Organization: Cummins, Inc.

Cummins supports the use of the work factor attribute for HD pickups and vans. The inclusion of this attribute recognizes the work capacity of these vehicles to haul goods and provide services. Vehicles in this class are required to operate under heavy loads, on- and off-road, in a safe, predictable manner. While many of the methods to improve GHG/FC in passenger cars can be applicable to these vehicles, many options will not be suitable given their extreme operating conditions and environments. The work factor is defined in such a way that creates an incentive for manufacturers to reduce curb weight, thereby improving GHG/FC as well as improving the utility of the truck. [EPA-HQ-OAR-2010-0162-1765.1, pp.31-32]

Organization: International Council on Clean Transportation (ICCT)

Establishing a “work factor” as a scaling function for Class 2B and 3 vehicles: From a fuel use and GHG emissions perspective, the second largest subsector of medium- and heavy-duty vehicles are the class 2B and 3 vehicles that include the one-ton pick up trucks and commercial vans. This subclass accounts for roughly 20% of fuel use, and thus bears significant regulatory attention. Scaling factors have been introduced and used successfully in the light duty vehicle market in order to allow manufacturers to target certain market segments without being placed at a competitive disadvantage. This new scaling function based on work – as defined by payload, hauling capacity, and capacity for 4-wheel drive – appears to align well with the vehicle characteristics that match market segments and vehicle utility. [EPA-HQ-OAR-2010-0162-1945.1, p.3]

Organization: Recreation Vehicle Industry Association (RVIA)

Work Factor: Throughout the recent of history of the CAFE program, RVIA has been a strong advocate for NHTSA factoring in cargo capacity and tow capability when setting fuel consumption standards for the light duty vehicles that are used for RV towing. Absent such consideration, there is a significant risk that RV owners will be forced to purchase vehicles for towing that do not have the capability to tow an RV safely. Because the 'work factor' approach proposed by EPA and NHTSA factors in payload capacity, towing capacity, and four wheel drive, RVIA supports the NPRM 'work factor' approach proposed for medium and heavy duty vehicles. [EPA-HQ-OAR-2010-0162-3300, pp.7-8]

For work trucks, EPA and NHTSA should oppose any recommendations to abandon the proposed 'work factor' approach since it does a good job factoring in cargo-carrying capacity and towing capability. [EPA-HQ-OAR-2010-0162-3300, p.12]

Organization: Robert Bosch, LLC

Bosch agrees that whole-vehicle GHG and fuel consumption standards are warranted for PUVs. Moreover, the agencies' reliance on a vehicle configuration's "work factor," reflecting both payload and towing capacities, to determine that particular configuration's "target" value, which would then be production-weighted to calculate the annual fleet average GHG and fuel consumption standards, strikes Bosch as a sound and rational approach. [EPA-HQ-OAR-2010-0162-1630.1, p.9]

Likewise, Bosch supports the respective proposed implementation plans, and commends the agencies for using MY 2008 production and vehicle specification data in the technology feasibility analysis for PUVs. [EPA-HQ-OAR-2010-0162-1630.1, p.9]

Response:

Many commenters expressed support for the standards, implementation schedule, and fleet average approach that sets g/mi GHG and gallons/100 mile fuel consumption standards based on vehicle work factors, though some expressed concerns about certain aspects of the program, as detailed and addressed in subsequent subsections of this Response To Comments document.

While accepting as reasonable the proposed GHG standard implementation schedule, some commenters expressed the belief that the GHG program was being adopted pursuant to section 202 (a)(3)(A) of the Clean Air Act, and that the lead time requirements of section 202 (a)(3)(C) therefore apply. This is mistaken. Section 202 (a)(3)(A) applies to standards for emissions of hydrocarbons, carbon monoxide, oxides of nitrogen, and particulate matter from heavy-duty vehicles and engines. This does not include the GHGs regulated under this rule. Thus, these rules implement section 202 (a) (1) and (2) of the CAA. Section 202 (a)(2) states, as to lead time, that standards shall take effect "after such period as the Administrator finds necessary to permit the development and application of the requisite technology". EPA has justified the appropriateness of its choice of initial model year for each of the standards adopted in the final rules.

6.3.2. The Standards Should Be Made More Stringent or Accelerated

Organizations Included in this Section:

American Council for an Energy-Efficient Economy
American Lung Association & Environmental Defense Fund
Center for Biological Diversity
Clean Air Task Force
Natural Resources Defense Council
Northeast States for Coordinated Air Use Management
Sierra Club
Union of Concerned Scientists

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The Energy Security and Independence Act of 2007 (EISA) requires that these new standards be “designed to achieve the maximum feasible improvement” (p.74158). In all three truck categories and for engines as well, the standards could and should be strengthened to meet that requirement and to increase the economic benefits of he rule while reducing emissions and oil consumption. [EPA-HQ-OAR-2010-0162-1894.1, p. 2]

• Work trucks – The proposed standards for 2018 have a similar technology basis to the improvements required for light-duty pickups by 2016, yet they take longer and accomplish less. They should be strengthened.[EPA-HQ-OAR-2010-0162-1894.1, p. 2]

The agencies rightly point out that 'Class 2b and 3 complete vehicles share much more in common with light-duty (LD) trucks than with other heavy-duty vehicles' (p.74189). They also observe that manufacturers often incorporate new light-duty truck design features into heavy-duty pickups and vans at their next design cycle. The 2012-2016 fuel economy and GHG rules will require large light-duty pickup trucks to reduce fuel consumption in the range of 16 percent from 2010 levels. To the extent that the technologies brought to market by the 2012-2016 LD rules are applicable to heavy-duty pickups and vans as well, the heavy-duty GHG rule should set a reduction target comparable to the percent reduction required in the light-duty rule for 2016. Light-duty trucks will again undergo improvements to reflect the forthcoming rule fro 2017-2025, which will help to achieve a higher target for Class 2b and 3 vehicles for 2018 and beyond. [EPA-HQ-OAR-2010-0162-1894.1, pp.19-20]

Recommendation (standards stringency): For gasoline pickups and vans, strengthen the standard to achieve at least 15 percent reduction. Consider a more stringent standard for diesel vehicles as well. Consider accelerating these reductions to 2016. [EPA-HQ-OAR-2010-0162-1894.1, p.20]

The proposed standards for 2018 would yield average CO2 emissions 10 percent lower for gasoline vehicles and 15 percent lower for diesel vehicles relative to 2010 model year vehicles. This stringency is inadequate. The Annual Energy Outlook (AEO) 2010 projects an 11 percent reduction in CO2 in 2018 for commercial vehicles weighing 8,500 to 10,000 pounds, largely the same vehicles under consideration here, in a reference case that does not include the effects of this rule. The proposed standard falls short of what could be achieved by these vehicles because i) the technology package the agencies cite to justify their proposed stringencies could achieve larger reductions, and ii) certain promising technologies for these vehicles were not included in the agencies' package demonstrating feasibility of the standards. [EPA-HQ-OAR-2010-0162-1894.1, p.20]

In a memo to the docket, the EPA shows CO2 reductions from the agencies' diesel package of 14.2 to 18.5 percent. The proposed reduction is near the bottom of this range. Furthermore, the fact that the work-factor-corrected baseline emissions for diesel vehicles is roughly the same as the gasoline baseline, despite the inherent efficiency advantages of diesel engines, suggests that manufacturers of current diesels in this category have been slow in adopting fuel-saving technologies. [EPA-HQ-OAR-2010-0162-1894.1, p.20]

For gasoline vehicles, the agencies also do not include cylinder deactivation and coupled cam phasing in their proposed package, which in their own assessment are very cheap (under $250 combined) and reduce CO2 by 4-8 percent. Major manufacturers including Honda, GM, Mercedes Benz, and Chrysler have already included these technologies into their light-duty fleet. Adding these two technologies to the agencies' package for gasoline vehicles, results in a revised package costing $1,607 and providing a CO2 reduction of 15 percent from a 2010 model year vehicle, according to the HO Lumped Parameter Model. This revised option offers an attractive payback of 4 years. [EPA-HQ-OAR-2010-0162-1894.1, pp.20-21]

Recommendation (additional technologies): Evaluate the feasibility of other promising technologies including turbo-GDI and hydraulic hybrids for gasoline vehicles. [EPA-HQ-OAR-2010-0162-1894.1, p.21]

The proposed standard does not take advantage of some advanced yet available technologies including Turbo-GOI, which combines S-GOI, turbo-charging, and downsizing for gasoline vehicles. According to the TIAX 2009 report submitted to the NAS, this package would reduce CO2 emissions for large trucks by 11-17 percent compared to stoichiometric GOI, at an added cost of $2000-$3000. The 2010 NAS study estimated 10-14 percent reduction potential for CO2 from turbocharged downsized direct injection engine with variable valve actuation (WA). Delphi Powertrain Systems observed that about 18 percent CO2 reduction was possible on the New European Driving Cycle (NEDC) with Turbo-GDI that employed a 3-way catalytic converter in comparison to a port-fuel naturally aspirated gasoline car. Ford has already adopted gasoline direct injection and turbochargers for the 2011 Ford F-150 model truck with 11,000 lbs towing capacity. Testing on this truck has confirmed its durability for more than 150,000 miles on test track encompassing the full range of potential customer operating conditions. Turbo-GDI is also available for Honda vehicles from 2010 model year. If Turbo-GDI is included in the agencies' package for gasoline vehicles and mass reduction is omitted, the revised package then reduces CO2 emissions by 18.7 percent to 33.7 percent at a cost of $3200. Assuming the midpoint of this range of savings (26 percent), this package has a payback of 4 years, still better than the payback of the agencies' proposed package. [EPA-HQ-OAR-2010-0162-1894.1, p.21]

Another important technology that the agencies have overlooked in this rule is hydraulic hybrid systems for Class 2b and 3 vehicles, as well as for vocational vehicles. Recently EPA and Chrysler entered into a cooperative agreement to develop and adapt hydraulic hybrid technology for the light duty auto market. EPA anticipates that the hydraulic hybrid technology will increase overall fuel efficiency by 30-35 percent and reduce overall GHG emissions by 25 percent. The NAS in its study also anticipated an 18-30 percent GHG reduction from hydraulic hybrids for Class 2b and 3 vans and 20-35 percent for vocational vehicles. The savings estimate was higher for Class 6 bucket trucks (up to 45 percent) and transit buses (up to 50 percent). This technology has already been introduced in vocational vehicles by Eaton, Crane Carrier, and Parker Hannifin. At a cost of $1200,1 the hydraulic hybrid would provide a very attractive payback of little more than one year for Class 2b and 3 van users. [EPA-HQ-OAR-2010-0162-1894.1, pp.21-22]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

We request that the agencies accelerate the phase-in of the proposed gasoline and diesel standards for heavy-duty pickups and vans to 2016. We also request that the Agencies adopt more stringent second-phase standards for gasoline Class 2b and 3 vehicles for 2018, based on available technology. Finally, we request that the agencies include a 2020 target for engine stringency. [EPA-HQ-OAR-2010-0162-3129.1, p.11]

The proposed package for gasoline pickups and vans did not include cost-effective technologies like cylinder deactivation and coupled cam phasing, which are capable of reducing CO2 by 4 to 8 percent. Adding these two technologies to the agencies' proposed gasoline package would provide a reduction of 15 percent, according to EPA's Lumped Parameter Model. The revised package offers a payback in less than 4 years, which is less than the payback period for the agencies' original package. Therefore, we request the agencies require gasoline pickups and vans to achieve at least a 15 percent reduction over 2010 levels by 2018. [EPA-HQ-OAR-2010-0162-3129.1, p.11]

The proposed rule provides for a 10 percent and 15 percent reduction in CO2 emissions from 2010 levels from gasoline and diesel fueled pickups and vans, respectively, in 2018. However, the 2010 Annual Energy Outlook (AEO) projects that heavy-duty pickups and vans will achieve virtually the same fuel efficiency in 2018 absent regulation, because these vehicles will take advantage of the technologies brought to market by the 2012-2016 light-duty rule. Therefore, to accelerate the take-up of these available technologies, we request that the final rule require the proposed improvements by 2016. This would still allow manufacturers four years of lead-time, ample time to implement existing technologies being used in the light-duty sector. [EPA-HQ-OAR-2010-0162-3129.1, p.11]

Organization: Center for Biological Diversity

In the case of heavy-duty pickup trucks and vans, the Agencies' undue deference to business-as-usual leads to an unacceptably slow phase-in of presently available technology. By design, the Agencies create opportunities for the three large manufacturers that together produce

95% of these vehicles to delay bringing all of their newly produced vehicles to higher standards in 2014 by allowing large portions of the fleet to remain unimproved. For example, under one contemplated approach, the Agencies propose to set a final standard for heavy-duty pickup trucks and vans in 2014, but to permit manufacturers to limit the percentage of vehicles in each model year that comply with the standard:

The percentage of regulated vehicles would increase each year, to 100 percent in 2018. We think it likely that manufacturers would leave the highest emitting vehicles unregulated for as long as possible under this approach, because these vehicles would tend to be the costliest to redesign or may simply be phased out of production. [EPA-HQ-OAR-2010-0162-2506.1, p.7]

In other words, this proposal acknowledges that all of the improvements underlying the standard are available and can be used in newly built vehicles as early as 2014, yet intentionally delays fleet-wide implementation for years. By definition, then, these technologies are both appropriate and technologically feasible. Therefore, the only factor that could justify delayed implementation across the entire fleet is cost-effectiveness. Crucially, however, the Agencies have failed to state the cost of fleet-wide implementation by 2014, thus depriving the public and decision-makers of necessary information. But regardless of that calculation, because the benefits of the rulemaking outweigh its costs by orders of magnitude, there is no doubt that this delay cannot be rationalized based on cost concerns alone. The implementation schedule approach abandons the concept of maximum feasible improvements, improperly weighs the requisite statutory factors, and/or impermissibly introduces extraneous considerations that arbitrarily weaken the resulting rulemaking. [EPA-HQ-OAR-2010-0162-2506.1, p.7]

Organization: Clean Air Task Force (CATF)

We urge EPA to strengthen its proposal by taking full advantage of technology options to reduce fuel consumption and greenhouse gas emissions from heavy-duty highway vehicles, including those that are described in the recent comprehensive report by the National Academy of Sciences. In evaluating the technologies available to reduce fuel use and GHG emissions from heavy-duty engines and vehicles, EPA relied heavily on the NAS report, as well as other published reports and confidential discussions with engine and vehicle manufacturers. To a large extent EPA evaluated the same technologies evaluated by the NAS panel, but came to different conclusions about the potential fuel savings that would be available in the 2015 – 2018 time frame. [EPA-HQ-OAR-2010-0162-2734.1, pp.3-4]

The NAS panel indicated that fuel use from HD pickups and vans could be reduced by 45% in the 2015 – 2020 time frame, while the proposed Rule is mandating only a 15% reduction for MY2018. These differences are attributable to two primary factors: 1) EPA judged some of the technologies included in the NAS report to not be technically feasible and/or cost effective for implementation by MY2018, and 2) to arrive at the potential fuel reduction figures the NAS report assumes essentially 100% penetration of all listed technologies fleet-wide, while EPA's proposed fleet average stringency levels assume more limited penetration rates for some technologies.

The NAS report found that fuel consumption in the heavy-duty pick-up and van sector could be reduced by about 45% in the 2015 to 2020 timeframe. However, EPA's proposal calls only for a reduction by 2018 of 10% for gasoline powered trucks, and 15% for diesels. These reductions are largely based on technologies supporting EPA's light-duty standards for the 2012-2016 timeframes, and because these technologies can be used to comply with both the 2012 to 2016 light duty vehicle standards as well as the proposed standards for heavy-duty pickup trucks and vans, we urge EPA to accelerate the phase-in of the gasoline and diesel standards for this category to achieve the proposed 2018 requirements by 2016. [EPA-HQ-OAR-2010-0162-2734.1, p.8]

In the technology package that EPA used to derive the proposed standards, EPA did not include technologies like cylinder deactivation and coupled cam phasing, which in EPA's own assessment are inexpensive (together costing less than $250) but effective, reducing carbon dioxide (CO2) by 4 to 8 percent. Adding these two technologies to the EPA's proposed gasoline truck package would provide a reduction of 15 percent, according to EPA's Lumped Parameter Model. This revised package offers a payback in less than 4 years, which is less than the payback period for EPA's proposed package that achieves only a 10 percent savings. Furthermore, the proposed standard does not take advantage of other promising technologies such as Turbo-GDI, which combines S-GDI, turbocharging, and downsizing for gasoline vehicles. According to the TIAX 2009 report cited in the NAS study, this package will reduce CO2 emissions for large trucks by 11 to 17 percent compared to stoichiometric GDI. The technologies have an added cost of $2,000-$3,000, but the payback period for these technologies on top of EPA's proposed package is 5 years. The NAS study also estimated a 10 to 14 percent reduction potential for CO2 from turbocharged downsized direct injection engine with Variable Valve Actuation (VVA). [EPA-HQ-OAR-2010-0162-2734.1, p.8]

In light of the potential for these advanced technologies to provide cost-effective reductions in fuel consumption and GHG emissions, we urge EPA to strengthen the standards in the final rule for gasoline pickups and vans to achieve at least an additional 15 percent reduction by 2018 by including cylinder deactivation and coupled cam phasing in the proposed package. We also urge EPA to consider other promising technologies, such as Turbo-GDI and VVA, which have the potential to significantly reduce CO2 emissions and provide a reasonable payback period. [EPA-HQ-OAR-2010-0162-2734.1, pp.8-9]

Organization: Natural Resources Defense Council (NRDC)

The stringency of the standard for gasoline-fueled heavy-duty pickups and vans should be increased to incorporate savings from available technologies. The agencies propose a 10 percent reduction in carbon dioxide (CO2) emissions from 2010 levels for gasoline vehicles by 2018. The proposal, however, stops short of including available technologies such as cylinder deactivation and coupled cam phasing. If added, these technologies could result in vehicle emission reductions of 15 percent. The agencies' evaluation of these two technologies indicates that they are cost-effective and are already being phased in to light-duty trucks to meet earlier standards covering model years 2012 to 2016. [EPA-HQ-OAR-2010-0162-1776.1, p.6]

Furthermore, the proposed standards do not take advantage of other promising technologies including turbocharged gasoline-direct injection (GDI), which allows for engine downsizing. According to the TIAX 2009 report submitted to the National Academies of Science (NAS), this package will reduce CO2 emissions for large pickups and vans by 11 to 17 percent. The 2010 NAS study also estimated a 10 to 14 percent reduction potential for CO2 from turbocharged downsized direct injection engine with Variable Valve Actuation (VVA). [EPA-HQ-OAR-2010-0162-1776.1, p.6]

We urge the agencies to increase the stringency of gasoline-powered heavy-duty pickups and vans to at least 15 percent to capture the savings from all available cost-effective technologies. [EPA-HQ-OAR-2010-0162-1776.1, p.6]

Organization: Northeast States for Coordinated Air Use Management (NESCAUM)

The agencies' proposal to reduce fuel consumption by 10% from gasoline vehicles and 15% from diesel vehicles by 2018 can and should be strengthened in order to maximize the benefits of improved fuel economy and reduced GHG emissions in this sector, using commercially viable technologies. We support the agencies' approach to require full vehicle emissions and fuel consumption testing for the class 2b and 3 vehicles. However, based on the findings of the NAS study, we believe the potential reduction for this sector could be greater than required under the proposed rule. The NAS study found that a 30 percent reduction could be achieved without hybridization in Class 2b trucks between 2015 and 2020. We encourage the agencies to consider more stringent standards for this class of vehicles for the 2018 timeframe. [EPA-HQ-OAR-2010-0162-1757.1, p.2]

AEO 2010 projects that heavy-duty pickups and vans will already achieve virtually the same efficiency in the Reference Case as the proposed standard requires, because these vehicles will take advantage of the technologies brought to market by the 2012-2016 light-duty rule. We agree with the assumption in AEO that the technologies used to comply with the 2012 to 2016 light duty vehicle standards can be used to comply with the proposed standards for heavy-duty pickup trucks and vans. Accordingly, we urge the agencies to accelerate the phase-in of the gasoline and diesel standards for this category to achieve the proposed 2018 requirements by 2016. [EPA-HQ-OAR-2010-0162-1757.1, p.3]

Organization: Sierra Club

Increase the stringency for Class 2B and 3 trucks and vans, as well as vocational trucks: While the range of work pickup-trucks and vocational trucks is broad, we believe further emissions reductions from Class 2B and 3 trucks and vans, as well as vocational trucks, are possible. In the proposed rule, EPA and NHTSA propose reductions for heavy-duty pickup trucks and vans based on a package of technologies, including low friction lubricants, stoichiometric gasoline direct injection (S-GDI), mass reduction and improved aerodynamics. However, the agencies do not include additional technologies, such as cylinder deactivation, that are both cheap and effective. [EPA-HQ-OAR-2010-0162-1889.1, p.3]

When setting the final standard for Class 2B and 3, EPA and NHTSA should consider additional technologies that reduce emissions and provide reasonable payback periods and strengthen the standards accordingly. [EPA-HQ-OAR-2010-0162-1889.1, p. 3]

Organization: Union of Concerned Scientists (UCS)

The proposed standards for class 2B and 3 pickup trucks and vans are based on technologies expected to be used for meeting the light-duty standards between 2012 and 2016. Based on the availability of these technologies and to be consistent with the faster implementation timeframe of the light-duty standards, we believe the agencies should require meeting the proposed 2018 requirements by 2016. [EPA-HQ-OAR-2010-0162-1764.1, p.9]

In addition, the standards for gasoline pickup trucks and vans should be strengthened to achieve at least a 15 percent reduction by 2018. This level of improvement could be achieved by considering additional technologies including coupled-cam phasing and cylinder deactivation. Additional investigation of turbocharging combined with stoichiometric gasoline direct injection and engine downsizing is also warranted given the potential 11 to 17% improvement identified by NAS for this technology. We urge the agencies to reevaluate these technologies and set a stringency level that reflects their performance improvement. [EPA-HQ-OAR-2010-0162-1764.1, p.9]

Organization: United States Senators (Dianne Feinstein, Olympia Snowe, Maria Cantwell, Richard Durbin, Barbara Boxer, Benjamin Cardin, Sheldon Whitehouse, Jack Reed, Jeff Merkley, Joseph Lieberman, Frank Lautenberg, Bill Nelson, Robert Menendez, Mark Udall, Thomas Carper, Daniel Akaka, Daniel Inouye, and John Kerry)

We are concerned that the fuel economy improvements proposed in the draft regulations are less aggressive than the potential identified by the National Academy Report, and we recommend the final standards be strengthened.

The DOT and EPA propose only a 12 percent improvement in fuel economy for gasoline pickup trucks and vans above 8,500 pounds between 2010 and 2018, and a 17 percent improvement for diesel vehicles of the same class. This is notably less fuel economy improvement than the 25 percent improvement required for cars, light trucks and SUVs under CAFE standards over the next four years. These less aggressive standards result, in large part, from the draft rule not considering all the technologies identified in the National Academy Report.

Many fuel-efficient technologies deployed in pick-up trucks under 8,500 pounds, like the Ford F150, may also be deployed in larger pick-up trucks regulated by this proposal, like the Ford F250. It is therefore concerning that the "maximum feasible improvement" in fuel economy under this regulation is considerably smaller than what is the "maximum feasible" rate attainable for vehicles under 8,500 pounds.

To meet the statutory mandate, we recommend that the final standards be based on the full suite of technologies identified as technologically feasible by the National Academy Report, and should associate as much fuel savings with each technology as the NAS estimated. The NAS identified fuel savings potential from technologies not included in the draft standards: turbocharged-gasoline direct injection systems, cylinder deactivation, and coupled cam phasing. Considering the full package of technologies could more than double the rate at which standards could be increased cost effectively, according to NAS's own estimate.

Response:

We have reviewed again the technology assessments from the 2010 NAS report, our own joint light-duty 2012-2016 rulemaking, and information provided by the commenters relevant to the stringency of these standards. After reviewing all of the information, we continue to conclude that the proposed standards and associated phase-in schedules represent technically stringent but reasonable standards considering the available lead time and costs to bring the necessary technologies to market and our own assessments of the efficacy of the technologies when applied to heavy-duty pickup trucks and vans. Our detailed technology feasibility analysis is provided in Chapter 2 of the RIA.

Commenters arguing for more stringent standards cited the heavy-duty vehicle NAS study (and an associated TIAX report) finding that technologies such as hybridization are feasible. However, in the ambitious timeframe we are focusing on for these rules, targeting as it does technologies implementable in the HD pickup and van fleet starting in 2014 and phasing in with normal product redesign cycles through 2018, our assessment shows that the standards we are establishing are appropriate. More advanced technologies considered in the NAS report would be appropriate for consideration in future rulemaking activity.

There are other relevant differences between the NAS report and the current rulemaking. The NAS report focuses on Class 2b Pickups and Vans in the 2015-2020 timeframe. It does not discuss which of the technologies it considers feasible for individual years in this timeframe, which overlaps but does not coincide with the 2014-2018 rulemaking timeframe. The report also does not focus specifically on the less-“light-duty-like” Class 3 vehicles also covered in the rulemaking. In addition, the report sometimes evaluates technology performance using different duty cycles which are different from those used in the final rule. Finally, the NAS report assumes less-advanced baseline vehicle technology, including 4-speed transmissions without aggressive shift logic and early torque converter lock-up (compared to 6-speed transmissions with these advances in the EPA/NHTSA analysis) and no gasoline engine cam phasing (see below). Thus the potential fuel consumption reductions obtained by the NAS report in adding new technologies are greater than those determined in the rulemaking.

Additional conventional technologies were also identified by commenters as promising in light-duty applications and potentially useful for HD applications. Specifically mentioned were gasoline engine turbo-charging and downsizing, cylinder deactiviation, and engine start-stop. While turbo-charging and downsizing of gasoline vehicles was a principal technology in the light duty rule, the agencies determined that in the realm of heavy duty vehicles, this approach provides much less benefit to vehicles which are required to regularly operate at high and sustained loads. In light duty applications, downsizing of a typically oversized engine largely results in benefits mainly under partial and light load conditions. This approach is more applicable to light duty vehicles because they infrequently require high or full power. Further, while turbo downsizing was already occurring in a portion of the light duty fleet, it has not been demonstrated in the heavy duty fleet, likely due to concerns with durability of this technology under constant heavy load operation. Similarly, cylinder deactivation and engine start-stop were determined to not be compatible with the duty cycle of heavy duty vehicles for similar reasons. See RIA section 2.3.1. The 2010 NAS Report and the TIAX Study that supports it were referenced by a number of commenters in support of their view that the standards should require these technologies, but the above-discussed challenges of making these technologies work in the HD sector are addressed by none of these sources—the NAS committee, TIAX , or the commenters.

The agencies also received comments questioning the exclusion of cam phasing from the technology set. During the rulemaking process, manufacturers introduced new or updated gasoline engines resulting in the majority of the 2010 gasoline heavy duty engines including cam phasing. Because of this, the baseline analysis of technology for the 2010 heavy duty gasoline fleet already includes the benefits of cam phasing and therefore it is not appropriate for the agencies to include this as a technology that is available for most manufactures to add to their current gasoline engines.

Commenters also argued for an earlier phase-in or earlier implementation without a phase-in, by 2014 or 2016. The phase-in of standards over 2014-2018 was chosen to strike a balance between meaningful reductions in the early years and providing manufacturers with needed lead time via a gradually accelerating ramp-up of technology penetration. Full implementation by 2014 or 2016 would not allow for the intended orderly migration to the HD sector of technologies developed for the light-duty GHG and fuel economy standards in MY 2012-2016. Although the agencies did not analyze the costs of regulatory alternatives with aggressive phase-ins, we expect that the lack of an orderly technology migration from the light-duty sector with much higher sales volumes, combined with the mismatch of standards timing with manufacturers' normal product redesign cycles, would greatly increase the cost of compliance.

We disagree with commenters who argued for acceleration of the phase-in to 2016 based on AEO 2010 projections that heavy-duty pickups and vans will already achieve virtually the same efficiency levels as required under the proposed standards using the technologies brought to market by the 2012-2016 light-duty rule. Our pre-proposal discussions with manufacturers and comments submitted by them on the proposal gave no indication that these technologies and the substantial associated fuel economy improvements would be in their product plans for this timeframe whether or not these HD rules were finalized. Rather than supporting the acceleration of standards, such a baseline would indicate that this is a no-cost/no-benefit rulemaking.

6.3.3. Objections and Concerns Regarding Standards Approach

Organizations Included in this Section:

American Automotive Policy Council
American Council for an Energy-Efficient Economy
Cummins, Inc.
Daimler Trucks North America
Engine Manufacturers and Truck Manufacturers Associations
Motor & Equipment Manufacturers Association
National Automobile Dealers Association
Natural Gas Vehicle Interests
Robert Bosch, LLC

Organization: American Automotive Policy Council

The agencies propose to define gross combined weight rating ('GCWR') for heavy-duty pickups and vans according to Society of Automotive Engineers Recommended Practice J2807 (April 2008) ('SAE J2807'). SAE J2807 recommends this procedure for vehicles rated up to 13,000 lbs. gross vehicle weight rating ('GVWR'). However, the Class 2b-3 heavy-duty pickup and van vehicles which EPA proposes SAE J2807 apply to include vehicles up to 14,000 lbs. GVWR. AAPC believes SAE J2807 could be used for vehicles up to 14,000 lbs. GVWR, but there is insufficient time for SAE to modify this procedure to include vehicles between 13,000-14,000 lbs. GVWR for implementation with the 2013 model year ('MY'). In order to prevent manufacturer uncertainty when determining the GCWR for vehicles up to 14,000 lb. GVWR, AAPC recommends that the agencies incorporate SAE J2807 by reference, and that the regulatory text specifically state that the SAE J2807 test procedures to determine GCWR apply to vehicles up to 14,000 lbs. GVWR for the purposes of this regulation. Alternatively, AAPC recommends that the pertinent test procedures be written into the regulation. [EPA-HQ-OAR-2010-0162-1762.1, pp.1-2]

The proposed regulatory definitions for gross combined weight rating and gross combination weight rating are inconsistent with the SAE J2807 methodology proposed for Class 2b/3 pickups and vans in the preamble. The definitions proposed by the agencies are not harmonized. In the preamble of the NPRM, the agencies propose that GCWR be determined by SAE J2807 for the heavy-duty pickup and van regulatory category. However, the proposed regulatory text from EPA and from NHTSA specifies that GCWR will be determined as a “value specified by the manufacturer”. No mention is made of SAE J2807 in either the definition sections or the sections specifically describing compliance provisions for Class 2b/3 complete and cab-complete vehicles. AAPC recommends that the regulatory text be modified in both instances to specify that GCWR be calculated according to SAE J2807 (or other appropriate regulatory reference) for the heavy-duty pickup and van category. [EPA-HQ-OAR-2010-0162-1762.1, p.2]

Additional minor inconsistencies noted by AAPC in the regulatory text are the varying naming conventions used by the agencies ("combined" and "combination") and inconsistent definitions of the term "GCWR" in the proposed regulatory text. For consistency in their application, AAPC recommends that the agencies harmonize the definitions of the various terms wherever possible. [EPA-HQ-OAR-2010-0162-1762.1, p.2]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Recommendation (combined gasoline and diesel standards): Consider a single standard for gasoline and diesel vehicles. The agencies assert that '[the required] reductions represent roughly equal stringency levels for gasoline and diesel vehicles, which is important in ensuring our proposed program maintains product choices available to vehicle buyers' (pp.74195-6). It is not clear why the agencies regard the proposed stringencies as equivalent, given that the baselines for gasoline and diesel are approximately the same, while diesel vehicles are required to achieve 15 percent reductions and gasoline are required to achieve 10 percent reduction. With a required emissions reduction of 15 percent for gasoline vehicles as recommended above, standards for gasoline and diesel vehicles would indeed be roughly equivalent. In that case, a combined, fuel independent standard would appear to offer greatest flexibility and greatest potential to drive fuel savings and emissions reductions. [EPA-HQ-OAR-2010-0162-1894.1, p.22]

Organization: Cummins, Inc.

Cummins does not support different standards between diesel and gasoline fueled vehicles. The Agencies have proposed separate standards for HD pickups and vans that require a 15% reduction by diesel and only 10% by gasoline vehicles. These standards diverge over time. A vehicle with a 5000 lb work factor equipped with a diesel engine would target CO2 emissions at 607 g/mi in 2014, where an equivalent gasoline vehicle would target 612 g/mi – approximately 1% higher. In 2018, the proposal would have these two vehicles targeted at 528 and 559 g/mi respectively – a nearly 6% difference. The proposed regulation moves in the wrong direction of creating a greater disparity over time instead of bringing diesel and gasoline vehicles to equivalent standards by 2018. [EPA-HQ-OAR-2010-0162-1765.1, p.34]

Consistent with our core principle on fuel neutrality, Cummins does not support different diesel and gasoline standards for HD pickups and vans. This is consistent with the criteria pollutant standards that are fuel neutral (Tier II, ARB LEVII and proposed LEVIII). Diesel engines have suffered a significantly higher cost penalty to control criteria pollutants to the same levels as gasoline engines. This proposed regulation for GHG/FC will require further development and added cost on both gasoline and diesel powertrains. However, since less is being required of gasoline vehicles in the regulation, this could lead to a market shift away from the more efficient diesel powertrain. [EPA-HQ-OAR-2010-0162-1765.1, p.34]

A significant market shift from gasoline to diesel would have a negative impact on the environmental and energy goals in this regulation. For example, for every 10% shift in market split to gasoline from diesel, the fleet CO2 emissions increase by 2%. In other words, if the market moves from a 70/30 split of diesel/gasoline to 60/40, the CO2 emissions from the fleet will increase 2%. In fact, if the market shift were taken to the limit, the net effect would be increased CO2 emissions when compared to today's fleet. [EPA-HQ-OAR-2010-0162-1765.1, p.34]

Organization: Daimler Trucks North America

Daimler strongly recommends that the inclusion of towing capacity within the work factor calculation not require a vehicle manufacturer to automatically assume the responsibility of including trailer tow as standard on all vehicles. [EPA-HQ-OAR-2010-0162-1818.1, p.110]

Organization: Engine Manufacturers and Truck Manufacturers Associations

Fuel-Neutrality [EPA-HQ-OAR-2010-0162-1940.1, p.14] Greenhouse gas emissions result from the combustion of any fuel, including gasoline, diesel and natural gas. The environment sees no difference between diesel-derived GHG, gasoline-derived GHG, or natural gas-derived GHG, and neither should the Proposed GHG/FE Standards. The same holds true with respect to any other criteria pollutant, which is why the Associations agree with EPA's long-standing policy of fuel-neutrality when proposing emission standards for HD vehicles and engines. [EPA-HQ-OAR-2010-0162-1940.1, p.14]

Organization: Motor & Equipment Manufacturers Association (MEMA)

The agencies have proposed "separate targets … for gasoline-fueled (and any other Otto-cycle) vehicles and diesel-fueled (and any other Diesel-cycle) vehicles." This proposal is counter to what EPA and NHTSA have done in the light-duty vehicle National Program, where the GHG and fuel economy target values are common regardless of powertrain. [EPA-HQ-OAR-2010-0162-1752.1, p.13]

MEMA acknowledges the recommended technology packages and the relative efficiency of gasoline and diesel vehicles differ. Still, in spite of the agencies' apparent "overall goal of remaining fuel-neutral" and their belief that the proposed standards "represent roughly equivalent stringency levels for gasoline and diesel vehicles, which is important in ensuring [the] proposed program maintains product choices available to buyers," the separate target values for spark ignition (i.e., gasoline) and compression-ignition (i.e., diesel) vehicles do not align with performance based standards as seen in other criteria emissions (as specified in 40 CFR Parts 69, 80 and 86) or the recently promulgated light-duty GHG emission standards. By way of example, regardless of the phase-in option selected, a MY2014 heavy-duty (HD) diesel pickup truck with a work factor of 3,000 pounds would have a GHG target of 511.4 g/mi under EPA's proposed formula in Section 1037.104(a)(2)(ii) ([0.0478 x 3000] + 368), while a MY2014 HD gasoline pickup truck, with an identical work factor, would have a GHG target of 515.6 g/mi under that formula ([0.0482 x 3000] + 371). While understanding the agencies' technology feasibility assessment, the resultant diesel target value is lower, which is to say, gasoline HD pickups and vans under the proposed rule would be able to emit higher GHG levels than diesel heavy-duty pickups and vans. [EPA-HQ-OAR-2010-0162-1752.1, pp.13-14]

The same disparity exists for fuel consumption: the fixed target standard for a MY2016 HD diesel pickup truck with a work factor of 3,000 pounds would be 4.6 gal/100 miles under NHTSA's proposed Section 535.5(a)(2)(ii) ([0.000432 x 3000] + 3.33), while the fixed target standard for a MY2016 HD gasoline pickup truck with the same work factor would be 5.5 gal/100 miles ([0.000513 x 3000] + 3.96). Once again, understanding the agencies' technology feasibility assessment, the diesel fixed target standard is lower, meaning that gasoline HD pickups and vans would be able to consume more fuel than diesel HD pickups and vans. [EPA-HQ-OAR-2010-0162-1752.1, p.14]

MEMA's calculations for a HD pickup truck with a work factor of 3,000 pounds further reveal that the difference between the diesel and gasoline GHG target values increases over time, going from 0.8 percent in MY2014 to 5.9 percent in MY2018 or MY2019 (depending on which phase-in schedule is selected). Rather than converging towards the same value, the separate diesel and gasoline GHG targets diverge over the model years in question. The same holds true for the proposed fuel consumption standards, where the difference between the phased-in (i.e., second alternative) target standards widens from 15.5 percent in MY2013 (assuming early compliance) to 21.3 percent in MY2018. [EPA-HQ-OAR-2010-0162-1752.1, p.14]

Organization: National Automobile Dealers Association (NADA)

At the same time, the rule should strive to be fuel and technology "neutral," leaving it to the new vehicle marketplace to largely determine what works best. As drafted, the proposal appears to disadvantage natural gas and other alternative-fueled vehicles. Corrections and adjustments should be provided for to promote fuel neutrality. [EPA-HQ-OAR-2010-0162-2705, p.10]

Organization: Natural Gas Vehicle Interests

The HD Rule proposes standards for Class 2b pickup trucks based on a "Work Factor", which in turn is derived from payload and towing capabilities. In addition, the Work Factor may be adjusted to account for the weight added by 4WD systems: "This adjustment would account for the fact that 4wd, critical to enabling the many off-road heavy-duty work applications, adds roughly 500 lb to the vehicle weight." 75 FR 74190. [EPA-HQ-OAR-2010-0162-2119.1, pp.12-13]

Because, like 4wd, CNG systems add several hundred pounds to vehicle curb weight, the Natural Gas Vehicle Interests request that the HD Rule be amended to create a similar adjustment for CNG Class 2b vehicles. Such systems weight between 300 and 900 lbs., depending on the materials used, and without such an adjustment these vehicles would have their target CO_2 emissions lowered by between 1.7 and 6%. Therefore, we propose an allowance of 500lbs. for CNG fuel systems, which is both comparable to the 4wd allowance and covers the majority of such fuel systems. [EPA-HQ-OAR-2010-0162-2119.1, p.13]

Organization: Robert Bosch, LLC

Based on the divergence in both the technologies associated with and the "relative efficiency" of gasoline and diesel vehicles, the agencies have proposed different standards for gasoline-fueled PUVs and diesel-fueled PUVs, as well as different engine standards for the gasoline and diesel engines installed in vocational vehicles. For example, under EPA's proposed section 1036.108(a)(1), the carbon dioxide (CO_2) standard for a MY 2016 Light HD diesel engine used in a Class 2b-5 vocational vehicle would be 600 g/hp-hr (dropping to 576 g/hp-hr in MY 2017), whereas for a MY 2016 gasoline engine used in the same type of vehicle, the standard would be 627 g/hp-hr (with no decrease in MY 2017). Perhaps more significantly, Light HD diesel engines used in MY 2014 and 2015 vocational vehicles would be subject to the same 600 g/hp-hr standard, while gasoline engines used in MY 2014 and 2015 vocational vehicles would not be subject to any CO_2 emissions standard because the 627 g/hp-hr level would not take effect until MY 2016. In Bosch's view, such uneven regulation could lead to an increase in CO_2 emissions. [EPA-HQ-OAR-2010-0162-1630.1, p.10]

In the context of PUVs, the agencies explain that they "are not basing the proposed standards on a targeted switch in the mix of diesel and gasoline vehicles," and that the proposed standards "represent roughly equivalent stringency levels for gasoline and diesel vehicles, which is important in ensuring [the] proposed program maintains product choices available to buyers." Bosch appreciates that the agencies are not looking to effect a market shift between diesel and gasoline, nor limit HD vehicle purchasers' choices. Nevertheless, it bears emphasizing that the proposed differential standards run counter to what EPA and NHTSA have done in the LDV National Program, where a single CO_2 target value and fuel economy standard applies to all vehicles regardless of the fuel(s) on which they operate. The proposed differential standards, moreover, diverge over time rather than converge toward a common value. [EPA-HQ-OAR-2010-0162-1630.1, pp.10-11]

Given the agencies' "aim of issuing a final rule by July 30, 2011," Bosch understands that there is insufficient time at this late stage for EPA and NHTSA to develop performance-based standards for PUVs and vocational vehicle engines. For this reason, Bosch does not oppose the differential standards as proposed. However, in light of the agencies' stated desire to "revise the [HD] vehicle and engine regulations to make them consistent with the [LDV] approach, applying standards for all regulated criteria pollutants and GHGs regardless of fuel type," Bosch takes this opportunity to encourage EPA and NHTSA, in their future endeavors to amend the HD National Program that results from this particular rulemaking, to move towards performance-based GHG emissions and fuel consumption standards. Bosch strongly believes that a single PUV/engine performance standard, *a la* the LDV National Program, would be preferable inasmuch as such a standard would denote a level playing field for all vehicle technologies irrespective of the fuel(s) on which they are based. [EPA-HQ-OAR-2010-0162-1630.1, pp.11-12]

Response:

Commenters objected to setting separate standards for diesel and gasoline (and other Otto-cycle) vehicles based on: (1) the view that it increases the burden for diesel engine manufacturers more than for gasoline engine manufacturers, and thereby could shift market share away from diesels, (2) historical precedent in both the LDV GHG rule and in various criteria pollutant standard rules, and (3) the fact that GHGs emitted by one type of engine are no different than those emitted by another type of engine. We believe that both engine types have roughly equivalent redesign burdens as evidenced by the feasibility and cost analysis in RIA Chapter 2. This is due in part to the fact that, even though the percentage CO2 and fuel consumption reductions are expressed from a common diesel/gasoline baseline in these final rules, 10 percent for gasoline vehicles and 15 percent for diesels, the actual starting base for diesels is at a lower level than for gasoline vehicles and so, considered separately, the actual percentage reduction needed for each of these two engine types is more nearly the same.

Natural gas vehicle interests proposed that CNG vehicles, like 4-wheel drive (4WD) vehicles, receive an additional 500 lb add-on to their work factor because they tend to weigh more than conventional vehicles. The work factor add-on for 4WD HD pickups and vans recognizes that this segment of vehicles incurs its weight penalty in order to meet off-road task requirements demanded of them, similar to the higher weight suspension systems needed to handle larger payloads and towing capacities. We do not believe it is appropriate to factor fuel type or other vehicle characteristics not directly related to vehicle work functions into the work factor calculation. These vehicles will be evaluated based on their actual tailpipe GHG emissions, which already affords an advantage in meeting the standards due to the lower GHG emissions associated with use of natural gas fuels which is typically 20-30% lower than gasoline or diesel.

Daimler expressed concern that the inclusion of towing capacity within the work factor calculation not require a vehicle manufacturer to automatically assume the responsibility of including trailer tow as standard on all vehicles. We believe the form of the towing term in the work factor calculation, based simply as it is on GCWR and GVWR, provides assurance of this. We have revised the wording of the regulations to provide the clarifications suggested by AAPC.

6.3.4. **Incomplete Vehicle Standards**

Organizations Included in this Section:

American Automotive Policy Council

Cummins, Inc.
Daimler Trucks North America
Engine Manufacturers and Truck Manufacturers Associations
National Automobile Dealers Association
National Truck Equipment Association
Navistar, Inc.

Organization: American Automotive Policy Council

AAPC supports the provisions to treat Class 2b-3 cab complete vehicles as the most similar complete vehicle which a manufacturer certifies (proposed 40 CFR 1037.104(h) and 49 CFR 535.5(a)(5)); we recommend that all vehicles of this description also have the option of being certified under the Vocational Vehicle standards. AAPC believes that allowing cab complete vehicles to be certified as their most similar complete counterpart is a logical flexibility which reduces test burden and avoids unnecessary test complexity while still capturing whole-vehicle efficiency improvements. [EPA-HQ-OAR-2010-0162-1762.1, p.25]

We propose the added flexibility of allowing a manufacturer to also certify any and all Class 2b-3 cab complete vehicles under the vocational engine and vehicle regulations. As currently proposed, a manufacturer may certify a vehicle for criteria pollutants under the engine dynamometer procedures, and then be required to perform additional chassis dynamometer testing to separately certify for greenhouse gas emissions. In addition, as proposed, a non-vertically integrated manufacturer may produce a vehicle that is certified by two different manufacturers. (For example, an engine supplier may certify the engine separately for criteria pollutants while a vehicle manufacturer utilizing the engine would additionally be required to certify the vehicle for greenhouse gas emissions.) Permitting manufacturers the option of certifying an unlimited volume of cab complete vehicles to the vocational engine and vehicle standards avoids these issues and recognizes that cab complete vehicles are generally designed for vocational vehicle up-fitting. [EPA-HQ-OAR-2010-0162-1762.1, p.25]

Organization: Cummins, Inc.

Class 2b and 3 cab-complete vehicles (i.e., chassis cabs) should be moved to the vocational engine and vehicle programs. For many of the same reasons [in the discussion of Class 4 vehicles], Cummins believes that cab-complete vehicles should also be moved to the vocational engine and vehicle programs. Similar to Class 4 vehicles, cab-completes are marketed to meet vocational requirements. Cab-completes for diesels can be certified for criteria pollutant emissions on either the engine or chassis dynamometer. Requiring GHG/FC to be measured on chassis tests only could create a “mixed certification” situation where the same vehicle and engine are measured on different cycles with different metrics for criteria pollutants and GHG/FC. [EPA-HQ-OAR-2010-0162-1765.1, p.33]

Given the Agencies have agreed to allow an optional “similar vehicle” attestation, eliminating the need for testing cab-completes, it would seem there would be no real benefit to this proposed requirement. Vehicles in this class are true derivatives of the complete Class 2b and 3 trucks and thus would share in the same vehicle improvements (i.e., aerodynamic design, transmission efficiency, low drag brakes, etc). Additionally, the engine would have to meet the vocational engine standards. [EPA-HQ-OAR-2010-0162-1765.1, p.33]

Organization: Daimler Trucks North America

Daimler agrees with the Agencies approach to treat vehicles that are produced in multiple stages, i.e. chassis cabs, as equivalents to another vehicle (sister vehicle) that is the most similar to the multistage vehicle leaving its facility. We also agree that not considering final stage manufacturer modifications is the best approach for these regulations because they pose an unfair burden on the manufacturers that produce multistage vehicles to monitor and control every final stage modification to its incomplete vehicles. [EPA-HQ-OAR-2010-0162-1818.1, p.109]

Daimler strongly recommends that the agencies clearly define the “Sister Vehicle” by a useful parameter such as footprint and/or GVWR to avoid any ambiguity when vehicle manufacturers are selecting the appropriate similar vehicle leaving its facility and to avoid any confusion when reading and complying with these regulations. This will ensure that we will have a more accurate way of defining the “sister vehicle” parameter independent of vehicle body shape. [EPA-HQ-OAR-2010-0162-1818.1, p.109]

Daimler strongly recommends that the vehicle manufacturer be allowed to use either the payload capacity of the incomplete vehicle or the payload capacity of the sister vehicle selected when determining the work factor for the selected vehicle category. [EPA-HQ-OAR-2010-0162-1818.1, p.109]

Daimler strongly recommends that manufacturers be required to create vehicle families (i.e., a fleet mix). There should be a two-stage approach: 1. Manufacturers should have the option to create vehicle families identical to the light-duty regulations, based on test groups. Within this option the manufacturer will be required to test for worst case. 2. Inside these families it will be optional to break down the vehicle families into more detailed sub categories of the test groups in an effort to achieve better GHG results. [EPA-HQ-OAR-2010-0162-1818.1, p.109]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The proposed standards define 'heavy-duty pickup trucks and vans' to include certain incomplete vehicles at or below 14,000 lbs. GVWR that would be regulated under the vehicle-based standards for complete 'heavy-duty pickup trucks and vans.' Those incomplete vehicles, called 'cab-complete vehicles,' have complete cabs, but lack a cargo carrying container. (See 75 at 74400, 74435.) Since a cab-complete vehicle is not completed by the certifying manufacturer, to establish a work factor (i.e., a combination of the vehicle's payload capacity and towing capabilities) on which the emissions and fuel efficiency targets are based, the manufacturer would apply the work factor from a similar (complete) vehicle. (See 75 at 74382, 74442.) Using a work factor from a similar vehicle eliminates any vehicle-based benefits (e.g., aerodynamic designs or transmission efficiency) that would be derived from the vehicle-based testing. Also, since engines for cab-complete vehicles are certified for criteria pollutant emissions using engine dynamometer standards, their categorization as 'heavy-duty pickup trucks and vans' creates the situation where GHG emissions would be measured on different cycles with different units of measure, and would require engine manufacturers to conduct separate accounting and to submit separate sets of data. [EPA-HQ-OAR-2010-0162-1940.1, pp.16-17]

Specifically, the Associations recommend the adoption of the following definitions: [EPA-HQ-OAR-2010-0162-1940.1, pp.17; 'Heavy-duty pickup trucks and vans' are pickup trucks and vans with a GVWR between 8,501lbs. and 14,000 lbs. (Class 2b through 3) manufactured as complete vehicles by a single or final stage manufacturer. [EPA-HQ-OAR-2010-0162-1940.1, p.18]

If a vehicle meets the foregoing requirements, it is presumptively a 'heavy-duty pickup truck or van' for the purposes of the GHG/FE Standards. If a manufacturer believes that a vehicle that meets the heavy-duty pickup trucks and vans definition is nonetheless a 'vocational vehicle,' the manufacturer would have the burden of establishing that fact to the Agencies' reasonable satisfaction. [EPA-HQ-OAR-2010-0162-1940.1, p.18]

Organization: National Automobile Dealers Association (NADA)

This vehicle group includes Class 2b and Class 3 large pickups and vans not otherwise covered by the EPA/NHTSA light-duty fuel economy/GHG program. They are commonly recognized to be “work trucks” principally used for a variety of commercial purposes including heavy-trailer towing, shuttle vans, and mini-school buses. Notably, these vehicles are sold by dealerships both primarily engaged in selling noncommercial, light-duty vehicles and primarily engaged in selling medium- and/or heavy-duty commercial vehicles. According to data compiled by Wards Auto for 2010, Class 2b sales included vehicles manufactured by Chrysler, Ford, General Motors, Daimler, and International dealerships, while Chrysler, Ford, General Motors, Isuzu, International, Daimler, and Mitsubishi Fuso dealerships sold Class 3 vehicles. [EPA-HQ-OAR-2010-0162-2705, p.7]

The proposal attempts to appropriately target standards using a “work factor” attribute. The “work factor” attribute is designed to reflect consideration of vehicle payload, towing capacity, and 2 or 4 wheel drive. Standards to be phased-in between MY 2014-18 aim to achieve up to 10 percent reductions for gasoline-equipped vehicles, and 15 percent reductions for diesel-equipped vehicles. Similar to the light-duty program, each OEM will have its own target based on the “work factor” of the fleet it produces. It is proposed that an additional 2% of GHG reductions will be achieved through the regulation of vehicle A/C systems. An average $1,400 per unit cost is associated with the heavy-duty pickup truck and van standards. [EPA-HQ-OAR-2010-0162-2705, p.7]

Like vocational vehicles, “work trucks” often aren’t built by a single manufacturer, but rather are completed or altered (upfitted) by body and equipment installers or truck dealerships. This reality should be taken into consideration as the standards are finalized. [EPA-HQ-OAR-2010-0162-2705, p.7]

OEMs who build complete vehicles or cab chassis for this commercial vehicle group indicate that while aggressive, the proposed standards are achievable through strategies such as engine downsizing, new engine and transmission technologies, and weight reductions. A major concern is that such strategies could result in vehicles that are no longer appropriate for certain uses. Certainly, mandates for this vehicle group must not result in designs that effectively force customers to purchase vehicles that are undersized or underpowered for their needs (i.e., trailer towing), as this would result in real safety concerns. [EPA-HQ-OAR-2010-0162-2705, pp.7-8]

Organization: National Truck Equipment Association (NTEA)

The NTEA agrees with the agencies’ concerns over applying these standards without recognition of the cab-chassis issue in these weight categories. We generally support the proposed approach. [EPA-HQ-OAR-2010-0162-1608.1, p.6]

In the Class 2b-3 work truck market, that includes pickup trucks and vans, final stage manufacturers may alter vehicles prior to the first retail sale through things such as pickup box removal programs. Final stage manufacturers may also use a cab-chassis based on the similar complete vehicle in this category to produce a final stage work truck or van. [EPA-HQ-OAR-2010-0162-1608.1, p.6]

The OEM manufacturer of the pickup or van based cab-chassis will provide information and data to later stage manufacturers for the safe completion or alteration of the vehicle but the OEM will has no ability to know in what type of work truck or van a given chassis will result. [EPA-HQ-OAR-2010-0162-1608.1, p.6]

Allowing the OEM to treat cab-chassis for their averaging purposes as the similar to their own completed version of the cab-chassis strikes a reasonable regulatory balance. It applies the benefits of the regulations to the chassis while eliminating the unreasonable and unrealistic regulatory burden of tracking the end use of every cab-chassis and conducting individual testing and/or calculations. [EPA-HQ-OAR-2010-0162-1608.1, p.6]

Recognizing that secondary manufacturers alter completed vehicles and providing allowances for this reality with regard to in-use testing is reasonable and supported by the NTEA. [EPA-HQ-OAR-2010-0162-1608.1, p.6]

We are somewhat concerned with the following provision with regard to secondary manufacturers… However, if they modify vehicle components in such a way that GHG emissions and fuel consumption are substantially affected, they become manufacturers subject to the standards under this proposal. [EPA-HQ-OAR-2010-0162-1608.1, p.6]

In the completion or alteration of a vehicle it is common that a new body is installed. That body may weigh more than the body typically installed by the OEM for a complete truck or van. For instance, it would be common for a pickup bed to be removed and replaced with a utility body – a body that likely weighs more than the simple pickup bed. The completed or altered vehicle would still fall within the original gross vehicle weight rating of the OEM but the curb weight would likely be different. [EPA-HQ-OAR-2010-0162-1608.1, p.6]

We suggest that secondary manufacturers not be subject to regulation as an OEM unless they actually change the GVWR of a vehicle. [EPA-HQ-OAR-2010-0162-1608.1, p.6]

Organization: Navistar, Inc.

"Heavy-duty pickup trucks and vans" are pickup trucks and vans with a GVWR between 8,501 lbs. and 14,000 lbs. (Class 2b-3) manufactured as complete vehicles by a single or final stage manufacturer and include cob-complete vehicles that are first sold as incomplete vehicles that substantially include the vehicle cab section. If a vehicle meets the foregoing requirements, it is presumptively a "heavy-duty pickup truck or van" for the purposes of the standards. If a manufacturer believes that a vehicle that meets the heavy-duty pickup trucks and vans definition is nonetheless a "vocational vehicle," the manufacturer would have the burden of establishing that fact to EPA's reasonable satisfaction. [EPA-HQ-OAR-2010-0162-1871.1, pp.33-34]

Response:

Manufacturers supported the proposed association of incomplete vehicles with their complete counterparts for certification purposes, but objected to requirements that would, in some cases, result in engine certification for criteria pollutants and vehicle certification for GHGs and fuel consumption, and vice-versa. The agencies agree that this is an undesirable outcome, because of both the duplicative testing and engine calibration effort and the perverse incentive for gaming, and so are finalizing a revised approach to incomplete vehicles, involving chassis-certification options that do not require any vehicles to both engine- and chassis-certify. See section V.B(1)(e) of the final rule preamble for details.

6.4. N_2O, CH_4, HFC Emissions Standards

6.4.1. N_2O and CH_4

Organizations Included in this Section:

Alliance of Automobile Manufacturers
American Automotive Policy Council
Center for Biological Diversity
Cummins, Inc.
Daimler Trucks North America
Engine Manufacturers and Truck Manufacturers Associations
Natural Gas Vehicle Interests

Organization: Alliance of Automobile Manufacturers (Alliance)

The Alliance supports the medium/heavy-duty rulemaking approach for controlling CH4 and N2O. The supported regulatory structure includes:

• De-linking CH4 and N2O performance - if a given model underperforms on either constituent that deficit can be covered by CO2 fleet overperformance. This approach respects the fact that the fundamental mechanisms for CH4 and N2O formation are different and the two constituents do not necessarily trend together. [EPA-HQ-OAR-2010-0162-1621.1, p.1]

• If a given model has a deficit to a CH4 and N2O cap, that model's volume (i.e., not the entire fleet) is required to be covered with CO2 fleet overperformance. This approach does not punish an individual model or technology. Some specific technologies (diesel, CNG, etc) may be challenged by the caps but those technologies have offsetting CO2 benefits.

• The difference between CH4 and N2O test values and the emission standard is required to be offset with CO2 fleet overperformance.

• CH4 and N2O compliance are measured on the combined 55/45 weighting of city and highway cycles. These cycles are the yardstick for fuel economy and CO2 measurement. [EPA-HQ-OAR-2010-0162-1621.1, p.2]

Organization: American Automotive Policy Council

We support EPA's approach to CO_2 and N_2O compliance demonstration allowing fully severable offsetting credits per model on a CO_2 equivalence… [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

Based on the limited amount of data available, the cap standards for Class 2b and 3 trucks appear to be appropriate for known technology and while operating on gasoline or diesel fuel. [EPA-HQ-OAR-2010-0162-1762.1, p.15]

Effect of N_2O and CH_4 caps on Alternative Fuels and Engine Technologies [EPA-HQ-OAR-2010-0162-1762.1, p.15]

On September 3, 2009, data was presented to EPA and submitted to the docket that showed a fundamental difference between the CH_4 emissions while operating on E85 fuel and the finalized cap standard for CH_4. As proposed in this heavy-duty rulemaking, the cap standard for CH_4 will preclude the further introduction of flexible-fueled vans and trucks in Class 2B and 3. Further, the proposed CH_4 cap standard runs contrary to the goals of EISA, to reduce the Nation's dependence on foreign oil, and contrary to the AAPC member companies' commitment to produce fully half (50%) of our volume as alternative fuel capable by 2012. [EPA-HQ-OAR-2010-0162-1762.1, p.15]

Similarly, absent appropriate consideration, capping CH_4 and N_2O at the proposed levels could have an unintended consequence of severely limiting and/or restricting greenhouse gas and petroleum consumption reducing technologies such as compressed natural gas vehicles, homogenous charge compression ignition engines ("HCCI"), partial-HCCI, or lean gasoline in the U.S. market. [EPA-HQ-OAR-2010-0162-1762.1, p.15]

AAPC recommends, per the presented E85 data, doubling the CH_4 emissions cap for E85 fuel. [EPA-HQ-OAR-2010-0162-1762.1, p.15]

AAPC further recommends that EPA consider unique N_2O and CH_4 caps for other alternative fuels and engine technologies. Short of that, the agencies should collect N_2O or CH_4 emission data for fuels other than gasoline and diesel and non-conventional engine technologies in order to justify a standard applicable to all fuels and engine technologies. [EPA-HQ-OAR-2010-0162-1762.1, p.15]

EPA has proposed the option of offsetting, on a CO_2 equivalent ("CO_2e") basis, any N_2O emissions or any CH_4 emissions in excess of the cap standards. This option is allowed for either of two constituents (CH_4 or N_2O or both) and the use of this option does not tie the two constituents together (i.e.,CH_4 and N_2O emissions are fully severable). Further, the required offset is tied to the additional amount over the cap standard. The proposed approach recognizes the inter-correlation of these constituents in impacting global warming and is environmentally neutral to meeting the proposed individual emissions caps. [EPA-HQ-OAR-2010-0162-1762.1, p.15]

Inappropriateness of full-useful-life standards [EPA-HQ-OAR-2010-0162-1762.1, p.16]

The data set that was used to establish the N2O caps was not developed using aged or full useful life components, and yet the caps were proposed as full-useful life requirements. AAPC recommends that EPA N2O caps be implemented as 4K requirements until such time as a representative full-useful life data set can be developed to determine appropriate compliance levels. [EPA-HQ-OAR-2010-0162-1762.1, p.16]

OEM's continue to have concerns that there is insufficient lead time to implement high production N2O testing for the 2014/2015 model years, either for this proposed MHDV rule or for the existing LDV rule. N2O measurement technology is in an early stage of development, and accurate (2%), repeatable, robust and high production capable equipment has not been proven. It could take 1-3 years of research time to improve this measurement and several more years to engineer and implement it on the number of test sites needed for high production, robust testing. A best case scenario is 4-5 years for robust N2O analysis, after which manufacturers would need product lead time in order to perform the design and development work necessary to insure compliance. This timing is beyond the 2014MY compliance and 2015 MY measurement requirements. Due to the unavailability of production capable equipment, EPA should extend the use of the N2O compliance statement for both MHDVs and LDVs beyond the currently allowed 2014 MY. [EPA-HQ-OAR-2010-0162-1762.1, pp.21-22]

"Starting in the 2014 model year, use continuous sampling to determine separate emission rates at each test mode during the test run for each pollutant except PM, as described in 40 CFR 1036.501." §1036.501 has similar language. [EPA-HQ-OAR-2010-0162-1762.1, p.22]

This would require major modifications to hardware and software (with associated costs) to implement, yet will provide no measurement benefits. It constitutes a fundamental shift in Part 1065 away from allowing bag testing (except for diesel heated FID). Additionally, requiring this in the 2014 MY does not provide sufficient lead time for manufacturers to make the substantial and costly facility modifications necessary to comply. [EPA-HQ-OAR-2010-0162-1762.1, p.22]

AAPC recommends that the proposal be modified to: [EPA-HQ-OAR-2010-0162-1762.1, p.22]

(1) Preserve the important Part 1065 allowance of including all modes of the RMC into one sample bag for compliance testing, then [EPA-HQ-OAR-2010-0162-1762.1, p.22]

(2) At a manufacturer's option, allow for the submittal of this new data reporting requirement using development or engineering quality data / test procedures for the individual speed / load points. This data collection can be a separate specialized test using bag or modal data. [EPA-HQ-OAR-2010-0162-1762.1, p.22]

NHTSA proposes to adjust fuel consumption values for CH4 and N2O if these constituents are included in a manufacturer's greenhouse gas fleet average at 49 CFR 535.8(c)(2)(iii). [EPA-HQ-OAR-2010-0162-1762.1, p.24]

AAPC notes that EPA is not proposing to establish CH4 and N2O standards for vocational vehicles (to which the referenced section applies). However, to the extent that such standards are finalized in future rulemakings, AAPC believes that it would be more appropriate to report fuel consumption as measured by the appropriate test procedures and/or models. In the case of CH4, the greenhouse gas constituent would be captured by the total hydrocarbon term in a carbon balance fuel consumption calculation. In the case of N2O, the production of N2O is closely related to the operation of the emission control system, not to fuel consumption. The inclusion of these components, especially weighted by their global warming potentials (which are unrelated to fuel consumption), represents a fuel consumption penalty although no real-world increase in petroleum consumption would be realized. AAPC recommends that NHTSA strike the proposed 49 CFR 535.8(c)(2)(iii). [EPA-HQ-OAR-2010-0162-1762.1, p.24]

Organization: Center for Biological Diversity

We support EPA's proposal to cap the emissions of two extremely potent greenhouse gases, nitrous oxide (N2O) and methane (CH4), as required by the Endangerment Finding so that future engine technologies or fuels do not result in increases in these emissions (so-called "no backsliding" standards). However, setting these caps at twice the current emission levels for these dangerous greenhouse gases is both antithetical to the endangerment finding and unnecessary. The Agencies themselves state that "manufacturers will be able to design and develop the engines and aftertreatment to avoid . . . increased emissions [of nitrous oxide and methane] through appropriate emission control technology selections like those already used and available today. . . EPA believes that these standards can be capped at the same level, regardless of type of HD engine involved . . . [and] there is no reason to believe that emissions will slip to levels close to the [proposed] cap . . . ." In other words, even though EPA believes existing technology can easily prevent methane and nitrous oxide levels from rising above current emission levels, it nonetheless proposes setting a cap that is approximately twice as high as current levels. Contrary to EPA's stated intent, such a high standard would encourage rather than prevent "backsliding." Section 202(a)(3) of the Clean Air Act requires that emission levels for these two powerful pollutants be set at the "greatest degree of emission reductions achievable." Plainly, permitting the doubling of emissions, even though technologies exist that feasibly prevent such an outcome, is a per se violation of the Clean Air Act. We strongly urge EPA to adopt methane and nitrous oxide caps that do not exceed current emission levels. [EPA-HQ-OAR-2010-0162-2506.1, p.13]

Organization: Cummins, Inc.

Cummins agrees with the Agencies that the proposed rule should not drive new technology in order to comply with CH4 and N2O standards. The proposed N2O standards of 0.05 g/bhp-hr for HD engines and 0.05 g/mi for HD pickups and vans need to be revisited. Cummins commits to work with the Agencies in order to develop more appropriate N2O standards reflective of existing product capability. [EPA-HQ-OAR-2010-0162-1765.1, p.20]

The Agencies have requested comment on whether the proposed 0.05 g/bhp-hr CH4 standard would result in any significant technical challenges for manufacturers of natural gas engines. The Preamble states that 'the proposed CH4 cap standard should not require any different emission control designs beyond what is already required to meet heavy-duty hydrocarbon standards on a dedicated natural gas vehicle" (see 75 FR 74210). However, this proposed CH4 standard cannot feasibly be achieved by current or future natural gas engines, which will therefore need to utilize the alternative CO2-equivalent compliance methodology. Cummins and other engine manufacturers have developed best-in-class CH4 reduction technologies to comply with Euro HD engine standards. The CH4 limit in the pending Euro VI HD standards, which currently represents the most stringent automotive CH4 standards in the world, is approximately one order of magnitude higher than the proposed 0.05 g/bhp-hr CH4 standard. [EPA-HQ-OAR-2010-0162-1765.1, p.20]

Further, as the Preamble acknowledges, CH4 emissions originate from unburned fuel. Assuming equivalent aftertreatment conversion efficiency for all hydrocarbon species (i.e., CH4 and non-methane hydrocarbons (NMHC)), it is reasonable to expect catalyst-out CH4 vs. NMHC exhaust emissions in the same proportion as CH4 vs. NMHC in the fuel composition. EPA's specification for natural gas fuel used during emission testing requires no less than 87% CH4 and no more than 5.2% inert constituents, with the balance of the fuel consisting of NMHC. Therefore, the nominal proportion of hydrocarbons in certification fuel is approximately 90% CH4, 10% NMHC. Given the existing HD engine NMHC emission standard of 0.14 g/bhphr, it is reasonable to expect CH4 emissions from natural gas engines up to approximately 1.2 g/bhp-hr. [EPA-HQ-OAR-2010-0162-1765.1, p.20]

Consistent with our core principle of fuel neutrality, we agree with the Agencies' approach to setting the CH4 standard at 0.05 g/bhp-hr and allowing natural gas engines to comply through the use of CO2-equivalent credits. [EPA-HQ-OAR-2010-0162-1765.1, p.20]

The proposed rule requires using CH4 and N2O generated from the FTP for both tractor and vocational engines. This is suitable for an engine to be applied in a vocational vehicle. However, when an engine is to be applied in a tractor, it would be more appropriate to determine compliance with the standard by using CH4 and N2O values generated from the SET only. This provides consistency with the manner in which CO2 certification is conducted and better aligns the laboratory test with the manner in which the product will perform in the field. [EPA-HQ-OAR-2010-0162-1765.1, p.21]

The standards for HD engines and HD pickups and vans were set using only data at the beginning of useful life. Degradation is not well understood given that the industry has not closely monitored GHGs in previous generation product deterioration testing. Contributing factors include: [EPA-HQ-OAR-2010-0162-1765.1, p.21]

-The control systems in common use today have been designed in order to maintain rigid compliance with oxides of nitrogen (NOx), hydrocarbons (HC) and particulate matter (PM). The independent variable that provided the flexibility to achieve the system robustness has been CO2 production. With the introduction of this rule, a different trade-off balance is anticipated. [EPA-HQ-OAR-2010-0162-1765.1, pp.21-22]

- The limited number of data samples yields an inconclusive understanding of CO2 degradation. [EPA-HQ-OAR-2010-0162-1765.1, p.22]

- Industry has insufficient time to obtain the data required to quantify deterioration. [EPA-HQ-OAR-2010-0162-1765.1, p.22]

Due to the fact that the standards were set without accounting for deterioration and the above factors, the Agencies should assign additive deterioration factors (DF) of zero (or multiplicative DF of one) for CO2, CH4 and N2O. [EPA-HQ-OAR-2010-0162-1765.1, p.22]

EPA proposes that a manufacturer may choose to comply with the nitrous oxide (N2O) and methane (CH4) standards using CO2 credits (see 75 FR 47210 and 74252). The amount of CO2 credits required would be calculated to account for the specified Global Warming Potentials (GWP) of N2O and CH4. Cummins agrees with allowing manufacturers to use CO2 credits to offset N2O and CH4 deficits on a CO2-equivalent basis. Although EPA in general does not expect manufacturers to use this provision (see 74 FR 74252), it will be used. As will be discussed later in these comments, current and future natural gas engines cannot comply with the proposed CH4 standard. It is therefore necessary to provide this as an option to comply with the N2O and CH4 standards. [EPA-HQ-OAR-2010-0162-1765.1, p.13]

Additionally, we recommend that EPA consider the potential benefits of a combined CO2-equivalent standard for all the GHG constituents. [EPA-HQ-OAR-2010-0162-1765.1, p.13]

Organization: Daimler Trucks North America

It is anticipated that EPA will succeed in its intention of setting N2O and/or CH4 emissions standards that do not require manufacturers to apply development resources to comply with current products. EPA proposes that if a manufacturer is unable to attain compliance with N2O and/or CH4 standards, it may establish a CO2 FCL below the CO2 standard and generate credits to offset the excess emissions. A manufacturer choosing this option would convert its excess N2O and/or CH4 emissions into CO2 equivalent emissions that require offsetting. Although there should be no reason for a manufacturer to use these provisions, given an appropriately set standard, we agree that the proposal provides an appropriate means that a manufacturer (because of unforeseen circumstances) may need to achieve overall GHG compliance while avoiding the need to engage in extensive programs to reduce N2O and/or CH4 emissions. We also agree that the proposed factors for conversion to CO2 of excess CH4 and N2O emissions are appropriate. Additionally we recommend that manufacturers have additional flexibility to reconcile excess N2O and/or CH4 by applying CO2 credits between heavy-heavy-duty engine vocational and tractor averaging sets, and also between medium-heavy-duty engine vocational and tractor averaging sets. Such an allowance provides a means for manufacturers having a limited number of engine families in either of the heavy-duty engine averaging sets to achieve overall compliance of the engine class with no environmental detriment. [EPA-HQ-OAR-2010-0162-1818.1, p.31]

EPA proposes to set an N2O standard at a level that is far enough above levels of model year 2010 engines to result in sufficient and conservative compliance margin in order to avoid the necessity for manufacturers to apply additional development effort to reduce existing N2O emissions levels. We agree with EPA that N2O and CH4 emissions are relatively low in today's diesel engines and that it is appropriate for EPA to set standards at levels not forcing additional development effort. [EPA-HQ-OAR-2010-0162-1818.1, p.36]

EPA's analysis has led to a too low proposed N2O emissions standard of 0.05 g/bhp-hr for heavy-duty engines effective in the 2014 model year. EPA's data base upon which it determined its proposed N2O level was however very limited. EPA described in the preamble that the engines tested included only two SCR equipped engines and four model year 2007 engines (tested during the Advance Collaborative Emissions Study) that did not utilize SCR technology. Model year 2007 technologies do not represent mainstream technology used by model year 2010 engines nor are they likely to represent mainstream technologies used by model year 2014 engines and are therefore inappropriate to use in setting the N2O standard. The model year 2007 engine FTP N2O emissions ranged from 0.005 to 0.023 g/bhp-hr and averaged 0.0144 g/bhp-hr (according to published reports). The two SCR equipped engines averaged 0.04 g/bhp-hr (based on the preamble description of the proposed standard's derivation), which is above the 0.025 g/bhp-hr level upon which EPA based its proposed standard. [EPA-HQ-OAR-2010-0162-1818.1, p.36]

EPA must consider a broader representative database of SCR only equipped engines upon which to establish a revised N2O standard. To support EPA's analyses, Daimler will provide results of tests conducted on a range of its engine families. (Because this is confidential business information, we will submit this information separately and directly to the EPA.) These data also support that EPA has underestimated N2O emissions levels of current SCR technology engines and that the proposed standard must be increased. [EPA-HQ-OAR-2010-0162-1818.1, p.36]

EPA requests comment on its technical assessment of current and future N2O emissions levels from heavy-duty diesel engines. The pursuit of improved understanding of mechanisms that lead to N2O formation is still in the early stages and as such, no substantive comments can be offered at this time regarding EPA's assessment. Over the past three model years, manufacturers have been required to develop and ready for production the release of unprecedented advanced aftertreatment systems for the heavy-duty marketplace. Over the coming years N2O measurement systems and test methods focusing on identifying conditions that lead to N2O emissions formation will need to be developed and refined. Unit such time as sufficient understanding is reached to assess potential design changes to reduce N2O emissions or avoid their increase, it is appropriate for EPA to establish standards that are set at a level not jeopardizing certification of current products. Should the Agencies find in the future that it is necessary to increase the stringency of N2O emission standards, it should do so only after conducting thorough evaluation of technical capabilities and providing appropriate lead time. [EPA-HQ-OAR-2010-0162-1818.1, pp.36-37]

Organization: Engine Manufacturers and Truck Manufacturers Associations

EPA has proposed an engine N20 emission standard that is 'designed to prevent increases in N2O emissions from current levels, i. e., a no-backsliding standard' that may result from the introduction of future technologies. (See 75 FR at 74208.) The Associations support this approach, but are concerned that the proposed 0.05 g/hp-hr standard may not actually reflect 'twice the average N2O level of current diesel engines.' (See 75 FR at 74209.) The proposed standard is based on emissions data from 'current diesel engines as demonstrated in the ACES Study and in EPA's testing of two additional engines with selective catalytic reduction aftertreatment systems' (See Id.) However, the engines from the ACES Study were certified to the model year 2007 standards and, thus, were not representative of the engine technologies used in model year 2010. Since N2O is generated during periods of low temperature in the NOx catalyst, only the emissions data from engines with NOx aftertreatment is representative. The inclusion of other data inappropriately reduces the average. Accordingly, the Agencies must analyze emissions data from more engines equipped with NOx aftertreatment systems to confirm the suitability of the proposed N2O standard, and, if the data justify it, revise the standard as necessary. The Associations are willing to assist the Agencies in that necessary analysis. [EPA-HQ-OAR-2010-0162-1940.1, p.12]

The Preamble states that since engine emissions regulations do not currently require testing for N2O, and because the Mandatory GHG Reporting final rule (see 74 FR at 56260) allows manufacturers to use good engineering judgment in lieu of direct N2O measurement, the proposed rule will allow manufacturers to delay direct measurement of N2O until the 2015 model year. (See 75 FR at 74209.) EMA and TMA agree with the Agencies that direct measurements of N2O should not be required until after the 2014 model year. [EPA-HQ-OAR-2010-0162-1940.1, p.12]

The Associations also agree that it is appropriate for EPA to provide means whereby manufacturers with products that exceed the N2O or CH4 standards can nonetheless certify their products without having to undertake any extensive development or testing efforts. The Associations also believe that the proposed factors for the conversion of CH4 and N2O to CO2-equivalent emissions are appropriate. In addition, EMA and TMA agree with EPA's proposal to allow manufacturers to carry-over from one model year to the next certification testing data for CO_2, N_2O and CH_4 emissions when no significant changes are made to the engine family. This is fully consistent with the current certification practices that pertain to other criteria pollutants. [EPA-HQ-OAR-2010-0162-1940.1, p.12]

Organization: Natural Gas Vehicle Interests

In addition to CO_2 standards, the HD Rule proposes additional, separate emissions limits for methane, and "requests comment on whether the proposed cap standard would result in any significant technological challenges for manufacturers of natural gas vehicles." 75 FR 74210. The proposed limits are "0.05 g/mi as measured on the Light-duty FTP and HFET drive cycles, to apply beginning with model year 2014 for HD pickups and vans" (id.); and "0.05 g/hp-hr as measured on the Heavy-duty FTP" for heavy-duty vehicles. Id. [EPA-HQ-OAR-2010-0162-2119.1, p.5]

As for the HHD methane standard itself, the Natural Gas Vehicle Interests note first that it is extremely stringent; in fact, it is an order of magnitude lower that the lowest methane standard we are aware of, the current EURO-VI standard of 0.5 g/kWh (0.37 g/bhp-hr). (Regulation (EC) No 595/2009 of the European Parliament and of the Council of 18 June 2009, Annex I, attached as Exhibit 2.) [EPA-HQ-OAR-2010-0162-2119.1, p.5]

Given this unprecedentedly low value, it is all the more surprising that the agency provides neither data nor rationale explaining or supporting this number; there is simply no information as to how EPA arrived at this standard. And while EPA states that "the proposed standard would be met by current diesel and gasoline engines with little if any technological improvements" (75 FR 74210), the same is absolutely not true for natural gas engines. In fact, the only way for natural gas engines to meet this standard will be with a combination of the most advanced (and expensive) catalyst technology plus using the proposed CO_2 Equivalent Option credit provision. [EPA-HQ-OAR-2010-0162-2119.1, pp.5-6]

We believe that the added catalyst cost to begin to comply with this standard will be approximately $2,000 per vehicle. This is necessarily an estimate as no one has ever tried to reduce methane emissions to this level; as noted, this standard is an order of magnitude lower than the lowest methane standard in use. There will also be additional costs for advanced fuel injectors and additional air handling controls. And because we estimate that best-in-class catalyst technology will be insufficient to achieve 0.05 g/bhp-hr CH_4, meeting the standard will require NG manufacturers to obtain and use CO_2 emission reduction credits (via the CO_2 Equivalent Option). [EPA-HQ-OAR-2010-0162-2119.1, p.6]

We support the proposed CO_2 Equivalent Option, which will be absolutely necessary for NGVs to meet the proposed methane standard. Moreover, given that the standard is utterly unprecedented and cannot be met with any known natural gas engine technology, the rule should permit maximum compliance flexibility and allow use of not only CO2 credits from the same engine family, but any CO2 credits whatsoever. We also support the EPA proposal to allow CO2 equivalent compliance on an engine family by engine family basis; this means that manufacturers who offer natural gas engines will not be required to subject all their engines to the CO2 equivalent approach. We also support this approach with regards to the CO2 equivalent compliance as proposed by EPA for vehicles subject to the light duty regulations issued earlier this year and urge EPA to provide this type of flexibility on a permanent basis. [EPA-HQ-OAR-2010-0162-2119.1, p.6]

The Natural Gas Vehicle Interests first note that methane emissions compliance for HD engines used in class 7 and 8 tractors should be measured on the SET, and not the Heavy-duty FTP. While EPA has a rationale for using the FTP to measure N2O ("The N2O emissions would be measured over the Heavy-duty FTP cycle because it is believed that this cycle poses the highest risk for N2O formation versus the additional heavy-duty compliance cycles" 75 FR 74209), EPA offers no such rationale for requiring another departure from SET. In light of the fact that the SET is used for measuring CO2 for these engines and there is no apparent basis for departing from it for methane emissions purposes, the Natural Gas Vehicle Interests request that the regulations allow methane measurement on the SET. [EPA-HQ-OAR-2010-0162-2119.1, p.6]

The HD Rule assigns a Global Warming Potential ("GWP") value of 25 to methane: "CH4 is greenhouse gas with a GWP of 25." 75 FR 74209; "For example, a manufacturer would use 25 Mg of positive CO2 credits to offset 1 Mg of negative CH4 credits" 74210; "CH4 has a GWP of 25 according to the IPCC Fourth Assessment Report." 74210, n. 102. [EPA-HQ-OAR-2010-0162-2119.1, p.6]

The problem is that while EPA's Office of Transportation and Air Quality uses the 25 GWP, the rest of EPA uses a GWP of 21 for their emission standards. See, e.g., EPA's Mandatory Reporting of Greenhouse Gases Rule, 74 FR 56395, and EPA's annual GHG emissions inventory, which uses 21 even for vehicle methane emissions ("Inventory Of U.S. Greenhouse Gas Emissions And Sinks: 1990 – 2008", EPA 430-R-10-006, p. ES-3). Not only does EPA use 21 in these reporting contexts, it uses the GWP of 21 for actual substantive methane emissions regulation, i.e., in its Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 FR 31519, 31522 ("CH4 has a GWP of 21"). [EPA-HQ-OAR-2010-0162-2119.1, pp.6-7]

In other words, having first imposed a draconian methane emission standard, the HD Rule then treats vehicle methane emissions as having 19% greater heat-trapping characteristics as the chemically identical molecules emitted from smokestacks or any other source. This sort of action defines "arbitrary and capricious", and unless EPA can explain the scientific basis for why vehicle methane emissions have 19% greater heat-trapping characteristics than methane from other sources, methane emissions under the HD Rule should be regulated with the same GWP as the thousands of other methane sources in the U.S. [EPA-HQ-OAR-2010-0162-2119.1, p.7]

Response:

Stringency of the N_2O and CH_4 "Cap" Standards

A number of commenters, primarily manufacturers, expressed concerns that the levels of the proposed cap standards for N_2O and CH_4 could pose technological challenges for some vehicle technologies and potentially restrict the development of some technologies that could reduce overall GHG emissions. Industry commenters, including the AAPC, were concerned that the N_2O standard could impede the introduction of, for example, lean-burn gasoline and diesel technologies. Also, these organizations, as well as natural gas vehicle advocates, were concerned that the CH_4 standard could impede the expanded production and sale of CNG or LNG vehicles. Natural Gas Vehicle Interests expressed concern for the stringency of the CH_4 for engines certified over the FTP stating that it was significantly more stringent than the recently finalized European standards. However, they failed to provide any data on the engine FTP cycle supporting their concern nor did they determine if the expected CH_4 levels could be offset using the optional CO_2 equivalent compliance approach as fully expected by EPA. However, due to additional data received from other stakeholders, EPA is finalizing a CH_4 of 0.10 g/bhp-hr, double the original proposed level.

However, we recognize that, in the absence of a limitation, the potential for significant emission increases exists with the evolution of new vehicle and engine technologies or the expanded penetration of existing low-production technologies into the fleet. Indeed, several industry commenters concede as much in stating that they are contemplating introducing vehicle technologies that could result in emissions exceeding the cap standard levels. Clearly, manufacturers wishing to introduce or significantly expand production of vehicles incorporating some of these alternative vehicle or fuel technologies may need to make improvements, or make use of the optional CO_2 equivalent compliance approach described below, in order to achieve N_2O and/or CH_4 emission levels similar to conventional gasoline vehicles and meet the cap standards. Given this lack of information and the availability of a CO_2-equivalent compliance option, EPA does not ascribe costs to the N_2O and CH_4 cap standards. [53]

The AAPC commented that the level of the CH_4 cap could preclude the introduction of E85 fueled flex-fuel trucks and vans. AAPC recommended doubling the CH_4 emission cap for FFV operation and establishing unique N_2O and CH_4 caps for other alternative fuels and engine technologies. EPA reviewed data supplied by AAPC and recognized that CH_4 levels trend higher when operating on E85 fuel. It is believed that since CH_4 is not currently a regulated pollutant, manufacturers have not made any specific effort to control CH_4 other than the default control as a byproduct of the required NMOG control. Absent introduction of new E85 offerings, the caps will remain an effective emission control measure. While it appears more challenging for FFVs

[53] In this respect, the N2O and CH4 standards differ from the engine standards, for CO2 which differentiate among gasoline and diesel engines. Unlike the situation with N2O and CH4, there is no readily available CO2 equivalent standard that would allow a gasoline engine to meet the same CO2 standard as a comparable diesel engine at essentially no cost.

because exhaust temperatures are lower on E-85 and CH_4 is more difficult to convert over current catalyst designs, much like light-duty, we believe that with some scrutiny of existing emission controls, CH_4 levels could be reduced while operating on E85 and therefore not preclude the introduction of future E85 fueled vehicles. This approach is consistent with the goal of preventing future increases in CH_4 or N_2O emissions from today's levels with any future alternative fuels or technologies. However, the CO2 equivalent approach will allow any elevated CH_4 levels to be offset with the reduced CO2 levels demonstrated while operating on E85. Using the CO2 equivalent approach, the finalized caps do not need to be changed for E85 or any other alternative fuels. Future technologies with not currently known emission levels similarly can utilize the CO_2 equivalent approach and therefore will need to consider the appropriate balance among the regulated GHG emissions.

As structured, the CO_2-equivalent compliance option will allow N_2O and CH_4 to be balanced with CO_2 to achieve the same final GHG reduction goals. N_2O or CH_4 levels above the caps can be independently accounted for with additional reductions in CO_2 beyond the CO_2 target. This approach allows new engine technologies or alternative fuels to balance the different GHG emissions ultimately resulting in same program goal of total GHG reductions. The Natural Gas Vehicle Interest requested that the agencies provide compliance flexibility for the use of CO_2 credits not only from the same engine family, but any CO_2 credit. The agencies note that the final provisions permit manufacturers to use any CO_2 credits available to the averaging set where the engine belongs.

The Center for Biological Diversity (CBD) supported more stringent standards. CBD commented that in light of the potency of these compounds, EPA should develop standards that do not just maintain current levels, but reduce emissions over current levels and that EPA had not analyzed either the technologies or the costs of doing so. EPA did not propose and is not prepared at this time to establish "technology forcing" standards for N_2O and that would require manufacturers to reduce emissions of these compounds below the levels generally seen in current conventional gasoline and diesel vehicles. [54] Further, the level of the finalized standard for both N2O and CH4 will result in emission levels that are consistent with today's average heavy duty engine and vehicle levels once deterioration and compliance margins have been factored in by manufacturers. Much like the Tier 2 program, we believe that the stringent heavy-duty emission requirements already result in significant N_2O and CH_4 control in conventional gasoline vehicles,

[54] In this regard, CBD mistakenly states that the standards for N2O ((nitrous oxide) are issued under the technology-forcing provisions of section 202 (a)(3). Section 202 (a)(3) applies (among other things) to emissions of oxides of nitrogen (NOx) from heavy duty vehicles. Nitrous oxide is not an oxide of nitrogen. Thus, the standards for N2O are issued pursuant to section 202 (a)(1) and (2), which are not technology forcing. Moreover, CBD mistakenly states that cap standards are "antithetical" to the endangerment finding EPA made under section 202 (a)(1). The section 202 (a)(1) endangerment finding determines whether a type of air pollution endangers public health or welfare and whether emissions of the air pollutant from new motor vehicles and engines causes or contributes to that endangerment. If the Administrator makes a positive endangerment finding, then EPA is directed to issue standards for such emissions taking into account the enumerated statutory factors in section 202 (a)(2). Those factors determine the stringency of the standard, not the endangerment finding.

and the agency does not expect current N_2O levels to rise for these vehicles. Moreover, EPA believes that the CO_2 standards will be challenging for the industry and that these standards should be the industry's chief focus for GHG emission controls.[55] Further, to reduce current emissions would result in costs that would need to then be included in the overall economic impacts of the program and accounted for in establishing a different, potentially less stringent CO_2 standard. Although we recognize that some technological approaches (i.e., calibration improvements, catalyst design and formulation) may exist for vehicles with alternative fuel and vehicle technologies to address N_2O or CH_4 emissions above the cap standards, we are not aware of technologies that could in the time frame of this rule reduce these emissions significantly and consistently below the cap levels, since this could require broad improvements to gasoline vehicle emission controls across the fleet. The commenters do not suggest any technologies that could do so. EPA could revisit this decision in the future if such technologies emerge.

EPA also disagrees with the implication of CBD's comment that EPA's positive endangerment finding dictates or otherwise influences the substantive section 202 (a) regulations. Standards under section 202(a)(2) are to be based on considerations of technical feasibility, cost, and available lead time and are not predicated on achieving any particular health or welfare-based outcome.

AAPC commented that the full useful life N_2O caps were developed without using data based on aged components. The data supporting the N_2O caps contained a variety of component ages with no indication of significant deterioration. The mechanisms that impact other regulated emissions are expected to similarly impact N_2O deterioration. Similar to NMOG and NOX emissions requirements, manufacturers will need to establish appropriate deterioration factors for N_2O.

EPA received additional data from EMA for SCR only equipped diesel engines that represent current performance levels for engine certified products. EPA reviewed this new data from EMA and finalized the N2O cap standard for the FTP engine cycle to achieve N2O emission control consistent with the goal of preventing increases from current SCR equipped diesel engine levels.

Test Burden Issues for N_2O

Manufacturers were almost unanimous in raising concerns about the impacts of a new testing requirement for N_2O on their test facilities, equipment, and procedures. AAPC requested additional lead time to implement N_2O measurement On the other hand, there were very few concerns about new burdens for CH_4 testing. This disparity in comments can be explained by the fact that manufacturers have historically developed CH_4 testing capability and experience for a

[55] See Massachusetts v. EPA, 549 U.S. at 533 (EPA has significant discretion as to timing of GHG regulations); see also Sierra Club v. EPA, 325 F. 3d 374, 379 (D.C. Cir. 2003) (upholding anti-backsliding standards for air toxics under technology-forcing section 202 (l) because it is reasonable for EPA to assess the effects of its other regulations on the motor vehicle sector before aggressively regulating emissions of toxic vehicular air pollutants.

number of purposes, including compliance with non-methane organic gases (NMOG) standards.[56] Thus, for CH_4, the new CH_4 cap standard will not result in new test burdens.

We recognize that N_2O testing will be new to most manufacturers. However, we do not believe that such testing will impose unreasonable new burdens, especially in relation to the cost of complying with the overall GHG standards. As discussed in Section II.E.1 of the preamble, N_2O measurement equipment capable of accurate measurement of emissions in the range of the cap standard is now readily available at costs that, while not trivial, are not unreasonable compared to other traditional emission measurement equipment. Manufacturers may need to modify their test facilities and patterns of testing to integrate N_2O testing into their emission testing programs, but again, these changes are not unusual and will not be excessively costly in most if not all cases.

Therefore, EPA is finalizing as proposed the ability to certify based on a compliance statement through model year 2014. For 2015 and later model years, manufacturers will need to submit measurements of N_2O for compliance purposes.

Test Cycle

Cummins commented that the proposed rule requires using CH4 and N2O generated from the FTP for both tractor and vocational engines and while this is suitable for a vocational vehicle, in a tractor, it would be more appropriate to determine compliance with the standard by using CH4 and N2O values generated from the SET only due to more similar operation in the field. We recognize that vocational vehicles and tractors may be and are likely operated differently. However, due to the mechanism we believe result in N_2O and CH_4 emissions, we determined that the FTP is normally the worst case cycle for both vocational vehicles and tractors and we expect that they both will experience operation similar to the FTP in the field. Further, the emission standards for N_2O and CH_4 are finalized based on data from the FTP cycle and the SET would likely require different standards.

Other Comments

Some manufacturers raised questions and concerns about how EPA could best address potential deterioration of emissions of N_2O and CH_4 over the life of the vehicles. Although catalytic emission control systems generally deteriorate in effectiveness over time, EPA is not aware of information on current technology vehicles that would allow specific conclusions on the degree of emissions deterioration. EPA believes that some degree of emissions deterioration in current catalytic control systems is likely, but given the limited information available on current technology vehicles, we are not able to determine appropriate independent values for such deterioration. However, we are not aware of information on current vehicles that would

[56] The process measuring and calculating NMOG requires methane to be independently measured and removed from the total hydrocarbon measurement.

indicate that deterioration of these emissions would be significantly different – higher or lower – than those of similar conventional emissions.

A commenter from the natural gas vehicle industry suggests that EPA include upstream fuel GHG emissions in its compliance approach. We agree that the production and distribution of natural gas can produce lower emissions of GHGs than comparable upstream emissions from the production and distribution of petroleum fuels. However, EPA as discussed in detail in Section III.C.3 of the preamble, EPA has concluded that for this rule, we will only consider upstream emissions for electric vehicles, given that electricity upstream GHG emissions are about three times higher than gasoline upstream GHG emissions. By comparison, the difference in upstream GHG emissions for both diesel fuel from oil and CNG from natural gas are relatively small compared to differences associated with electricity. EPA will continue to assess the issue of upstream emissions in future rulemakings.

A commenter questioned the different global warming potentials (GWP) values used across EPA different offices. The GWP used in this rule are consistent with the 2007 Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (AR4). At this time, the 1996 IPCC Second Assessment Report (SAR) GWP values are used in the official U.S. greenhouse gas inventory submission to the United Nations Framework Convention on Climate Change (per the reporting requirements under that international convention, which were last updated in 2006). N_2O has a GWP of 298 and CH_4 has a GWP of 25 according to the 2007 IPCC AR4. These AR4 values are based on the latest science from the IPCC, and are considered the most appropriate GWP values for N_2O and CH_4 in this context.

6.4.2. Air Conditioning

Organizations Included in this Section:

American Automotive Policy Council
California Air Resources Board
Daimler Trucks North America
Institute for Policy Integrity
National Association of Clean Air Agencies
National Solid Wastes Management Association
Navistar, Inc.
New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

Organization: American Automotive Policy Council

AAPC agrees with EPA's use of a design-based method to demonstrate improvements in air conditioning system design. A system based on the SAE Surface Vehicle Standard J2727, as proposed, will provide a well-developed procedure enabling the determination of direct air conditioning leakage values while minimizing unnecessary, and at many times impractical, test burden. This proposed procedure will have been in use as a regulatory process for several years prior to the mandatory implementation of this rulemaking and will therefore have been fully vetted for the purposes of regulatory compliance. [EPA-HQ-OAR-2010-0162-1762.1, p.8]

AAPC supports a direct air conditioning emission standard (based on percentage leakage per year or leakage in grams per year) [EPA-HQ-OAR-2010-0162-1762.1, p.8]

EPA proposes a percent refrigerant leakage per year standard for Class 2b-3 complete / cabcomplete vehicles and for Class 7-8 tractors. To calculate a percentage leakage per year, a manufacturer would first determine a mass leakage per year through an SAE J2727 based process and then divide that value by the total design refrigerant capacity. [EPA-HQ-OAR-2010-0162-1762.1, p.8]

The form of standard proposed recognizes that certain Class 2b-3 complete vehicles (e.g. large passenger vans) and Class 7-8 tractors (e.g. sleeper cabs) may require additional cooling capacity. The need for additional cooling capacity can drive the need to add additional components such as multiple evaporators to the system, resulting in higher calculated mass leakage rates regardless of low leakage components selected for the design. These higher mass leakage rates tend to be offset by the greater refrigerant capacity that is required, thereby normalizing leakage rate to system cooling capacity. [EPA-HQ-OAR-2010-0162-1762.1, p.8]

AAPC recommends that manufacturers also be allowed the flexibility to comply with the direct air conditioning emission standard by achieving a gram per year leakage rate at or below a set standard. [EPA-HQ-OAR-2010-0162-1762.1, p.8]

Although a percentage leakage per year based standard does an excellent job of normalizing gram per year leakage rates to cooling system capacity, it also tends to penalize well-designed low leak rate systems with smaller refrigerant charges. As a manufacturer takes efforts to reduce total refrigerant charge requirements (effectively reducing manufacturing cost while providing environmental and energy benefits associated with upstream and downstream processing) the percentage leakage rate calculated for compliance increases. [EPA-HQ-OAR-2010-0162-1762.1, p.8]

In the regulatory impact analysis for the Light-Duty Rulemaking, EPA determined that the annual average impact of air conditioning refrigerant leakage for light-duty trucks was 20.7 grams per year. The agency provided additional greenhouse gas emission credits for light-duty trucks with leakage rates of less than 20.7 grams per year, thereby establishing that not only was a system with a 20.7 gram per year refrigerant leakage rate considered a low leak system, but also that vehicles with even lower leakage rates were worthy of credit for additional actions taken. [EPA-HQ-OAR-2010-0162-1762.1, p.9]

Given that Class 2b-3 complete and cab-complete vehicle air conditioning systems are substantially similar to those used in their light-duty pickup and van counterparts38, AAPC recommends that the agencies consider adding a direct air conditioning emission standard in the form of a gram per year leakage rate as an optional alternative to the percentage leakage rate standard for Class 2b-3 complete and cab-complete vehicles. We envision that such a standard would be set at 20.7 grams per year as calculated by 40 CFR 86.166-12. This level of standard would ensure that vehicles certifying to it were achieving similar reductions to their counterparts generating credit under the light-duty program, making it directly comparable to the agencies goals in setting the percentage leak rate standard. [EPA-HQ-OAR-2010-0162-1762.1, p.9]

The proposed direct air conditioning emission standard does not address the range of system refrigerant capacities likely to be used in medium- and heavy-duty trucks. AAPC recommends a standard allowing at most 2.7 percent leakage or an alternative compliance path based on the gram per year leakage score. [EPA-HQ-OAR-2010-0162-1762.1, p.9]

EPA proposes that the direct air conditioning emission standard be set at 1.50 percent leakage per year. The agency seeks “comment on whether the stringency of a single “percent refrigerant leakage per year” standard fairly addresses the range of system refrigerant capacities likely to be used in heavy-duty trucks.” [EPA-HQ-OAR-2010-0162-1762.1, p.9]

In setting the standard at 1.50%, EPA relied on data from vehicles with the largest system capacities in the 2010 Minnesota refrigerant leakage database. By using just the data from vehicles with the largest system capacities, EPA omitted several medium-duty trucks which were included in the dataset, but which had refrigerant capacities of less than 810 grams. For example, the 2010 Dodge Ram 2500 vehicles have refrigerant capacities of 737 grams and 625 grams for the gasoline- and diesel-powered versions, respectively. [EPA-HQ-OAR-2010-0162-1762.1, p.9]

In the case of the 2010 Dodge Ram 2500 diesel, which has a leakage score of 11.5 grams per year, the vehicle is in the top 20% of lowest leakage rate for all vehicles in the database.42 Although it is clearly a well-designed low leak system, its relatively smaller refrigerant capacity results in a calculated percentage leakage rate above the proposed standard.

Even more troubling, EPA’s Light-Duty Rulemaking RIA, published only six months before this NPRM, suggests that the 2010 Ram 2500 diesel could not pass the proposed 1.50 percent leakage standard via further improvement of its gram per year leakage score. A leakage score of 9.38 grams per year would be required to meet the proposed 1.50% percent leakage per year standard. However, in their Light Duty Rulemaking, EPA states that “the minimum score that EPA considers feasible is fixed at… 10.4 grams per year for… trucks.” Lower scores are only possible with the implementation of electric compressors, a technology typically limited to hybrid electric vehicles. [EPA-HQ-OAR-2010-0162-1762.1, p.10]

To address these concerns, AAPC recommends that the percent leakage standard be raised to at least 2.7% (the highest percent leakage noted in EPA’s analysis of high capacity systems) and that an alternative compliance path based on the gram per year leakage score also be allowed. [EPA-HQ-OAR-2010-0162-1762.1, p.10]

EPA acknowledges that heavy-duty air conditioning systems today are similar to those used in light-duty applications. Based on this similarity, the AAPC member companies recommend that air-conditioning systems that use a low global warming potential ("GWP") refrigerant (Credit = MaxCredit*[1-LeakScore/Average Impact)*(GWPRefrigerant/1430)] [EPA-HQ-OAR-2010-0162-1762.1, p.10]

Where: [EPA-HQ-OAR-2010-0162-1762.1, p.10]

MaxCredit is 17.2. [EPA-HQ-OAR-2010-0162-1762.1, p.10]

LeakScore is the leakage score of the A/C system as measured according to methods similar to the SAE J2727 procedure in units of g/yr. The minimum score deemed feasible is fixed at 10.4 g/yr. [EPA-HQ-OAR-2010-0162-1762.1, p.10]

AvgImpact is the average impact of A/C leakage is 20.7 g/yr [EPA-HQ-OAR-2010-0162-1762.1, p.10]

GWPRefrigerant is the global warming potential for direct radiative forcing of the refrigerant as defined by EPA (or IPCC). [EPA-HQ-OAR-2010-0162-1762.1, p.10]

Air Conditioning System Efficiency Improvements [EPA-HQ-OAR-2010-0162-1762.1, p.11]

AAPC disagrees with EPA's statement that "the quantity of indirect GHG emissions from A/C use in heavy-duty trucks relative to the CO2 emissions from driving the vehicle and moving freight is very small. "The Heavy-Duty Draft RIA shows that the indirect credits are 0.3 g of CO2/ton-mile of the total GHG emissions value in the heavy-duty vehicles.50 For a 14,000 lbs. (6.35 ton) GVWR vehicle, this GHG credit would be approximately 2.0 grams/mile of CO2. These credits correspond with significant real-world greenhouse gas and fuel consumption reductions. [EPA-HQ-OAR-2010-0162-1762.1, p.11]

AAPC recommends that both EPA and NHTSA recognize the greenhouse gas and fuel consumption benefits of improving air conditioning system efficiency through a technology based approach. The menu-based procedure specified by 40 CFR 86.1866-12(c) would be acceptable to AAPC member companies. We envision that such an approach would remain in place until a viable performance-based test is developed to demonstrate improvements over current average baseline (2010 MY) efficiency levels. Once the performance based test is available, a manufacturer would be required to demonstrate up to a 20% improvement over current average efficiency levels in order to qualify for credits. This methodology allows for full credit for a system that achieves up to a maximum 20% improvement, and partial credit for systems that achieve less. [EPA-HQ-OAR-2010-0162-1762.1, p.11]

Organization: California Air Resources Board (ARB)

ARB staff urges the agencies to establish, in this rulemaking, refrigerant leakage standards for air conditioning systems installed on Class 2b-8 vocational vehicles. While ARB staff understands the agencies' concerns regarding the complex manufacturing/build process associated with these vehicles, ARB believes it is possible to first establish effective, interim requirements only applicable to air conditioning system manufacturers. Since the agencies have already proposed to establish requirements for air conditioning systems in other heavy-duty vehicle categories, it is evident the agencies expect the necessary leakage-control technologies to be available for the model years covered by this proposal. These same technologies would likely be compatible with air conditioning systems installed on Class 2b-8 vocational vehicles as well. Although these recommended requirements would not regulate how air conditioning systems are ultimately installed, the agencies could, similar to what is currently being proposed for Class 7 and 8 tractors, require air conditioning system manufacturers to provide detailed installation instructions to final system installers in order to minimize poor installation practices. By promulgating manufacturer-based requirements in this rulemaking, it would, at a minimum, help ensure the sound design and construction of the air conditioning systems themselves. [EPA-HQ-OAR-2010-0162-2354.1, p. 5]

Organization: Daimler Trucks North America

Another example, which will be discussed below, is our suggestion of integrating air conditioning (AC) leakage into full-vehicle emission standards rather than regulating this one system separately from all others. [EPA-HQ-OAR-2010-0162-1818.1, p.13]

EPA is not proposing AC refrigerant leakage standards for Class 2b-8 vocational vehicles at this time, primarily because of the number of entities involved in their manufacture and thus the potential for different entities besides the chassis manufacturer to be involved in the AC system production and installation. EPA requests comment on how AC standards might practically be applied to manufacturers of vocational vehicles. (pg33) Daimler agrees that the impact would be small and does not seek AC system efficiency standards for vocational vehicles. [EPA-HQ-OAR-2010-0162-1818.1, p.93]

On 75 Fed. Reg. 74163 and 74211, the EPA proposes to regulate AC leakage from HDVs but not to allow balancing of Global Warming Potential (GWP) weighted emissions. The Agency seeks comment on this decision and whether EPA should reflect AC system efficiency in the final program either as a credit or a stand-alone standard based on the same technologies and performance levels as the light-duty program. (75 Fed. Reg. 74164). The EPA's reasoning for not allowing a 'basket of gases' approach to minimizing AC leakage or making an equivalent reduction in CO_2 emissions is flawed. The EPA says that AC leakage contributes only a small amount to total HDV GWPweighted emissions, and that this creates a disincentive to reducing HVAC leakage, which in turn means that HVAC leakage must be controlled. Accepting the EPA's premises as true actually leads to the contrary conclusion: HVAC leakage contributes a small amount to total GWP-weighted emissions, such that there may be little incentive for society as a whole to control those emissions, as opposed to making an equivalent and more cost-effective reduction in GWP-weighted emissions elsewhere. If we accepted the EPA's reasoning, then the smaller a source of GHG emissions, the more important it would be to control that source, leading to increased cost spent to reduce decreased emissions, a perversely cost-ineffective approach to regulating. This is clearly counter to what the EPA should actually do. The EPA should follow the precedent it set with LDVs and regulate using a basket of gases approach. In summary, the EPA should adjust up its CO2 levels for each vehicle category by the GWP-weighted amount at which the EPA proposes to limit AC leakage and should allow each manufacturer to meet the aggregate CO2-equivalent emission level in the manner that it finds most cost-effective, thus achieving the same net GWP effect at the minimum cost. [EPA-HQ-OAR-2010-0162-1818.1, pp.93-94]

DTNA believes that we can meet the EPA’s proposed 1.5% leakage rate, even though this is a 50% reduction. We do have some concerns, however. Class 8 cabs do not have the same AC systems as do LDVs, nor do the vehicles have the same size interior volume to cool, as the EPA states on 75 Fed. Reg. 74163. In turn, assumptions based on LDVs might not be applicable. For example, HDV sleepers may have second refrigerant loops or after-market idle-reduction AC systems. We recommend that the EPA more closely examine what are achievable leakage rates for HDVs, rather than making assumptions based upon LDVs, before tightening standards. Moreover, we recommend that secondary AC loops for idle reduction should not be subject to the stringent regulation of the tractor AC system. [EPA-HQ-OAR-2010-0162-1818.1, p.94]

DTNA Either Needs More Clarification Of The EPA’s AC System Durability Requirements Or Requests That The Agency Not Apply Such Requirements. [EPA-HQ-OAR-2010-0162-1818.1, p.95]

On 75 Fed. Reg. 74213 and elsewhere, the EPA suggests that manufacturers would have to certify vehicles’ AC system leakage by providing “engineering analysis” of AC component and system durability. With such a vague description as this, it is not clear how to us what is involved in certification and whether the EPA’s expectations are reasonable. In turn, we are unable to adequately comment on the proposed regulation. [EPA-HQ-OAR-2010-0162-1818.1, p.95]

Organization: Institute for Policy Integrity

The agencies do not propose to regulate air conditioning leakage from vocational vehicles, and do not discuss such regulation as an alternative rulemaking possibility. The agencies explain that since they have chosen to regulate the chassis manufacturer for this class of vehicles, and since other entities are potentially involved in designing the air conditioning system, regulating air conditioning for this vehicle class is not practical. [EPA-HQ-OAR-2010-0162-1895.1, p.5]

However, the agencies do not specify the extent to which third parties are involved in vocational vehicle air conditioning system production and installation, or whether regulation at a level other than the chassis manufacturer may be appropriate for certain vocational vehicles. Notably, this broad vehicle category includes not only work trucks, but also recreational vehicles and transit buses. To the extent implementation of direct control standards is currently infeasible, the agencies should consider whether alternatives such as labeling (see Section II below), credits (see Section III below), or voluntary approaches would be beneficial, and the agencies should set a schedule for future regulatory actions to directly control leakage. [EPA-HQ-OAR-2010-0162-1895.1, p.5]

Organization: National Association of Clean Air Agencies (NACAA)

The agencies propose a refrigerant leakage standard in terms of percent of total refrigerant leakage per year, in contrast to the credit approach used for light-duty vehicles in which the standard is expressed in terms of absolute grams per year. An absolute gram-per-year refrigerant leakage standard, at least as stringent as that applicable to light-duty vehicles, is warranted for heavy-duty vehicles and we encourage EPA to take this approach in the final rule. NACAA also recommends that an additional standard be applied for overall air conditioning system efficiency. [EPA-HQ-OAR-2010-0162-1607.1, p.4]

Organization: National Solid Wastes Management Association (NSWMA)

We support the proposed exclusion of air conditioning systems in vocational vehicles from the refrigerant leakage standard given the differences in these vehicles. [EPA-HQ-OAR-2010-0162-1870.1, p.8]

Organization: Navistar, Inc.

EPA is proposing a design-based, refrigerant leakage standard for air conditioning systems in heavy-duty trucks and vans and Class 7 and 8 tractors, set at a 1.5 % leakage per year. EPA also is proposing to make applicable to such systems the CAA emission warranty and recall provisions under CAA §207. There are fundamental defects with both proposals. [EPA-HQ-OAR-2010-0162-1871.1, p.39]

There is no factual basis in this record to support an air conditioning leakage standard. As EPA itself admits, the quantity of air conditioning leakage compared to the total amount of emissions in the overall GHG scheme is miniscule. It appears EPA is concerned about “lost control opportunities,” but many manufacturers, including Navistar, already employ “state of the art” or “best practices” technology in their air conditioning systems. As a result, there is no reason to subject manufacturers to the administrative and/or compliance costs for a new program. When such costs are weighed against the “very small” environmental impact on GHG emissions from air conditioning systems, the new program is simply not supportable. [EPA-HQ-OAR-2010-0162-1871.1, 39-40]

To the extent that EPA wishes to incentivize such changes, Navistar recommends that EPA simply institute – as with the LD program – opportunities for generating GHG credits as opposed to the creation of a costly standard.101 EPA’s concern that credits would be insignificant to overall GHG reduction only reinforces that a leakage standard is not justifiable in the first place but, in any event, the lack of credit could be cured by simply adding a credit multiplier such that generating credits from reductions in refrigerant leakage would be worthwhile for vehicle manufacturers. Moreover, a credit system would properly reward those manufacturers who have already been using “best practices” in their technology choices. [EPA-HQ-OAR-2010-0162-1871.1, p.40]

Although Navistar would agree with EPA’s menu, design-based approach if a standard was warranted, EPA appears to give no consideration to the complexities and costs of even that system. Manufacturers have significant variation in their air conditioning systems due to different engines, cab heights and positions, cooling packages, sleeper berths, etc. The proposed rule is not clear about the reporting or certification requirements for all of the air conditioning system variations in all the various vehicle combinations. If manufacturers have to obtain approval for each system variation, the costs of administrative compliance would be significant. Assuming a standard was supportable on this record – and it is not – EPA would still be required to modify its proposal to accept a “worst case” submission that could then be used to judge compliance with other similar systems. [EPA-HQ-OAR-2010-0162-1871.1, p.40]

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

Regarding air conditioning (A/C) system efficiency standards discussed on Page 74164 in FR 75 No.229, New York State recommends that EPA include A/C efficiency standards as a 'stand-alone' standard. Refrigerants are potent greenhouse gases. The proposed rule only prescribes a limited number of currently available technologies to reduce greenhouse emissions and fuel consumption. Since the 'technology-forcing' aspects of this rule-making are very limited, the industry has been afforded a great deal of flexibility to use advanced and innovative technology credits to demonstrate compliance. Thus, a discrete, prescriptive standard specific to AIC efficiency is appropriate. [EPA-HQ-OAR-2010-0162-2047.1, pp.4-5]

Response:

EPA has addressed AAPC's comment concerning the difficulty in meeting a "percent refrigerant leakage per year" standard on trucks with lower refrigerant capacity air conditioning systems by providing the option to certify to a "leakage rate" standard of 11.0 grams per year, for systems with a refrigerant capacity of 733 grams or lower. Since refrigerant leakage past the compressor shaft seal is the dominant source of leakage in belt-driven air conditioning systems, the we recognize that a single "percent refrigerant leakage per year" is not feasible for systems with a refrigerant capacity of 733 grams or lower, as the minimum feasible leakage rate does not continue to drop as the capacity or size of the air conditioning system is reduced. The fixed leakage from the compressor seal and other system devices results in a minimum feasible yearly leakage rate, and further reductions in refrigerant capacity (the 'denominator' in the percent refrigerant leakage calculation) will result in a system which cannot meet the 1.50 percent leakage per year standard. The EPA does not believe that leakage reducing technologies are available at this time which would allow lower capacity systems to meet the percent per year standard, so we are finalizing a maximum grams per year leakage standard of 11.0 grams per year for air conditioning systems with a refrigerant capacity of 733 grams or lower. The agencies have established the standard, as well as the refrigerant capacity threshold, by examining the State of Minnesota GHG Reporting Database for the yearly leakage rate from 2010 and 2011 model year pickup trucks. In the Minnesota data, the average leak rate for the pickup truck category (16 unique model and refrigerant capacity combinations) was 13.3 grams per year, with an average capacity of 654 grams, resulting in an average percent refrigerant leakage per year of 2.0%. 4 of the 16 model/capacity combinations in the reporting data achieved a leak rate 11.0 grams per year or lower, and this was chosen as the maximum yearly leak rate, as several manufacturers have demonstrated that this level of yearly leakage is feasible. To avoid a discontinuity between the "percent leakage" and "leak rate" standards – where one approach would be more or less stringent, depending on the refrigerant capacity – a refrigerant capacity of 733 grams was chosen as a threshold capacity, below which, the leak rate approach can be used. We believe that this approach - of having a leak rate standard for lower capacity systems and a percent leakage per year standard for higher capacity systems - will result in reduced refrigerant emissions from all air conditioning systems, while still allowing manufacturers the ability to produce low-leak, lower capacity systems in vehicles which require them.

In addition, the EPA recognizes that some manufacturers currently utilize an improved manufacturing process for assembly and testing of air conditioning systems, where a helium leak test is performed on 100 percent of all o-ring fittings and connections after final assembly. By leak testing each fitting, the manufacturer or supplier is verifying that the o-ring is not damaged during assembly (which is the primary source of leakage from o-ring fittings), and when calculating the yearly leak rate for a system, EPA will allow a relative emission value equivalent to a 'seal washer' can be used in place of the value normally used for an o-ring fitting, when 100% helium leak testing is performed on those fittings. While further updates to the SAE J2727 standard may be forthcoming (to address new materials and measurement methods for permeation through hoses, EPA believes it is appropriate to include the helium leak test update to the leakage calculation method at this time.

Concerning the Institute for Policy Integrity's comments concerning the regulation of refrigerant leakage on vocational vehicles, the agency is not finalizing leakage standards for Class 2b-8 Vocational Vehicles at this time due to the complexity in the build process and the potential for different entities besides the chassis manufacturer to be involved in the air conditioning system production and installation, with consequent difficulties in developing a regulatory system.

Vocational vehicles undergo a complex build process. Often an incomplete chassis is built by a chassis manufacturer with an engine purchased from an engine manufacturer and a transmission purchased from another manufacturer. A body manufacturer purchases an incomplete chassis which is then completed by attaching the appropriate features to the chassis. Chassis manufacturers represent a limited number of companies as compared to body manufacturers, which are made up of a diverse set of companies that are typically small businesses. These companies would need to be regulated if whole vehicle standards were established.

Concerning Navistar's comments on the administrative and compliance cost of refrigerant leakage regulations, and the small relative impact these emissions have on the GHG emissions from air conditioning systems, the agency believes this action is justified on both counts. We believe that the administrative and compliance costs will be trivial, as the 'leakage' value is not a measured result, but is simply a calculated estimate, using the known specifications/properties for all of the devices and components that comprise a manufacturers air conditioning system design. For those manufacturers with air conditioning systems that already meet the percent leakage per year standard, they only need to report the leakage result as part of their normal certification process. For manufacturers with systems which do not meet the standard, we believe that the cost for reducing refrigerant leakage ($22) will be partially recovered by the end-user over the vehicle's lifetime through reduced vehicle downtime, and cost savings for delaying or eliminating recharging an air conditioning system which has lost refrigerant to the point where system performance is affected. In the 2012-2016 Light-Duty GHG Rule, we estimated that the cost of recharging an air conditioning system was between $100 and $147, and that such cost can be delayed, and possibly eliminated completely, if the refrigerant leakage rate is reduced. The estimated cost for the CO2-equivalent emission reductions resulting from reduced refrigerant leakage (over the 30 year lifetime of a vehicle) is $21 per ton, which is within the range of costs for other vehicle technologies.

6.4.3. **Light-Duty CO2eq Approach**

Organizations Included in this Section:

Institute for Policy Integrity
Alliance of Automobile Manufacturers
American Automotive Policy Council
Natural Gas Interests

Organization: Institute for Policy Integrity

Allowing compliance with nitrous oxide and methane standards through carbon dioxide-equivalent values, as proposed, is appropriate, as long as it does not undermine stringency. [EPA-HQ-OAR-2010-0162-1895.1, p.13]

The proposed changes to the light-duty standards (allowing a carbon dioxide-equivalency approach for either nitrous oxide or methane, without requiring use of both, and also exploring a credit-based approach)80 are also justified and consistent with Policy Integrity's comments on that rulemaking. However, burying a proposed change to a previously finalized rule in the notice for a different rule falls outside norms of administrative procedure. Notice of a proposed rulemaking, required by the Administrative Procedure Act,81 is basic to administrative law. To ensure adequate public participation, notice of a proposed rule must adequately inform the public of its intent. This proposed rulemaking explicitly focuses on standards for medium- and heavy-duty vehicles. Yet, the agencies are also proposing changes to their rule covering light-duty vehicles. While the new the proposed rulemaking will interest a good number of parties that commented on the light-duty rule, there may be a sizable number of other parties whose interests are not implicated by a medium and heavy-duty rule. In future modifications of final rules, the agencies should make a separate proposal to revise their rules in order to maximize opportunities for public participation.

Organization: Alliance of Automobile Manufacturers (Alliance)

In this medium/heavy-duty proposal, the agency incorrectly characterizes the light-duty issues with CH4 and N2O as short-term or early leadtime issues. The agencies request comments on the CH4 and N2O approach in light duty rule. For the reasons outlined above, the Alliance believes the agencies should address the disconnect between the light-duty and medium/heavy-duty rules. The Alliance recommends the light duty rules be updated with these more comprehensive features proposed in the medium/heavy-duty rule, for the entire 2012-2016 rulemaking including any additional future model year rulemakings. [EPA-HQ-OAR-2010-0162-1621.1, p.2]

Organization: American Automotive Policy Council

De-linking CH4 and N2O performance - if a given model underperforms on either constituent that deficit can be covered by CO2 fleet over-performance. This approach respects the fact that the fundamental mechanisms for CH4 and N2O formation are different and the two constituents do not necessarily trend together. [EPA-HQ-OAR-2010-0162-1762.1, p.16]

If a given model has a deficit to a CH4 and N2O cap, that model's volume (i.e., not the entire fleet) is required to be covered with CO2 fleet over-performance. This approach does not punish an individual model or technology. Some specific technologies (diesel, CNG, etc) may be challenged by the caps but those technologies have offsetting CO2 benefits. [EPA-HQ-OAR-2010-0162-1762.1, p.16]

The difference between CH4 and N2O test values and the emission standard is required to be offset with CO2 fleet over-performance. [EPA-HQ-OAR-2010-0162-1762.1, p.16]

CH4 and N2O compliance are measured on the combined 55/45 weighting of city and highway cycles. These cycles are the yardstick for fuel economy and CO2 measurement. [EPA-HQ-OAR-2010-0162-1762.1, p.16]

In this medium/heavy-duty proposal, the agency incorrectly characterizes the light-duty issues with CH4 and N2O as short-term or early lead time issues. The agencies request comments on the CH4 and N2O approach in the light duty rule. For the reasons outlined above, AAPC believes the agencies should address the disconnect between the light-duty and medium/heavy-duty rules. [EPA-HQ-OAR-2010-0162-1762.1, p.16]

AAPC recommends the light-duty rules be updated with these more comprehensive features proposed in the medium/heavy-duty NPRM for the entire 2012-2016 rulemaking including any additional future model year rulemakings. [EPA-HQ-OAR-2010-0162-1762.1, p.16]

We support EPA's approach to CO2 and N2O compliance demonstration allowing fully severable offsetting credits per model on a CO2 equivalence basis and recommend that this more accurate approach be extended to the light-duty greenhouse gas emissions program. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

Organization: Natural Gas Interests

We also support this approach with regards to the CO_2 equivalent compliance as proposed by EPA for vehicles subject to the light duty regulations issued earlier this year and urge EPA to provide this type of flexibility on a permanent basis. [EPA-HQ-OAR-2010-0162-2119.1, p.6]

Response:

EPA requested comments on the option of allowing manufacturers to use the CO_2 equivalent approach for one pollutant but not the other for their fleet—that is, allowing a manufacturer to fold in either CH_4 or N_2O as part of the CO_2-equivalent standard. For example, if a manufacturer is having trouble complying with the CH_4 standard but not the N_2O standard, the manufacturer could use the CO_2 equivalent option including CH_4, but choose to comply separately with the applicable N_2O cap standard. EPA also requested comments on an alternative approach of allowing manufacturers to use CO_2 credits, on a CO_2 equivalent basis, to offset N_2O and CH_4 emissions above the applicable standard. This is similar to the approach proposed and being finalized for heavy-duty vehicles. EPA requested comments on allowing the additional flexibility in the light-duty program for MYs 2012–2014 to help manufacturers address any near-term issues that they may have with the N_2O and CH_4 standards.

Commenters providing comment on this issue supported additional flexibility for manufacturers, and manufacturers specifically supported the heavy-duty vehicle approach of allowing CO_2 credits on a CO_2 equivalent basis to be used to meet the CH_4 and N_2O standards. EPA continues to believe that it is appropriate to provide additional flexibility to manufacturers to meet the N_2O and CH_4 standards. EPA is finalizing provisions allowing manufacturers to use CO_2 credits, on a CO_2-equivalent basis, to meet the N_2O and CH_4 standards, which is consistent with many commenters' preferred approach. This provides manufacturers with an additional option that "de-links" N_2O and CH_4, as manufacturers could use CO2 credits on a CO_2-equivalent basis to meet either or both the CH_4 and N_2O standards on a test group basis as needed.

In EPA's request for comments, EPA discussed the new flexibility as being needed to address lead time issues for MYs 2012-2014. In response to manufacturer concerns and comments regarding the impact of the N_2O and CH_4 standards, EPA understands that manufacturers are now making technology decisions for beyond MY 2014 and that some technologies such as FFVs may have difficulty meeting the CH_4 and N_2O standards, presenting manufacturers with difficult decisions of absorbing the 3-4 g/mile CO_2-equivalent emissions fleet wide, making significant investments in existing vehicle technologies, or curtailing the use of certain technologies.[57] The CH_4 standard, in particular, could prove challenging for FFVs because exhaust temperatures are lower on E-85 and CH_4 is more difficult to convert over the catalyst. EPA's initial estimate that these issues could be resolved without disrupting product plans by MY 2015 appears to be overly optimistic, and therefore EPA is extending the flexibility through model year 2016. This change helps ensure that the CH_4 and N_2O standards will not be an obstacle for the use of FFVs or other technologies in this time frame, and at the same time, assure that overall fleet average GHG emissions will remain at the same level as under the main standards.

[57] "Discussions with Vehicle Manufacturers Regarding the Light-duty Vehicle CH_4 and N_2O Standards," Memorandum from Christopher Lieske to Docket EPA-HQ-OAR-2010-0162.

7. Greenhouse Gas Emissions Model (GEM)

7.1. The Greenhouse Gas Emissions Model

Organization: Daimler Trucks North America

In any event, while we understand that the Agencies do not intend to allow the option of using a real engine in GEM in the initial phase of this rulemaking, an acceptable short term alternative that would allow manufactures to allocate technology improvements between engines and vehicles is to allow credit trading between engines and vehicles. [EPA-HQ-OAR-2010-0162-1818.1, p.13]

GEM uses what we infer to be a simple PID model of a driver. In turn, GEM mischaracterizes the single greatest source of driver inefficiency, bad driving. If GEM used a more realistic driver model, and if GEM allowed for manufacturers to input characteristics of technologies that lessen effects of bad driving (e.g., AMT controls or progressive shifting controls), then GEM would (1) have more fidelity to real-world fuel consumption and (2) provide manufacturers better incentives to create new fuel saving technologies. [EPA-HQ-OAR-2010-0162-1818.1, p.90]

On pages 75 Fed. Reg. 74180 and 74204, the Agencies request comments on GEM. While we generally agree with the Agencies' modeling approach, we recommend instead a full-vehicle model that could be harmonized worldwide (perhaps with different drive cycles for the different countries). Such a program would drive cost-effective improvements as described elsewhere in these comments. Plus, such a program would facilitate improvements to GEM, as regulators from several countries could work together to improve its fidelity to real in-use driving. [EPA-HQ-OAR-2010-0162-1818.1, p.92]

Although GEM may suffice for the first phase of a regulatory program like the presently proposed one, it is not adequate for predicting vehicle fuel consumption to the level that is necessary to help customers. GEM, with only limited inputs and with preselected fuel maps and transmission characteristics, predicts fuel consumption only slightly better than could be done with an analytical model using such inputs as Cd, tire rolling resistance, weight, a characteristic vehicle speed representative of a cycle average, and a characteristic acceleration rate. We do not say this to criticize the Agencies, because for the first phase of a regulation, such simplicity is natural. Rather, we say this for two reasons: (1) to encourage the Agencies to expand GEM, for example by including real fuel maps, and (2) to caution the Agencies or the public against reading too much into GEM results. Better are such predictive tools as DDC's Spec Manager, which incorporates the primary features of GEM but also includes realistic fuel maps and drivetrain characteristics. [EPA-HQ-OAR-2010-0162-1818.1, pp.92-93]

Response:

Many changes have been made since the GEM was first released to the public. One of the key changes is the driver model. The new model uses the targeted vehicle driving speed to estimate vehicle torque demand at any given time, and then the power required to drive the vehicle is derived to estimate the required accelerator and braking pedal positions. If the driver misses the vehicle speed target, a speed correction logic controlled by a PID controller is applied to adjust necessary accelerator and braking pedal positions in order to match targeted vehicle speed at every simulation time step. The enhanced driver model used in the final rulemaking with its feed-forward driver controls more realistically models driving behavior.

As noted by the commenter, development of the agencies' own vehicle model, the GEM, was undertaken to address the specific issues and goals of the first phase of the HD National Program and will require additional work if it is to be used in a broader fashion in future regulations. The agencies look forward to working with other countries as they develop their own fuel efficiency and GHG emissions programs for heavy-duty vehicles. The agencies will remain open to substantially revisiting many of the decisions taken in this first phase of regulation including the scope and even use of the GEM model as we consider future regulations.

The GEM is not intended to be used for predicting fuel consumption for consumers. Rather, it is only specifically designed and used for the purpose of compliance with the HD tractor and vocational vehicle standards. Due to the nature of the current rulemaking, the rule mainly focuses on the improvements of a few key parameters. Taking a combination tractor for example, it only includes aerodynamic drag and rolling resistance together with weight reduction, vehicle speed limit and extended idle reduction. In addition, all comparisons are made in a relative basis as opposed to the 2010 model year baseline vehicle model configuration. Accuracy in an absolute sense is not critical for this rulemaking. The agencies will reconsider this comment seriously once the certification includes many other vehicle components in the possible next phase of rules for the heavy-duty sector.

Organization: Engine Manufacturers and Truck Manufacturers Associations

While GEM is a better certification tool for the Proposed GHG/FE Standard than chassis-dynamometer testing, the fact remains that GEM is new and unproven. In fact, the Agencies note in the RIA document that 'the proposed model has not yet been peer reviewed but is expected to be before any final rule is issued.' (RIA, p. 4-7.) Thus, since GEM remains subject to further development (and so is still somewhat of a work in progress), it is unclear whether manufacturers will have adequate notice and opportunity for comment on the version of GEM that ultimately is finalized for certification purposes. [EPA-HQ-OAR-2010-0162-1940.1, p.21]

To address the Associations' concerns regarding the evolving nature of GEM, as well as manufacturers' current lack of experience with it, the Agencies should provide manufacturers with additional opportunities for input regarding GEM before it is officially deployed as the certification tool for HD vehicles. This opportunity for additional 'trial runs' and feedback from manufacturers will help to mitigate the potential for GEM being finalized without adequate opportunity for review and input, and will help to work out any remaining 'bugs' in GEM before the potential risks and liabilities of the certification process take effect. [EPA-HQ-OAR-2010-0162-1940.1, p.21]

In that regard, some 'bugs' within GEM already have been identified. More specifically, and for example, within GEM there is an inconsistency in the output of the program between MY2014 and MY2017 vehicles. The output for MY2017, which should decrease by the same amount as the reduced engine standard (since the stringency change is for the engine only), does not decrease in that manner for a number of technology groupings. Below are examples of this inconsistency, which should not be considered as an all-inclusive list of GEM's potential problems: [EPA-HQ-OAR-2010-0162-1940.1, p.21]

[See p.22 of this comment for a table displaying GEM inconsistencies]

Other specific problems within GEM that will require further development, include: [EPA-HQ-OAR-2010-0162-1940.1, p.22]

• The appropriate 'presets' are needed for Aero Drag (0.6 or 0.7 depending on Class); [EPA-HQ-OAR-2010-0162-1940.1, p.22]

• The Aero Drag values should be limited to only those values that are available for each tractor regulatory class; [EPA-HQ-OAR-2010-0162-1940.1, p.22]

• The engine fuel rates does not go to 'zero' during zero throttle deceleration events; [EPA-HQ-OAR-2010-0162-1940.1, p.22]

• The engine does not provide motoring (or negative) torque during deceleration events; [EPA-HQ-OAR-2010-0162-1940.1, p.22]

• The model exhibits unstable idle operation behavior; [EPA-HQ-OAR-2010-0162-1940.1, p.22]

• The model's 55 mph constant speed cycle measures performance over 400 seconds, and the 65 mph constant speed cycle measures performance over 300 seconds. [EPA-HQ-OAR-2010-0162-1940.1, p.22]

The resultant calculations are inconsistent with the descriptions of the cycles in the regulation (§1037.510); and Thus, there clearly is more work that needs to be done to ensure that GEM is ready to play its role in the certification of HD vehicles. Accordingly, the Agencies should make the changes to GEM indicated above, and should provide an opportunity to manufacturers to review and comment on the revised model before it is finalized. [EPA-HQ-OAR-2010-0162-1940.1, p.22]

Response:

In the past few months, the agencies have validated the GEM with respect to each vehicle subcategory and a range of input values, trying to identify any potential 'bugs'. The agencies also conducted a peer review of the proposed version of the GEM. As described in RIA Chapter 4, all bugs mentioned in this comment have been identified and fixed except the zero fueling during zero throttle deceleration. The agencies recognize that different manufacturers have different fuel cutoff control logics, and it would be challenging to implement all control logics without manufacturers' support in providing the data for the final model validations. Furthermore, the GEM evaluates GHG performance of a relatively small number of technologies. It is not a model to assess whole vehicle performance. Consistent with this limited purpose, the model is designed with (i.e. the model architecture specifies) various predefined values, such as engine fuel maps, drive cycles, driver behavior, etc. We repeat that the purpose of these fixed parameters is to be able to evaluate performance of those technologies for which non-defined values are input into the GEM – tire rolling resistance, idle reduction, aerodynamic improvements, and mass reduction. So the comment that GEM may specify unrealistic fuel maps or other automatic parameters misses the point. All that matters is whether performance of the limited set of technologies is reasonably predicted, and, as shown in the administrative record, the agencies reasonably believe that GEM indeed models performance of these technologies accurately. Fixing non-input parameters assists in and is necessary to achieve the model's purpose. Consequently, we are delaying implementation of a fuel cutoff strategy until a future rulemaking.

The agencies appreciate the comments suggesting a multi-step iterative approach to GEM development and model releases. However, we do not believe such an approach would be the most effective way to work with the regulated community nor do we believe that such an approach could be easily integrated with the general administrative procedures defined under the Clean Air Act. Instead, we believe the current notice and comment approach is the most appropriate way for the Agency to solicit helpful input on the GEM model in an organized manner. As illustrated throughout this section, EPA has used this input to improve the GEM for the final rule. We do not believe that it will be necessary to iterate yet again on the GEM model for this first phase of the program given the extensive testing the model has now undergone. In any case, any change to the model would require rulemaking (since the model is part of the rule), and this would afford robust opportunities for public comment.

The agencies are not including pre-defined Cd values in the GEM for the final rulemaking because of the provisions included in the final rulemaking to allow manufacturers to include wind-averaged yaw benefits. The incremental improvement in Cd will vary by vehicle configuration, and therefore, cannot be pre-defined by the agencies.

The agencies have corrected the calculation in the proposed regulations at §1037.510 to match the calculation used in the GEM. The revised calculations are described in §1037.525(d).

Organization: Navistar, Inc.

The cornerstone of the vehicle standard implementation is the GEM model. The principle upon which manufacturers preliminarily agreed to support a proposal was founded on the idea that a mix of existing vehicle technologies should be able to meet the new standards. Based on the limited time and input data manufacturers have had to assess the GEM model's performance, we have not been able to determine whether the model carries through this key concept. [EPA-HQ-OAR-2010-0162-1871.1, p.27]

The GEM model must accurately model a particular manufacturer's vehicle. Therefore, manufacturers must be able to set its assumptions based on the manufacturer's data. We are extremely concerned with the Agencies' position that the standardized assumptions in the GEM model are "frozen" until the Agencies choose to reopen a regulatory docket. These assumptions include key performance attributes like aerodynamic drag and frontal area for vocational applications, engine fuel maps for tractors and vocational and others. In light of GEM's limitations for modeling total vehicle capabilities, it is a requirement that innovative technologies are a means to capture GHG benefits not considered in GEM. Also, incremental improvements on drag coefficients ("Cd") must be allowed. That means improving a vehicle's Cd from 0.70 to 0.68 would have value. Under the current GEM model, no value is assigned to that improvement unless it reached Cd 0.65. [EPA-HQ-OAR-2010-0162-1871.1, pp.27-28]

Additionally, from our working with the GEM model to date, we have noticed a number of items that the Agencies need to address for the model to comply the principles it purports reflect. These include:

- The inability to use Navistar's own "bsfc" maps or do other customizations in the GEM reduces our ability to innovate on, or be recognized for, some potential vehicle features (e.g., transmissions that change the operating range of the engine over the drive cycle, allowing highly optimized fuel maps – or axles that significantly reduce driveline losses). [EPA-HQ-OAR-2010-0162-1871.1, p.28]

- Automated entry. For production and large scale variation simulation purposes, the GEM needs a bulk input-output system. For production regulation, the GEM needs a standardized reporting/tabulation system with volume capability. This can be engineered into the GEM within Matlab, but EPA must provide an "authorized" version with this capability to remove potential misunderstandings from future compliance discussions. [EPA-HQ-OAR-2010-0162-1871.1, p.28]

- Vehicle weight reduction is limited to tires and wheels. Such constraints limit the opportunity for vehicle improvements to impact GHG emissions. All things being equal, lighter engines, trucks and tractors will use less fuel and emit less CO2 per ton-mile of cargo. Other weight reduction opportunities must be allowed. [EPA-HQ-OAR-2010-0162-1871.1, p.28]

- The Agencies need to permit idle reduction as a vehicle credit option on GEM for vocational vehicles. Idle reduction technology can have a significant impact in certain vocational applications. [EPA-HQ-OAR-2010-0162-1871.1, p.28]

- The GEM model also needs to “grey-out” or eliminate options other than tire rolling resistance for vocational classes, if these options are not allowed in the simulation for regulatory purposes. Currently, the system allows output adjustment for aerodynamics and other inputs that should be eliminated. [EPA-HQ-OAR-2010-0162-1871.1, p.28]

- Navistar does not have aerodynamic coefficients of drag for all configurations of our line-haul products, which adds to the inability to assess compliance space using GEM. Broader flexibility in assessing compliance space is warranted for full product line manufacturers. [EPA-HQ-OAR-2010-0162-1871.1, p.28]

Navistar has not been given a meaningful opportunity to comment on the GEM model because time afforded to assess this model has not been sufficient to assess how it functions. For example, the GEM model’s comparison against actual fuel economy of a Navistar ProStar truck demonstrated that the current GEM model underreported the fuel economy benefits of Navistar’s truck by 2% to 4%. Underreporting fuel economy benefits in the range that EPA expects fuel economy improvements is capricious. Therefore, on its face, the GEM model unfairly prejudices Navistar’s vehicles. We also suspect that the GEM model is not currently in its final form because, inter alia, we find that attributes other than tires can be adjusted when assessing vocational vehicles. At a minimum, EPA must at some date meaningfully prior to the 2014 effective year, publish an updated version of the GEM model and conduct a notice and comment period with sufficient time for manufacturers to assess the model. [EPA-HQ-OAR-2010-0162-1871.1, pp.28-29]

Navistar also requests a workshop on the GEM model. As the GEM model is a key element of the standard, EPA must fully address these issues before the emission standard can be considered feasible and conduct further notice and comment rulemaking prior to finalizing the model. [EPA-HQ-OAR-2010-0162-1871.1, p.29]

<u>Response:</u>

The agencies believe that they afforded ample opportunity for notice and comment on the GEM model. The agencies released the GEM to the public on the EPA website (http://www.epa.gov/otaq/climate/regulations.htm) on October 25, 2010 (along with a users’ guide and descriptions of the validation testing for the model). This allowed stakeholders to review the model for over 90 days prior to the end of the comment period. The model is not especially complicated, and is similar to many other existing models used for similar purposes (see 75 FR at 74180). Several stakeholders were able to review and provide technical comments on the GEM in the allotted public comment period. The agencies thus believe that the public comment period was ample for meaningful review of the model.

Depending on the vehicle category, the rule only considers a few standard input parameters, such as aerodynamic drag and rolling resistance together with weight reduction, vehicle speed limit and extended idle reduction for combination tractors and tire rolling resistance for vocational vehicles. All other parameters or components, such as engine and driveline, are pre-defined for the reasons laid out in preamble Section II. Technologies which result in GHG emission improvements but are not inputs to GEM may be eligible to generate off-cycle/innovative credits (as the commenter requests). In addition, the GEM v2.0 being released for the final rulemaking will allow manufacturers to input the Cd value rather than being required to select from predefined inputs. This change will allow manufacturers to use the GEM for evaluation of innovative technologies that improve aerodynamics.

Improvements have been made since the early released version of the GEM, in response to comments. As can be seen in the RIA Chapter 4 – Vehicle Simulation Model, the difference between the projected results from the GEM and experimental results for the cases the agencies tested are all less than 1.3%. More importantly, as explained in earlier comment responses, certification is done in a relative basis compared to pre-selected baseline, and therefore, absolutely high accuracy in vehicle economy prediction is not critical. Simply put, the GEM is not a whole vehicle test. It evaluates performance of a relatively small number of technologies. Use of fixed values in the model's architecture is to allow for evaluation of the limited set of technologies. Thus, the comment that the pre-specified values may not match those of Navistar (or other OEMs) is off-point since the level at which these values is fixed does not affect the model's predictions for the technologies whose performance it assesses. Moreover, assuming that Navistar has accurately measured its true values of tire rolling resistance and aerodynamic drag, any offsets between the GEM and Navistar's actual in use performance are not relevant to the relative reduction estimates of the GEM.

For this first phase of regulation, the agencies have decided to regulate engines and vehicles separately except for heavy-duty pickups and vans. We believe this separate regulation of engines and vehicles is the most appropriate way to achieve the near term reductions sought in this first phase program without introducing substantial new testing burden. We agree that in the future it may be desirable to include a complete vehicle standard for combination tractors and other vocational vehicles using a complete chassis test procedure or a more fully integrated vehicle model. At that point, it would be necessary to use a fuel map specific to the engine installed in the vehicle being tested. However, given our separate regulation of engines and vehicles in this first phase of the regulation, such an approach would inappropriately double count emission reductions from engine improvements first in showing compliance with the engine standard and then again in the truck model. To prevent such double counting, the GEM model uses a fixed engine map.

The GEM v2.0 adopted in the final rulemaking will include a feature to allow the user to run a batch job, meaning that the automated feature is included.

The GEM has added the features to grey out those parameters that are not applicable to certain vehicle subcategories.

The agencies are not including idle reduction technology as an input to the GEM for vocational vehicles. As discussed in preamble Section II.C, idle reduction technologies can reduce workday idling associated with vocational vehicles. However, characterizing idling activity for the vocational segment in order to quantify the benefits of idle reduction technology is complicated by the variety of duty cycles found in the sector. Idling in school buses, fire trucks, pick-up trucks, delivery trucks, and other types of vocational vehicles varies significantly. Given the great variety of duty cycles and operating conditions of vocational vehicles and the timing of these rules, it is not feasible at this time to establish an accurate baseline for quantifying the expected improvements which could result from use of idle reduction technologies.

Navistar evidently believes that if a value is not a GEM input it cannot be utilized as a means of complying with the standard. This is not correct. Any technology for which reduction benefits are not captured in the GEM (or test cycles) may be eligible as an innovative, off-cycle credit. As such, for vocational vehicles, parameters which are inputs to the GEM for combination tractors but not for vocational vehicles, but which are not part of the technology basis for the standard (e.g. mass reduction) could also be utilized as a means of compliance. See preamble Section IV.B.3 and §1037.611Finally, the agencies may consider a compliance workshop which would include the operation of the GEM, similar to other workshops conducted by the agency in past rulemakings. However, the agency believes that the GEM user guide available at http://www.epa.gov/otaq/climate/regulations.htm and the regulations provide clear guidance on how to use the GEM because the maximum number of input parameters for a vehicle configuration is five (Cd, steer tire RRc, drive tire RRc, vehicle speed limiter setting, and extended idle reduction value).

Organization: Cummins, Inc.

We agree with the Agencies that the use of a model can be an accurate and cost effective method of evaluating vehicles. Cummins utilizes vehicle modeling extensively in our development processes. The Agencies should address the following aspects of the GEM:

- The engine fuel rate does not go to zero during zero throttle deceleration events.

- The engine does not provide motoring (or negative) torque during deceleration events.

- The model shows unstable idle behavior. [EPA-HQ-OAR-2010-0162-1765.1, p.47]

- The GEM 55 mph constant speed cycle measures performance over 400 seconds, and the 65 mph constant speed cycle measures performance over 300 seconds. While this difference does not materially affect the model results, the calculation is inconsistent with the description of the cycles in the regulation (see § 1037.510).

- Vehicle technologies that are not intended for a selected vehicle category should be completely disabled in the user interface. For example, the GEM currently allows and applies the idle reduction credit for any vehicle category. This behavior is contrary to the regulatory intent that idle reduction credits be limited to Class 8 sleeper cab vehicles (§ 1037.520). [EPA-HQ-OAR-2010-0162-1765.1, p.48]

Figure 10 through Figure 12 show examples of these issues. While these behaviors are not significantly impacting the use of the GEM for the current regulation, the Agencies should consider correcting them in order to have a model that more accurately represents engine behavior. [EPA-HQ-OAR-2010-0162-1765.1, p.48]

[Figure 10 can be found on page 48 of this comment. Figures 11 and 12 can be found on page 49 of this comment.]

The current method of calculating composite emissions when a PTO cycle is included is not consistent with the method used for the composite vehicle cycle calculation with no PTO in the GEM. In other words, if zero PTO emissions are used in the PTO calculation, the composite cycle value does not match the GEM's non-PTO calculation. [EPA-HQ-OAR-2010-0162-1765.1, pp.49-50]EPA Response:

Response:

All issues mentioned in this comment have been identified and fixed except the zero fueling during zero throttle deceleration. The agencies have altered the graphical user interface (GUI) for the GEM v2.0 such that the inputs correspond to the technology basis for the vehicle standards for each subcategory. Thus, consistent with the public comment, idle reduction would not be an automatic input to GEM for other than Class 8 sleeper cab combination tractors (although idle reduction could, at least in theory, be available as an innovative credit for other vehicle subcategories). The agencies recognize that different manufacturers have different fuel cutoff control logics, and it would be challenging to implement all control logics without manufacturers' support in providing the data for the final model validations. Furthermore, because the GEM's purpose is to quantify the relative effectiveness of a limited suite of technologies and not the absolute GHG emissions or fuel consumption of whole trucks, we believe that it is more important at this time to develop the base model architecture so as to assure accurate and quantifiable assessment of performance of that limited suite of technologies. Fixing parameter values in the model achieves this objective, even if the absolute emissions may differ from those actually achieved (which is not of regulatory consequence since GEM is not used to model absolute vehicle emissions). Consequently, we are delaying implementation of a fuel cutoff strategy until a future rulemaking.

The agencies have corrected the description of the cycles and the calculation of the weighted composite result in the regulations to match the GEM. In addition, the agencies have corrected the weighting of the PTO cycle emissions for hybrids such that the weighting for the final rulemaking was developed by properly VMT-weighting the cycles. The corrected equation can be found in §1037.525(d) and described in RIA Chapter 3.7.1.1.

7.2. GEM Configuration Definitions

Organization: Allison Transmission

At the time that these comments are filed, the GEM modeling to support this rulemaking effort is limited to several discrete factors including aerodynamics, rolling resistance, and weight. As EPA and NHTSA well know, aerodynamic factors can have a relatively small impact at low urban speeds and 'stop and go' traffic. EPA and NHTSA have also not fully addressed some significant factors in the GEM, like non-hybrid transmissions, which can have a far greater impact on FE and GHG emissions than discrete aerodynamic technology. Thus, it is impossible to state EPA and NHTSA have addressed the 'largest' emission factors affecting the FE and GHG emissions of MD/HD vehicles in the GEM. [EPA-HQ-OAR-2010-0162-2735.1, p.11]

At minimum, both EPA and NHTSA should make available additional information on the GEM when any updates are completed and afford an opportunity for public notice and comment on all but the most minor, administrative items contained in the model. Such an approach is not only required by the Clean Air Act (CAA), but is also supported by several policy statements concerning the transparency of the rulemaking process. More importantly, in order to serve as a basis for this proposed rule, the GEM must be improved to reflect a more accurate estimation of FE and GHG performance. The current GEM is overly simplified and provides an insufficient basis and support for the resulting regulatory standards. [EPA-HQ-OAR-2010-0162-2735.1, pp.11-12]

The GEM provides an intrinsic part of this proposed rule. While EPA and NHTSA may seek to improve the operation of the model and improve the regulatory program in this proposed rule, the Agencies cannot rely on a model which is subject to change and thereby not subject to full public notice and comment. EPA and NHTSA should therefore provide an additional period of notice and comment for this proposed rule based on changes to the GEM model made between November 30, 2010 and January 31, 2011, as well as any significant changes made to the model thereafter. [EPA-HQ-OAR-2010-0162-2735.1, p.19]

At minimum, EPA and NHTSA must make a complete GEM model available to the public and allow a sufficient amount of time for comment on the model and its utilization within the proposed rule. The GEM model is an integral part of both the compliance mechanism in this proposed rule as well as the EPA and NHTSA assessment of the stringency of the proposed regulations and, by extension, the compliance of the proposed rule with the statutory authorities sought to be implemented by both Agencies. Given its central relevance to the proposed rule, EPA and NHTSA must allow public comment on the completed model as well as its utilization in deriving the proposed rules. [EPA-HQ-OAR-2010-0162-2735.1, p.19]

Response:

The agencies fully recognize the importance of the total vehicle and power train system including transmission to overall vehicle GHG emissions and fuel economy. At the same time, the agencies also realize that this new GHG rule is the first ever rule, covering a large number of vehicle applications with many variables. Therefore, the agencies took a careful and relatively simple step in the rule in lieu of involving all vehicle components and all detailed applications. As a result, the agencies only focus on a few key parameters, such as aerodynamics, rolling resistance, weight reduction, and extended idle reduction for the first rules. All other parameters or components, such as transmissions, are predefined for the reasons laid out in preamble Section II. Once gaining extensive experience from this first ever rulemaking, the agencies would seriously consider a more complex rule covering additional vehicle components in a future rulemaking. Technologies, such as advanced transmission, may be considered in the innovative technology provisions.

Regarding the commenter's concerns about changes to the model between our proposal in November and our final action, we should be clear that the model being finalized today differs little in structure and purpose from proposal. The changes that have been made were in response to comments raised on the NPRM version of the model. The agencies thus believe that all changes to the GEM between proposal and final rule are logical outgrowths of the proposal. We do not believe that it will be necessary to iterate yet again on the GEM model for this first phase of the program given the extensive testing the model has now undergone. In any case, any change to the model would require rulemaking (since the model is part of the rule), and this would afford robust opportunities for public comment.

The GEM has been extensively validated and benchmarked against various testing data as well as other well known vehicle model since the GEM was first released to public, as described in RIA Chapter 4.

Organization: ArvinMeritor, Inc.

Validation of chassis systems is accomplished through simulation (use of the EPA's GEM program) rather than through chassis dynamometer testing. The agencies recognized early on that the number of chassis dynamometers available nationally was very limited, and that such testing was both time consuming and expensive. In view of these obstacles, the simulation approach was selected as practical yet meaningful. (Engines will still be subject to the type of engine dynamometer testing conducted in recent years for certification of emission levels.) [EPA-HQ-OAR-2010-0162-1605.1, p.2]

The agencies' motivation to keep the GEM simulation program simple, and to limit the number of input parameters, is well understood. Such an approach makes implementation of regulations in a compressed time frame achievable. Unfortunately, the approach also fails to take into account a number of vehicle systems and technologies that play heavily into the fuel efficiency/emissions equation. [EPA-HQ-OAR-2010-0162-1605.1, p.3]

Axle Type (Single vs. Tandem, "live" tandem with two axles driving vs. "tag" tandem, with one drive axle and one non-driving axle) - Single driving axles are typically more efficient than a "live" tandem, which has two driving axles. Collectively, the two axles of the "live" tandem have more gearing-related efficiency losses and oil churning losses. The majority of highway tractors in service today use a "live" tandem; this configuration is called a "6 X 4" (indicating 6 wheels on the tractor, four of which are driving). Some tractors utilize one driving axle and one non-driving axle, the latter only providing a load carrying function. This "6 X 2" configuration is 1 to 2 percent more efficient than a 6 X 4, although tractive capabilities are inferior. The higher efficiency of the 6 X 2 translates into fuel efficiency improvement. Consideration of the axle type would allow the GEM simulation program to more accurately calculate drivetrain parasitic losses. [EPA-HQ-OAR-2010-0162-1605.1, p.4]

Efficiencies of Drivetrain Components – As noted above, axle efficiencies can vary significantly depending on manufacturer and configuration, which factors directly into the fuel-efficiency calculation. Similarly there are efficiency differences in transmissions depending on the basic architecture, and whether its top gear position is "direct" (no gears transmitting torque), or "overdrive" (torque transmitted through overdrive gearset, which contributes to parasitic loss). Rather than assuming a generic single value for drivetrain efficiency, ArvinMeritor believes that individual component efficiencies, specific to a configuration and model family, should be included as input parameters to the simulation program. [EPA-HQ-OAR-2010-0162-1605.1, p.4]

Transmission type (manual, automatic, automated mechanical) and number of speeds – The transmission plays a key role in determining the engine rpm during vehicle "cruise" operation, which is a significant factor in fuel economy. Automated mechanical transmissions have been shown to improve fuel economy by controlling engine rpm in a more consistent fashion than the typical driver can when using a manual transmission. Incorporating the details of the transmission into the simulation program could provide a means for quantifying benefits of particular transmission configurations. [EPA-HQ-OAR-2010-0162-1605.1, pp.3-4]

Including drivetrain component efficiencies in the GEM program may become even more important in the future, as suppliers bring to market high efficiency components and systems. One such example is "high efficiency axle" technology. Parasitic losses in the drive axle of commercial vehicles range from 4 to 7 percent. Through development of advanced mechanical systems and/or the application of electronic controls, these parasitic losses can be significantly reduced, perhaps by over 50 percent. The resulting improvement in overall drivetrain efficiency results in attractive fuel efficiency increases, estimated at 2 to 3 percent. Development and commercialization of these technologies promises to deliver meaningful improvements in GHG emissions and fuel consumption during the regulatory period of these proposed rules. [EPA-HQ-OAR-2010-0162-1605.1, p.4]

Inclusion of Actual OEM Engine into GEM Simulation Program – For these Phase 1 regulations, the agencies have chosen to keep the engine certification process separate from the vehicle simulation process. To facilitate this “separation,” the GEM simulation program uses a “generic” engine assumed to meet the proposed regulatory limits for engines. By not using OEM-specified engines, the approach seemingly prevents an OEM that has “overachieved” on the engine regulations from making fewer improvements to the vehicle chassis and body. While the rationale for this approach is understood, this seems to result in a less accurate simulation of the actual vehicle, and runs counter to the generally held benefit of looking at the complete vehicle system (including the engine), rather than a more fragmented approach. ArvinMeritor supports a change to the GEM simulation program that would allow use of the actual engine data for the engine model to be used in a particular vehicle. In addition, it is not illogical to allow an OEM that has overperformed on the engine side to obtain some relief on the amount of improvement required for the rest of the vehicle. [EPA-HQ-OAR-2010-0162-1605.1, p.6]

Area 3 “Phase 2” (post-2017) Regulations It is recognized that neither EPA nor NHTSA consider the currently proposed regulations “optimal.” As stated in the proposed regulations, some compromises were made in order to generate a workable, practical regulation that could be implemented in a relatively short time frame. There appear to be opportunities for improvement in the next wave of regulations. ArvinMeritor offers the following comments:

The GEM simulation program that serves as the basis of vehicle certification considers the contribution of only a limited number of specific systems or technologies and does not consider any “synergistic” benefits of combining the technologies. ArvinMeritor recommends that the next wave of regulations take a more “holistic” view of the vehicle. Some means to achieve this:

o Accommodate far more input parameters, including all major systems that affect fuel economy and emissions.

o Utilize the OEM-specified engines and their operating characteristics for the simulation, rather than the “generic” engine that is being utilized for the current regulations.

o Enhance the overall capability of the simulation program to consider the technology synergies. (Example: the synergistic benefit of a high-efficiency diesel and a hybrid system tuned to maximize efficiency of the complete system.) [EPA-HQ-OAR-2010-0162-1605.1, p.9]

Response:

As discussed in preamble Section II, the agencies are predefining the drivetrain components, including the axle, in the GEM. The agencies’ assessment of the current vehicle configuration process at the truck dealer's level is that the truck companies provide tools to specify the proper drivetrain matched to the buyer's specific circumstances. These dealer tools allow a significant amount of customization for drive cycle and payload to provide the best specification for each individual customer. The agencies are not seeking to disrupt this process. Optimal drivetrain selection is dependent on the engine, drive cycle (including vehicle speed and road grade), and payload. Each combination of engine, drive cycle, and payload has a single optimal transmission and final drive ratio.

The agencies proposed and are adopting an approach which requires improvements in fuel consumption and GHG emissions from both the engine and the vehicle. To achieve this goal, the agencies are requiring a specific level of reduction from the engine demonstrated on an engine dynamometer test and an additional level of reduction from the vehicle with compliance measured using the GEM. As discussed in the preamble Section IV, the agencies are not allowing most credits (ABT, innovative, and early credits) to flow between HD engines and vehicles. Thus, the GEM must contain predefined engine fuel maps to keep the reductions relative to the specific category – engines or vehicles.

All suggestions made by this commenter are constructive and helpful. The agencies will take all these suggestions into consideration for the next wave of regulation.

Organization: California Air Resources Board (ARB)

It is unclear to ARB staff how the agencies will ensure class 7 and 8 tractor tire replacements will continue to meet the steer tire rolling resistance and drive tire rolling resistance simulation input values entered into the GEM model for a particular HD tractor model. As a result, ARB staff recommends that the tire efficiency requirements should be decoupled from the class 7 and 8 tractor chassis standards. Further, ARB staff believes it is more appropriate that tire efficiency be regulated at the tire-manufacturer/retread facility level by establishing appropriate rolling-resistance standards for class 7 and 8 tractor tires. [EPA-HQ-OAR-2010-0162-2354.1, pp. 3-4]

OEM tires are not permanent fixtures on a tractor throughout the tractor's useful life. In the proposal, the agencies acknowledge that tires do not last as long as the tractors themselves and are often retreaded or replaced. For example, steer tires on a highway tractor might need replacement after 75,000 to 150,000 miles. Drive tires might need retreading or replacement after 150,000 to 300,000. The useful life of a class 7 tractor is proposed to be 10 years/185,000 miles. For a class 8 tractor, the useful life is proposed to be 10 years /435,000 miles, and these mileage values are considerably less than the actual lifetime mileage of these trucks. The simulation inputs for the GEM model require the tractor chassis OEM to enter values for coefficient of drag, vehicle speed limiter, vehicle weight reduction, extended idle reduction, steer tire rolling resistance, and drive tire rolling resistance. However, since tires will likely be replaced at the discretion of the tractor owner during the life of the tractor, there is no mechanism to insure that the rolling resistance of the replacement or retreaded tire will be the same as the OEM tire. [EPA-HQ-OAR-2010-0162-2354.1, p. 4]

As a result, ARB staff is recommending that the agencies remove tire rolling resistance as an input in the GEM, and instead establish low-rolling resistance certification standards for tires that must be met by all tire manufacturers and retread facilities. This approach would provide assurance to the agencies that all retread or replacement tires are meeting minimum low-rolling resistance requirements as defined by the agencies. In addition, ARB staff recommends that the agencies require that the tractor's owner's manual identify the minimum low-rolling resistance tire certification standards that should be met by retread or replacement tires. [EPA-HQ-OAR-2010-0162-2354.1, p. 4]

Response:

The agencies respectfully disagree with the ARB's recommendation on removing the tire rolling resistance as an input in the GEM. The agencies believe that the appropriate regulated entity for the vehicle requirements is the tractor manufacturer or the vocational vehicle chassis manufacturer. At this time, we are not prepared to set a maximum rolling resistance value for all tires implemented at the tire OEM level. Our current approach allows vehicle manufacturers to use the ABT provisions of the rule to weigh and appropriately make engineering tradeoffs among tire rolling resistance and other elements of vehicle design in order to achieve our environmental and energy security goals. We believe this approach provides needed flexibility to ensure that the truck OEM has full control of the overall vehicle dynamics and is able to continue as they do today to manage all aspects of that performance including safety.

As the commenter notes, tires are likely to be replaced during the life of a vehicle and today's final action does not include an absolute requirement that tires providing equal or better rolling resistance will be used for replacement. The rule does include provisions to recommend that owners take such actions, and we fully expect this regulation will lead to an across the board reduction in the rolling resistance of new and replacement tires. We believe that as LRR tires become more common on new equipment, the aftermarket prices of these tires will also decrease. Along with decreasing tire prices, the fuel savings realized through use of LRR tires will ideally provide enough incentive for owner/operators to continue purchasing these tires.

Organization: Daimler Trucks North America

The ability of a manufacturer to use its actual fuel map would provide further incentive for improving engine efficiency than is provided in the Agencies' current rule. The GEM model can easily accept these inputs, and manufacturers can establish a common practice for measuring fuel maps with the reliability and accuracy necessary for a regulatory program. Our findings are that, although many of the GEM runs are reasonably accurate relative to a run using GEM with a real engine, there are some drive cycles on which GEM has a margin of error approximately as large as the change in g CO_2 / ton-mile that the Agencies seek (e.g., 3%, which is the same as the change between 2014 and 2017 vehicle standards). In other words, if the Agencies left to manufacturers the decision whether to invest in vehicle or engine technologies in order to meet advancing standards, a manufacturer such as DTNA might make a decision different than what the Agencies predetermine. Yet that manufacturer's choice could be shown through GEM to meet the standards. In turn, we strongly recommend incorporating real fuel maps into GEM, thereby allowing manufacturers to choose the most cost-effective manner to meet upcoming standards. [EPA-HQ-OAR-2010-0162-1818.1, p.88]

[See p.88 of this comment for a table showing GEM - Matlab Results]

The primary justifications for using a typical engine in GEM are that (1) there is a separate engine certification procedure (Re. 75 Fed. Reg. 74162) and (2) that "If the Agencies did not standardize the fuel map, then a tractor that uses an engine with emissions and fuel consumption better than the standards would require fewer vehicle reductions than those technically feasible reductions being proposed" (Re. 75 Fed. Reg. 74187). Reason (1) is circular logic: the real engine fuel map is not included in GEM because the engine is regulated separately from the vehicle. Of course, if the real engine fuel map were included in GEM, the engine would not need to be regulated separately. Reason (2) is quizzical: the Agencies fail to clarify why it is problematic that a manufacturer could achieve a net emission reduction and fuel savings in one way but not in another. Moreover, reason (2) is counter to the EPA's technology neutral policy, a longstanding policy that allows manufacturers to find the most cost-effective emission reductions. Under the Agencies' current proposed rule, regulations would prohibit some cost-optimization, instead requiring a potentially suboptimal expenditure on the engine when savings could more cheaply be obtained on the vehicle. A better long-term solution than what the Agencies propose is to allow manufacturers to override the preselected engine fuel map in GEM with an actual engine fuel map. We believe that we can work with the Agencies to develop procedures for getting verifiable engine fuel maps and for making sure that engine improvements do not get double credits (i.e., do not get counted on both the engine and vehicle). Such a solution would further encourage full systems approaches to fuel savings and CO_2 reductions, further encouraging development of advanced, more efficient powertrains. Moreover, such a solution would allow manufacturers to invest in the most cost-effective CO_2 reductions and fuel savings, rather than forcing separate engine and vehicle developments that, by themselves, may not be the most cost-effective. [EPA-HQ-OAR-2010-0162-1818.1, pp.88-89]

On page 75 Fed. Reg. 74185, the Agencies request comment on the defined GEM model inputs. In much the same way that the Agencies allow manufacturers to take credit for innovative technologies through innovative technology testing, the Agencies should allow manufacturers to show, through bench tests, improvements in components like transmissions or axles. The results of these tests would have to be certified by the Agencies but, afterward, could be used as inputs to GEM (in lieu of the Agencies' preselected values) such that a manufacturer could more easily demonstrated improved efficiency. In turn, the Agencies' allowing manufacturers to more easily demonstrate and get credit from such improvements will stimulate such improvements and enhance the Agencies' program. Such a suggestion may not be possible in the short timeframe between now and when manufacturers must certify MY 2013 or 2014 vehicles, but it can be developed in Phase 2 of the program. Moreover, it should be developed as the Agencies move toward more stringent standards, which manufacturers will likely meet in manners other than can be addressed through GEM in its current state. [EPA-HQ-OAR-2010-0162-1818.1, p.89]

GEM would be further strengthened if a manufacturer could take credit for fuel saving control strategies like strategies that constrain throttle position (e.g., predictive vehicle management technologies) and shifting (e.g., AMT controls). GEM can be expanded to contain these features, and in turn for these features the provisions like that in 40 CFR §86.1866-12(d) are not necessary. Moreover, because 40 CFR §86.1866-12(d) provisions are subject to “EPA approval” (quoting the regulation), the provisions leave to Agency discretion whether a manufacturer’s fuel saving technology will factor into the manufacturer’s CO2 credit balance. In turn, the regulations leave room for arbitrariness that could be removed through use of GEM. Moreover still, a manufacturer can only qualify for the 40 CFR §86.1866-12(d) provisions if the test cycles are inadequate to demonstrate the fuel saving technology; the Agencies create no provision for getting CO2 credits for technologies that can be demonstrated on the test cycles. GEM precludes such demonstration and it need not do so. GEM could prove technologies in the robust, verifiable manner that is comparable to in-use operation that the EPA requires in 40 CFR §86.1866-12(d). [EPA-HQ-OAR-2010-0162-1818.1, p.89]

Similarly, because GEM standardizes engine loads, there is no way in GEM to show effectiveness of engine or vehicle designs that inherently save fuel, like cooling systems optimized for reduced fan-on time, or predictive engine management technologies. Manufacturers should get credit for such fuel-saving yet resource-intensive technologies in order to incentivize them in the future. [EPA-HQ-OAR-2010-0162-1818.1, pp.89-90]

As noted elsewhere in these comments and in the comments of many others, there are problems with GEM that must be resolved. For example, the Agencies say that the only difference between the 2014 and 2017 standards are the engine fuel maps, while 'there is no change in stringency of the tractor vehicle (not including the engine) and there is stability in the tractor vehicle (not including engine) standards for the full rulemaking period.' (75 Fed. Reg. 74187.) This is not borne out by the model. Taking an example vehicle with Cd = 0.55 and with idle reduction technologies and with the agencies' baseline tires, running it through the model for both 2014 and 2017 standards shows that the vehicle complies in 2014 (with a 72.84 g CO2 / ton-mile) but not in 2017 (with a 71.55 g CO2 / ton-mile, which rounds to 72 g CO2 / ton-mile). The output for MY2017, which should decrease by the same amount as the reduced engine standard (since the stringency change is for the engine only), does not decrease in that manner. This is true for a number of technology groupings. Below are examples of this inconsistency, which should not be considered as an all-inclusive list of GEM’s potential problems: [EPA-HQ-OAR-2010-0162-1818.1, p.90]

[See p.91 of this comment for a table showing inconsistencies in the GEM model]

This and other GEM problems is likely the result of the mathematical nonlinearity of the GEM model which makes it extremely difficult to change one parameter (the engine fuel map for example) yet have all other results decrease by the same number of g CO_2 / tonmile. We do not have a proposed solution for the GEM problems but they must be addressed before the rule is finalized. [EPA-HQ-OAR-2010-0162-1818.1, p.91]

On 75 Fed. Reg. 74219, the Agencies describe how they took fleet penetration rates in (for example) Cd's, calculated fleet-averaged Cd's and other parameters, then used the GEM results from this aggregate vehicle for fleet-averaged calculations. This may be close to accurate, or it may not, due to GEM's nonlinearity with respect to the various input parameters. The proper way to calculate the baseline or fleet average using a nonlinear model like GEM is not to take as inputs a linear average of fleet Cd's and a linear average of tire rolling resistances. Rather, the proper way is to calculate the fuel consumption and CO_2 emissions from a variety of vehicles representing the various segments of the fleet and to weight their fuel consumption and CO_2 emissions according to their percentage of the fleet. We recommend that the agencies recheck the validity of their numbers. [EPA-HQ-OAR-2010-0162-1818.1, p.91]

"EPA and NHTSA request comments on the magnitude and need for an in-use adjustment factor for the engine standard and the compliance model (GEM) based tractor standard." (Re. 75 Fed. Reg. 74179.) Adjustment factors for in-use GEM analysis make no sense in the context of the present regulatory program. First, the Agencies' proposed certification program involves GEM modeling, so manufacturers certify only their GEM results. Manufacturers cannot be held to any standard other than a GEM result and Daimler strongly objects to any sort of in-use vehicle testing other than the given modeling approach, as there has been no attempt to nor would there be any way of validating in-use GHG emissions against the GEM model results for the wide range of vehicles the Agencies propose to regulate. That the Agencies have found correlation in limited testing of a few vehicles is insufficient to demonstrate that GEM results can be translated to in-use results across the range of vehicles in question. Second, the Agencies have not proposed sufficient details of an in-use program to enable Daimler to understand how the program would be run, much less to enable us to comment on what is an appropriate in-use adjustment factor for such a program. We need many more of the general details before we can comment on the specifics. [EPA-HQ-OAR-2010-0162-1818.1, p.92]

Response:

For this first phase of regulation, the agencies have decided to regulate engines and vehicles separately except for heavy-duty pickups and vans. We believe this separate regulation of engines and vehicles is the most appropriate way to achieve the near term reductions sought in this first phase program without introducing substantial new testing burden (even assuming that whole vehicle test procedures for combination tractors and vocational vehicles could be developed in the timeframe of this action). We agree that in the future it may be desirable to include a complete vehicle standard for combination tractors and other vocational vehicles using a complete chassis test procedure or a more fully integrated vehicle model. At that point, it would be necessary to use a fuel map specific to the engine installed in the vehicle being tested. However, given our separate regulation of engines and vehicles in this first phase of the regulation, such an approach would inappropriately double count emission reductions from engine improvements first in showing compliance with the engine standard and then again in the truck model. To prevent such double counting, the GEM model uses a fixed engine map.

The agencies are adopting provisions for innovative technology credits in the final rulemaking which may credit manufacturers for installing technologies such as those mentioned by the commenter like predictive vehicle management.

The agencies agree with the comment that there does not exist a reason to include an in-use adjustment factor for the HD tractor and vocational vehicle CO_2 emissions results. The agencies are assigning a CO_2 deterioration factor of zero to the CO_2 emissions results from the GEM.

The agencies have revised the approach to be used by manufacturers to determine the Cd input to the GEM, as described in the preamble Section II. The agencies are adopting an approach where the aerodynamic bins are determined from the drag force (Cd*A) test results. Therefore, the issue raised by the commenter relative to frontal areas has been resolved. .

The agencies recognize the issues associated with inconsistency in the proposal between the 2014 and 2017 model year engine and vehicle improvements. The corrections have been made in the applicable 2014 and 2017 model year engine fuel maps. However, it should be pointed out that it is impossible to make the engine and vehicle have identical reduction rate between 2014 and 2017 models. This is because vehicle operation in certification mainly runs in the range between low to medium loads, while engine certification runs in 25% loads or higher for tractor truck engines, and almost everywhere in the FTP cycle for vocational truck engines. Engine related technology availability would not be evenly distributed across the engine fuel map beyond 2014 model year.

As far as nonlinearity of the GEM to inputs parameters, such as aerodynamic drag and rolling resistance, is concerned, studies show that the vehicle behavior follows a close-to linear relationship between those input parameters and weighted CO_2 reduction. The agencies have provided charts in RIA Chapter 2 showing the linear trend of the GEM inputs relative to the weighted CO_2 emissions results from the GEM. Nonlinearity is fairly weak in the range of variation of those input parameters. Therefore, it is acceptable for the GEM to take as inputs a linear average of fleet Cd's and a linear average of tire rolling resistances.

Organization: International Council on Clean Transportation (ICCT)

The agencies have developed a MATLAB/Simulink-based software program called the Greenhouse gas Emissions Model (GEM) to evaluate fuel use and CO2 emissions through the simulation of whole-vehicle operation, which is consistent with NAS panel recommendation. This model will be used to certify vehicle compliance with GHG and fuel consumption standards, based on model inputs specific to each vehicle. Conceptually, GEM is similar to many models that have been developed by other research institutions and commercial entities in that it uses various inputs to characterize a vehicle's properties (weight, aerodynamics, and rolling resistance) and predicts how the vehicle would behave on a second-by-second basis when following a specific drive cycle. [EPA-HQ-OAR-2010-0162-1945.1, p.17]

The inputs in the GEM are associated with many features of the vehicle that have a (sic) strongest impact on fuel consumption and CO2 emissions. One potential shortfall of the software is that the GEM does not currently credit any gains that may be achieved in the driveline system. While, presumably, many of the improvements in engine technology will be motivated by the distinct engine regulation, no credit would be given to advances in transmission efficiency or better synergy between the engine and transmission. 8 For tractors, manufacturers would provide five modeling inputs: 1) coefficient of drag, 2) coefficient of rolling resistance for both steer and drive tires, 3) weight reduction, 4) extended idle reduction technology, and 5) vehicle speed limiter. [EPA-HQ-OAR-2010-0162-1945.1, p.17]

Response:

The agencies discussed in the proposal that our assessment of the current vehicle ordering process at the dealer level provided the tools necessary for buyers to select the most optimum drivetrain configuration for their specific circumstance (75 FR at 74187). The agencies continue to believe that this is true and that the potential exists for unintended consequences if the agencies did not specify the drivetrain configuration in the GEM, of driving all vehicle configurations to a single drivetrain specification which is optimum on the drive cycles and payloads used to demonstrate compliance.

Organization: Natural Resources Defense Council (NRDC)

To provide a clearer picture of the role of technology advancements and actual on-road performance, final vehicle manufacturers should be required to report actual vehicle technology configurations to EPA and those configurations should be made public. [EPA-HQ-OAR-2010-0162-1776.1, p.8]

The GEM model documentation describes a set of parameters used by the GEM model to calculate emissions. Tables 2 and 3 list model input parameters assumed by EPA for the purpose of determining compliance. For example, EPA specifies transmission characteristic and as a default, EPA assigns the same transmission specifications for all class 8 tractors (see Table 2). In real world applications, however, transmission configurations can vary significantly. Running GEM with only the default input parameters prevents the model from projecting emissions and fuel consumption reductions from more advanced or specialized transmission configurations.

EPA should provide manufacturers with the list of input parameters, covering at a minimum the parameters of Tables 2 and 3, and a form for efficient data submittal and public use. [EPA-HQ-OAR-2010-0162-1776.1, p.8]

EPA should publish runs of the GEM model using the actual data inputs to show the difference between real-world configured trucks and the truck certification configurations with default GEM inputs. [EPA-HQ-OAR-2010-0162-1776.1, p.8]

Response:

The GEM output file will report actual specifications for vehicle configuration sold. However, the inputs used for GEM will use standardized parameters except those inputs required for use to input through the GEM graphic user interface (GUI).

The agencies fully recognize the importance of the transmission contributions to overall vehicle performance. However, due to the nature of the first ever rulemaking, the agencies decided to only include the most significant parameters associated with vehicle greenhouse gas emissions reductions. Taking a combination tractor as an example, it includes aerodynamic drag, rolling resistance, weight reduction, speed limit, and extended idle reduction. Because the GEM's purpose is to quantify the relative effectiveness of a limited suite of technologies and not the absolute GHG emissions or fuel consumption of whole trucks, we believe that it is more important at this time to develop the base model architecture validated to ensure that a relative effectiveness comparison of technologies is quantifiable, even if the absolute emissions may have some error due to items like modeling the aspects mentioned by the commenter such as different transmissions. Transmission improvements are not part of the technology package on which the combination tractor (or vocational vehicle) standard is predicated and are not input to the GEM, but transmission improvements could be evaluated as an innovative credit and thus utilized for demonstrating compliance on that basis.

Regarding the comments to use the GEM with actual vehicle inputs to evaluate overall engine and vehicle performance or to validate the GEM itself, such evaluations can be done using the freely available Matlab/Simulink version of the GEM. We would encourage stakeholders to do so, and we fully intend to continue such studies as we work on future regulatory actions. We are not however, requiring OEMs to do such studies in this final action due to the extra test burden that would be required to develop the engine maps and the other vehicle model inputs. Absent a standard using this information, we do not believe mandating such testing only for informational purposes would be appropriate. We would note that tractor and engine OEMs typically already provide more specific tools for this purpose to their customers and the use of the GEM for this purpose would be at best duplicative.

Organization: Truck Renting and Leasing Association (TRALA)

Heavy-duty vehicle simulation is extremely useful but complex. Attributes such as shift time, clutch profile, controller, shift schedule, and LU schedule are important. Transients, turbo lag, lug-up curve (torque converter match) are critical to accuracy. Moreover, correct simulation parameters are vocation dependent. [EPA-HQ-OAR-2010-0162-1816.1, p.5]

Unfortunately, we understand that aspects of the GEM are incomplete, inaccurate, or both. GEM outputs showing times to reach 55 and 65 MPH are not representative of actual vehicle performance, for example. [EPA-HQ-OAR-2010-0162-1816.1, p.5]

For these and other reasons, TRALA believes that it is critical for EPA and NHTSA to continue to work closely with industry to ensure that the GEM is complete and accurate. The agencies should continue to revise and update GEM through a transparent, public process that allows sufficient time for interested party input. Issues with respect to GEM may be significant enough that it would be appropriate for the agencies to subsequently publish a supplemental notice of proposed rulemaking - but only if doing so would not run afoul of manufacturers' legitimate concerns regarding Clean Air Act lead-time requirements. [EPA-HQ-OAR-2010-0162-1816.1, p.5]

Response:

The agencies fully recognize the importance of all attributes to overall vehicle performance mentioned by TRALA. However, due to the nature of the first ever rulemaking, the agencies have chosen to include the most important parameters associated with vehicle greenhouse gas reduction. Taking a combination tractor as an example, it includes aerodynamic drag, rolling resistance, weight reduction, speed limit, and extended idle reduction. All attributes mentioned by TRALA will not be part of the GEM inputs. Furthermore, as explained in other responses, because the GEM's purpose is to quantify the relative effectiveness of a limited suite of technologies and not the absolute GHG emissions or fuel consumption of whole trucks, we believe that it is more important at this time to develop the base model architecture validated to ensure that a relative effectiveness comparison of technologies is quantifiable,. Specifying values for the parameters s mentioned by the commenter, such as shift time, clutch profile, controller, shift schedule, turbo lag, allows for the comparison needed to measure relative performance (i.e. performance relative to a set baseline) of the technologies which GEM actually evaluates..

The CO_2 emissions from the 55 and 65 MPH cruise cycles only consider the emissions during the portion at the cruise speed, and therefore, the time required to reach 55 or 65 MPH is not relevant to the certification.

As indicated in the response to EMA/TMA above, the agencies appreciate the comments suggesting a multi step iterative approach to GEM development and model releases. However, we do not believe such an approach would be the most effective way to work with the regulated community nor do we believe that such an approach could be easily integrated with the general administrative procedures defined under the Clean Air Act. Instead, we believe the current notice and comment approach is the most appropriate way for the Agency to solicit helpful input on the GEM model in an organized manner. As illustrated throughout this section, EPA has used this input to improve the GEM model that will serve as a basis for compliance in our final action. We do not believe that it will be necessary to iterate yet again on the GEM model for this first phase of the program given the extensive testing the model has now undergone. Post-rule changes to the model would be effectuated through rulemaking, since the GEM is part of the final rule.

Organization: Waste Management

Waste Management commends the Agencies' goals of setting performance standards that recognize diverse fleets, while still maintaining a streamlined certification program. Towards that end, the Agencies selected a single set of parameters for the GEM model representing the vocational heavy, heavy-duty class 8 vehicles. Because of the multiplicity of vehicles within this class of vocational truck, we are concerned that one set of parameters will not adequately reflect the very divergent characteristics of this class. We recommend EPA make changes to the GEM modeling parameters to more accurately reflect the average refuse truck. [EPA-HQ-OAR-2010-0162-1854.1, p.5]

Inserted in Table 3 [See p.5 of this comment summary for Table 3: Vocational Vehicle Modeling Input Parameters] (extracted from the EPA's Greenhouse gas Emissions Model (GEM) User Guide) below for selected parameters are WM recommended values for an average refuse vehicle. They are significantly different than the parameters EPA assumes for its GEM model. [EPA-HQ-OAR-2010-0162-1854.1, p.5]

Response:

The agencies fully realize the complications of vocational vehicle sector. That is one of the reasons why the agencies only include the tire rolling resistance as the key input for the GEM for the sake of simplicity, while keeping all others as standard components or attributes. Furthermore, certification will be only conducted in a relative basis to the defined baseline 2010 model year vehicle configuration. This way, to a large extend, the agencies can eliminate uncertainty of a large vehicle-to-vehicle variation in vocational vehicle sector.

The agencies did reconsider the payload and curb weights used in the proposal based on the comments received relative to heavy heavy-duty vocational vehicles. For the final rulemaking, the agencies reduced both the curb weight and payload of the HHD vocational vehicles, as described in preamble Section II.D.2.c.iii.

8. Test Procedures

<u>Organizations Included in this Section:</u>

Union of Concerned Scientists
Engine Manufacturers and Truck Manufacturers Associations
American Council for Energy-Efficient Economy
Eaton Corporation
CALSTART
Natural Resources Defense Council

Organization: Engine Manufacturers and Truck Manufacturers Associations

Additionally, the Proposed GHG/FE Standards do not include any provisions to account for the 'background' levels of CO2 that exist in -- and cannot be removed from -- the ambient air that engines 'ingest' during certification testing. The Agencies should modify the proposed engine test procedures to include provisions for removing from the engine emission test results the 'background' CO2. [EPA-HQ-OAR-2010-0162-1940.1, p.13]

The Associations have additional concerns about the accuracy, variability and test-to-test correlation of CO2 measurement, and therefore encourage the Agencies to consider potential alternative methods. However, in considering alternatives, the Agencies should focus on providing a single new metric rather than any optional alternative. Toward that end, one possible method that the Agencies should consider is measuring the amount of fuel consumed by the engine and converting that measure into CO2 based on the test fuel properties. [EPA-HQ-OAR-2010-0162-1940.1, p.13]

The Associations also note that proposed §1036.501(f) (which also is referenced in §86.1362-2010(f)) calls for manufacturers to use continuous sampling, and, as a component of that sampling, to apply 'good engineering judgment' to sample emissions at each test mode over the ramped-modal cycle. (See 75 FR at 74371.) The requirement for modal emission sampling is overly-burdensome and unnecessary, and furthermore 'good engineering judgment' is not detailed enough to ensure consistent measurement across the industry. Therefore, the Agencies should withdraw the requirement for modal emissions sampling. [EPA-HQ-OAR-2010-0162-1940.1, p.13]

Organization: ACEEE, Eaton Corporation, CALSTART, NRDC, and UCS

Specifically, we support the further development of test procedures, including powertrain, chassis and hardware in the loop simulation, to capture the benefits of advanced and innovative technologies under the program. This is particularly important for the vocational vehicle segment since the proposed compliance certification only captures improvements in engines and tire rolling resistance. Other technologies, such as hybrid power systems, advanced transmissions, as well as engine off PTO operation, have the potential to offer significant fuel savings and greenhouse gas reductions in the vocational segment over the timeframe of the standards. The test procedures should be designed to capture the benefits of these important technologies. The standards should also provide a clear and consistent process for evaluating and crediting fuel efficiency technologies. [EPA-HQ-OAR-2010-0162-1941.1, p.1]

Response:

The agencies agree with the commenter that it is important to incentivize the introduction of advanced and innovative technologies which could reduce greenhouse gas emissions and improve fuel consumption. For that reason, with today's action the agencies are allowing for multiple options to fairly assess the performance of certain advanced technologies. Hybrid vehicle and engine systems may be certified using one of three methods discussed in the original notice of proposed rulemaking. The three options include pre-transmission powerpack certification, post-transmission powerpack certification, and complete vehicle chassis certification. To demonstrate the benefit of the hybrid system, the test protocol has been refined to address the comparability of results between methods, as well as to more accurately reflect the benefit associated with use of the hybrid. For post-transmission and chassis based testing, a comparison with a baseline defined based on the market for the specific vehicle under consideration allows for an improvement factor to be developed to assess the actual improvement versus the traditionally produced vehicle. We have provided additional details regarding control system performance during the test to address test to test repeatability and general reproducibility of the test results. The pre-transmission option for engines equipped with hybrid system will allow those companies that have an engine with a directly coupled hybrid system to quantify performance benefits. Credits generated using any of these options will be fungible beyond the regulatory subcategory in which they were generated within constraints that prevent market disruptions. Additionally, these credits will have a value of 1.5 times the initial value of the credit. With these incentives, options, and appropriate constraints, the agencies feel this provision appropriately incentivizes the introduction of advanced technologies, such as hybrids, without the risk of market disruptions. In addition to advanced technology credits for hybrids, Rankine cycle engines, fuel cell vehicles, and all electric vehicles may also receive advanced technology credits. For those technologies which may generate a GHG emission and fuel consumption performance benefit for which existing test procedures do not currently capture, manufacturers may certify those technologies as innovative technologies. There may also be innovative technologies that are also advanced technologies. Such technologies may obtain advanced technology credit upon completion of the appropriate review and scrutiny, along with public review and comment.

Organization: American Automotive Policy Council

AAPC has a number of concerns with proposed changes to measurement methods and test procedure requirements in Part 86 Subpart N; Part 1036; Part 1037; Part 1066; and Part 1065. While not all of these changes would affect testing required for the currently proposed HD

GHG and fuel consumption requirements, AAPC is concerned that their application to future requirements could result in significant facility impacts for manufacturers required to comply with them. Aspects of the proposed changes having an immediate impact on manufacturers certifying to the proposed GHG and fuel consumption standards are detailed below. A complete list of concerns with the proposed measurement and test procedure changes is provided in Attachment I. [EPA-HQ-OAR-2010-0162-1762.1, p.21; See p. 27 of this comment for Attachment I entitled, AAPC Comments on Proposed Measurements and Test Procedure Changes]

Response:

The agencies understand the concerns broached regarding inconsistent test procedures for vehicles traditionally tested using the same test procedure. It is the intent of these test provisions to implement consistent test procedures for sectors without significant disruption to existing test systems.

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The agencies must ensure that this first phase of the program enables them to move to a full-fledged program, and in particular a program based on integrated testing and modeling of complete vehicles, in the next phase. Doing so will enable future standards to encourage technologies that the current compliance regime cannot differentiate but can actually cut emissions and fuel consumption. This will require extensive data collection on vehicles, duty cycles, and emissions, as well as extensive work on engine and vehicle drive cycles and modeling. In the proposed rule, the agencies clearly recognize the need for a new, more sophisticated approach to vehicle testing than currently proposed to “more completely capture the complex interactions of the total vehicle and the potential to reduce fuel consumption and GHG emissions through the optimization of those interactions” (p.74172). The agencies commit to “participate in efforts to improve our ability to accurately characterize the actual in-use fuel consumption and emissions of this complex sector” (p.74156) and mention that they may “begin to develop a knowledge base enabling improvement upon this regulatory framework for model years beyond 2018” (p.74159). Given that these aspects of the first phase are crucial to the long-term efficacy of the program, the building of such a knowledge base and capabilities should be supported by data collection and reporting requirements in the rule itself. [EPA-HQ-OAR-2010-0162-1894.1, p.3]

In the proposed program, test fuel efficiency will not relate closely to real-world fuel efficiency, because the truck as tested will not be the same as the truck as sold. Possible negative consequences of this situation include 1) that truck buyers will not realize the fuel savings implied by the levels at which the trucks are certified and the overall emissions reduction promised for the program will not be achieved, and 2) that manufacturers will tailor vehicles and equipment to do well as tested, not as sold or driven. [EPA-HQ-OAR-2010-0162-1894.1, p.4]

Implementing a chassis test for all vehicles as well as a standard that reflects the full variation of truck operating characteristics will be very difficult. It is nonetheless essential that the agencies and regulated entities use the opportunity of the rule's first phase to gather information that will assist in closing the gap between compliance and real-world emissions and fuel consumption in the future. One important step toward that outcome would be to require manufacturers to report actual truck configurations, rather than the standard inputs for engine, transmission and gearing, and the fuel consumption of their vehicles as calculated by GEM using the real specifications. [EPA-HQ-OAR-2010-0162-1894.1, p.4]

Recommendation (in-use and onroad testing): Collect in-use testing and full vehicle testing data performed by manufacturers, fleets, and federal agencies. Expand agency onroad testing to validate current compliance models and encourage manufacturers and fleets to provide more data. Make data publicly available.

The agencies should collect and publicly disseminate existing vehicle performance data and data generated in future model years. Likewise, data collected through in-use testing should be used to help develop a program of complete vehicle testing and to improve the simulation model. Both simulation results and in-use testing data should be made available to the public. While data collection regarding heavy-duty vehicles already on the road is likely outside the scope of this rule, the absence of up-to-date data has proven an obstacle in developing this program. The agencies should seek to restore the Vehicle inventory and Use Survey or initiate a replacement data collection effort as soon as possible. [EPA-HQ-OAR-2010-0162-1894.1, p.5]

Response:

The agencies recognize the need for the inclusion of a broad data set for developing both the test protocols and procedures for whole vehicle testing and modeling and so the agencies will rely upon data made available to it through various in-house and manufacturer run in-use programs. To the extent data may be made available publicly, the agencies will pursue a transparent pathway to data sharing. Regarding use of the Vehicle Inventory and Use Survey, the agencies agree that the data made available through that process had a good deal of utility. At this time, updated data from that source is not available as neither NHTSA, nor EPA developed that database and funding for that data collection is no longer available.

Organization: American Council for an Energy-Efficient Economy (ACEEE), Daimler Trucks North America, Natural Resources Defense Council, Union of Concerned Scientists, Volvo Group North America

We appreciate the difficulty of establishing standards and test protocols that reflect the performance of the full vehicle as sold. At the same time, the increasing sophistication of fuel efficiency technologies will require that the program move toward full-vehicle standards to capture the full range of efficiency opportunities. Hence we urge the agencies to take these steps:

• Implement in the final rule a program to collect data, including the actual vehicle configurations sold and their performance as estimated by simulation modeling, which will provide information required to develop a full-vehicle program;

• Develop and refine vehicle test cycles that more accurately reflect actual drive cycles; and

• Develop, and make available by 2017, an alternative compliance process for vocational trucks and tractors that captures full vehicle performance over the appropriate drive cycles, using a complete integrated vehicle model, supported by selective chassis and/or on-road testing. [EPA-HQ-OAR-2010-0162-1892.1, p.1]

These steps also will allow the agencies to better demonstrate the program's fuel and emissions savings.

An effective and successful program needs to include a level playing field for manufacturers and must be based on technically sound data and methodologies. The agencies should take steps to ensure that baselines established and test methods used for compliance, whether for engines, for aerodynamic features, or for other systems, allow fair comparisons across manufacturers, test facilities, and test methods. In addition, the test procedures and certification processes for technologies not captured under the proposed engine and vehicle certification process, such as hybrid systems and other innovative and advanced technologies, must be further developed. A rigorous and clearly defined testing and compliance program is necessary to ensure vehicles and engines from all manufacturers are achieving the reductions expected. [EPA-HQ-OAR-2010-0162-1892.1, p.2]

Response:

The agencies agree with the commenters that a level playing field is essential for an effective and successful program. The agencies further agree that technically sound data and test methods for compliance for engines, aerodynamic features, and other systems. The agencies have continued to refine the test protocols for advanced technologies as a result of the comments received. An updated protocol for testing advanced technology applications, as well as updates to the duty cycles have been addressed as a result of both comments from the industry and other stakeholders, as well as additional Agency testing and data analysis.

Organization: Center for Biological Diversity

In the case of vocational vehicles in particular, the Agencies have gravely shortchanged the process. They limit performance improvements to just two types of technologies – tire resistance and engine technologies – but leave out entire categories ("[a]erodynamics technology, weight reduction, drive train improvement, and hybrid powertrains") because grappling with setting standards based on these technologies would be "difficult." While it is true that the number of different types of vocational vehicles and their manufacturers increase the complexity of this vehicle segment, these circumstances do not excuse the Agencies from requiring the use of available, feasible, and cost-effective technologies. Aerodynamics, regenerative breaking/acceleration, idling reduction, hybrid powertrains and the use of advanced materials to reduce weight could achieve tremendous additional improvements – between 20 to 50 percent fuel use reductions in the case of hybrid powertrains alone. As to hybrid powertrains, the Agencies state that their decision to exclude them as a mandatory measure – even though hybrid powertrains are already in use – is motivated by a desire not to "overestimate" the number of hybrids that are likely to be introduced into the market; instead, they propose to encourage production of hybrids through credits alone. This approach completely misperceives the Agencies' mandate: rather than applying a conservative approach, the Agencies must push for technological breakthroughs through the use of ambitious goals. The Agencies cannot simply exclude a presently available technology that delivers considerable fuel efficiency improvements because they cannot precisely estimate future market penetration or fear potentially slower uptakes. The law requires exactly the opposite approach. [17] [EPA-HQ-OAR-2010-0162-2506.1, pp.4-5]

---

[17] The Agencies estimate that a 25 percent utilization rate of hybrid powertrains in MY 2017 vocational vehicles might increase the cost per vehicle by $30,000. Proposed Rule, 75 Fed. Reg. 74245. Even if this estimate were correct, it alone cannot justify dismissing these improvements absent a full cost-benefit analysis, which the Agencies have not provided. As to weight reduction efforts, the Agencies have simply skipped the economic analysis of the costs and benefits to be achieved. Id. at 74241. [EPA-HQ-OAR-2010-0162-2506.1, p.5]

Response:

The agencies agree with the commenter that hybrid and other advanced technologies have the potential to play a significant role in future Greenhouse gas emissions reductions and fuel consumption improvements. However, as stated in section III and in other comment responses (see (e.g. 6.2.2.1), it is not appropriate to include hybrid technologies as a technology on which standard stringency for vocational vehicles is premised. For the reasons stated in the proposal for this action, in addition to the general market capitalization at present for many of the hybrid system suppliers and requisite investment required to meet all of the requirements for complete vehicle certification at this time, the agencies continue to focus on an approach that encourages investment and technology development when and where it is most practical through the use of credit provisions. As penetration rates begin to increase and the systems required for successful implementation of hybrids are more fully developed, the issue of a potential hybrid mandate may be revisited by the agencies.

Organization: Daimler Trucks North America

On page 75 Fed. Reg. 74181, the Agencies seek comment on metrics for fuel consumption and GHG emission. We agree that grams CO2 / ton-mile or gallons of fuel / ton-mile are appropriate metrics for the present program. See our comments below related to the appropriate metric for buses. [EPA-HQ-OAR-2010-0162-1818.1, p.23]

Response:

The agencies agree with the commenters that a level playing field is essential for an effective and successful program. The agencies further agree that technically sound data and test methods for compliance for engines, aerodynamic features, and other systems. The agencies have continued to refine the test protocols for advanced technologies as a result of the comments received. An updated protocol for testing advanced technology applications, as well as updates to the duty cycles have been addressed as a result of both comments from the industry and other stakeholders, as well as additional Agency testing and data analysis. The agencies are committed to a compliance program that is both straightforward and transparent to ensure the benefits of this action are realized.

Organization: Natural Resources Defense Council (NRDC)

Going forward, an effective and successful Heavy-Duty National Program needs to also include a level playing field for manufacturers and must be based on technically sound data and methodologies. The agencies should take steps to ensure that baselines established and test methods used for compliance, whether for engines, for aerodynamic features, or for other systems, allow fair comparisons across manufacturers, test facilities, and test methods. A rigorous and clearly defined testing and compliance program is necessary to ensure vehicles and engines from all manufacturers are achieving the reductions expected. [EPA-HQ-OAR-2010-0162-1776.1, pp.9-10]

Response:

The agencies agree with the commenters that a level playing field is essential for an effective and successful program. The agencies further agree that technically sound data and test methods for compliance for engines, aerodynamic features, and other systems. The agencies have continued to refine the test protocols for advanced technologies as a result of the comments received. An updated protocol for testing advanced technology applications, as well as updates to the duty cycles have been addressed as a result of both comments from the industry and other stakeholders, as well as additional Agency testing and data analysis. The agencies are committed to a compliance program that is both straightforward and transparent to ensure the benefits of this action are realized.

Organization: Parker Hannifin Corporation

Section IV.B.2.(b)(i) and (ii) of the preamble to the proposed rule sets out hybrid certification procedures to generate credits. “Company Name” believes that these requirements are too burdensome and a simpler approach could provide a better measure of real world reductions. An alternative to estimating the benefits of a new technology using a chassis or engine dynamometer test over some simulated driving schedule would be to measure real world reductions in fuel consumption. A manufacturer could declare a percent fuel consumption reduction for a particular technology. Emission credits would be based on that declaration, but those credits (or a portion of those credits) would not be available for use until the manufacturer provided data from in-use vehicles validating the claimed reduction in fuel consumption. This concept could not only simplify the testing necessary to introduce innovative technology, it could also verify that these new technologies actually achieved real world fuel consumption reductions. It would also allow for the introduction of innovative concepts (i.e., vehicle routing and logistics) that achieved reductions that cannot be measured on a chassis or engine dynamometer test procedure. [EPA-HQ-OAR-2010-0162-1628-cp, p.1]

An alternative to estimating the benefits of a new technology using a chassis or engine dynamometer test over some simulated driving schedule would be to measure real world reductions in fuel consumption. A manufacturer could declare a percent fuel consumption reduction for a particular technology. Emission credits would be based on that declaration, but those credits (or a portion of those credits) would not be available for use until the manufacturer provided data from in-use vehicles validating the claimed reduction in fuel consumption. This concept could not only simplify the testing necessary to introduce innovative technology, it could also verify that these new technologies actually achieved real world fuel consumption reductions. It would also allow for the introduction of innovative concepts (i.e., vehicle routing and logistics) that achieved reductions that cannot be measured on a chassis or engine dynamometer test procedure. [EPA-HQ-OAR-2010-0162-3277, p.1]

Response:

The agencies agree with the commenters that a level playing field is essential for an effective and successful program. The agencies further agree that technically sound data and test methods for compliance for engines, aerodynamic features, and other systems. The agencies have continued to refine the test protocols for advanced technologies as a result of the comments received. An updated protocol for testing advanced technology applications, as well as updates to the duty cycles have been addressed as a result of both comments from the industry and other stakeholders, as well as additional Agency testing and data analysis. The agencies are committed to a compliance program that is both straightforward and transparent to ensure the benefits of this action are realized.

8.1. Fuel Efficiency / Consumption

Organizations Included in this Section:

Union of Concerned Scientists
Engine Manufacturers and Truck Manufacturers Associations
Sierra Club

Organization: Sierra Club

In order to capture the full potential for fuel savings and emissions reductions, EPA and NHTSA have discussed the need for a more sophisticated approach to vehicle testing. In the next round of standards, the Heavy-Duty National Program should transition to a compliance based on actual technology performance in a full-vehicle configuration. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

Agency Response: The agencies agree with the commenters that a level playing field is essential for an effective and successful program. The agencies further agree that technically sound data and test methods for compliance for engines, aerodynamic features, and other systems. The agencies have continued to refine the test protocols for advanced technologies as a result of the comments received. An updated protocol for testing advanced technology applications, as well as updates to the duty cycles have been addressed as a result of both comments from the industry and other stakeholders, as well as additional Agency testing and data analysis. The agencies are committed to a compliance program that is both straightforward and transparent to ensure the benefits of this action are realized.

Organization: Union of Concerned Scientists (UCS)

As the first ever standards for fuel efficiency and greenhouse gas emissions, it is imperative that this rulemaking sets a strong foundation for the dramatic reductions in fuel consumption and emissions that are needed to reduce our nation’s dependence on oil and prevent the worst impacts of climate change. A mature program should capture the performance of the full vehicle that is sold, be based on testing that closely reflects realworld performance, and includes a data collection component which allows for accurate evaluation and further development of the program. [EPA-HQ-OAR-2010-0162-1764.1, p.4]

To fully capture the suite of technologies available to improve truck efficiency and greenhouse gas emissions, the agencies should move towards a compliance program that is based on the full vehicle performance. The proposal for Class 2B and Class 3 pickup trucks and vans is based on full vehicle testing similar to the existing light-duty vehicle standards. However, the proposal for vocational trucks and tractors relies on a combination of testing and simulation modeling that approximates vehicle performance, but does not capture the overall performance of the vehicle that is sold to the consumer. We appreciate the agencies desire to simplify the standards in the short term in order to move existing technology in to the new truck fleet quickly. However, to realize the savings available from existing and future truck technologies, the agencies must move towards standards and compliance certification that captures the full vehicle performance. [EPA-HQ-OAR-2010-0162-1764.1, pp.4-5]

For example, the proposed vehicle standards for tractors capture aerodynamic and tire rolling resistance improvements as well as some idling and weight savings improvements. However, the vehicle simulation model does not capture drive line improvements, such as improved transmissions and friction reduction, or improvements in accessory loads, such as improved power steering or compressors. While the engines are tested separately and will likely have varying levels of performance, the vehicle simulation model does not account for any unique engine characteristics. [EPA-HQ-OAR-2010-0162-1764.1, p.5]

The agencies should develop and implement a compliance mechanism that is based on full vehicle performance and make this available by model year 2017. Developing the appropriate testing and compliance mechanism prior to the end of the program will allow the agencies and manufacturers to gain experience and facilitate the move toward full vehicle compliance testing in future standards setting. The compliance mechanism may include simulation modeling, but should require select chassis or on-road testing to ensure a high level of confidence in results. In addition, the full vehicle compliance mechanism should be designed to be compatible with an engine-specific standard to preserve the benefits offered by a engine standard as discussed later in these comments. [EPA-HQ-OAR-2010-0162-1764.1, p.5]

The development of application specific drive cycles and full vehicle compliance testing will require a robust data collection program. Data collection will also be critical to evaluating the effectiveness of the program, identifying areas of improvement, and developing future standards. As part of the rulemaking, the agencies should require manufactures to submit information on the actual configuration of the vehicle as sold to the customer along with its simulated fuel consumption and make this information publically available. Knowing the final configuration and the technologies incorporated into each vehicle will be critical in assessing the overall fuel consumption reduction and emission benefits of the program. Finally, in-use testing and full vehicle testing data by manufacturers and government agencies should be collected and made available to inform the development of the full vehicle compliance testing program. [EPA-HQ-OAR-2010-0162-1764.1, pp.5-6]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The proposed regulations include fuel consumption standards for natural gas engines that are based on the diesel carbon 'intensity factor' of 10,180 gCO_2/diesel-gallon equivalent, instead of a corresponding factor for natural gas. The Agencies should clarify that a natural gas engine's fuel consumption may be calculated from CO_2 emissions by using the diesel conversion factor. Allowing a natural gas engine's fuel consumption to be calculated using the diesel conversion factor will result in aligned values - as should be the case in a single, aligned HD National Program. [EPA-HQ-OAR-2010-0162-1940.1, p.14]

Response:

The agencies agree with the commenters that a level playing field is essential for an effective and successful program. The agencies further agree that technically sound data and test methods for compliance for engines, aerodynamic features, and other systems. The agencies have continued to refine the test protocols for advanced technologies as a result of the comments received. An updated protocol for testing advanced technology applications, as well as updates to the duty cycles have been addressed as a result of both comments from the industry and other stakeholders, as well as additional Agency testing and data analysis. The agencies are committed to a compliance program that is both straightforward and transparent to ensure the benefits of this action are realized.

The agencies recognize the need for the inclusion of a broad data set for developing both the test protocols and procedures for whole vehicle testing and modeling and so the agencies will rely upon data made available to it through various in-house and manufacturer run in-use programs. To the extent data may be made available publicly, the agencies will pursue a transparent pathway to data sharing.

8.2. **Chassis test and hybrid test procedures**

Organizations Included in this Section:

Alliance of Automobile Manufacturers
Allison Transmission
American Automotive Policy Council

Organization: Alliance of Automobile Manufacturers (Alliance)

In addition to the N2O related issues above, the Alliance continues to have concerns that there is insufficient lead time to implement high production N2O testing for the 2014/2015 model years, either for this proposed MHDV rule or for the existing LDV rule. N2O measurement technology is in an early stage of development, and accurate (2%), repeatable, robust and high production capable equipment has not been proven. Due to the unavailability of production capable equipment, EPA should extend the use of the N2O compliance statement for both MHDVs and LDVs. [EPA-HQ-OAR-2010-0162-1621.1, p.2]

Separately, the Alliance has significant concerns with the agencies “likely” consideration of applying the new heavy duty chassis test procedures (Part 1066) to light duty vehicle testing:

V. NHTSA and EPA Proposed Compliance, Certification, and Enforcement F. General Regulatory Provisions (3) Test Procedures For Measuring Emissions From Heavy-Duty Vehicles

“…we will likely consider in the future applying these procedures also for other heavy-duty vehicle testing and for light-duty vehicles …” [EPA-HQ-OAR-2010-0162-1621.1, p.2]

These procedures are significantly different than current emission and fuel economy test procedures as specified in Parts 86 and 600. In addition to significantly different test procedures, the preamble also notes that the change to SI units (International System of Units) from English units would result in a significantly different tolerance for compliance with a drive cycle trace. This proposed transition of drive cycles from mph to kph or even m/s is a major departure from historical standards, regulatory requirements, and current compliance practices. [EPA-HQ-OAR-2010-0162-1621.1, p.2]

Organization: Allison Transmission

EPA and NHTSA considered, but did not propose, chassis-based vehicle tests for Class 7 and 8 vehicles similar to the dynamometer tests that are done for LDVs utilizing a Federal Test Procedure. The agencies, however, stated they did not pursue this path for several reasons including significant technical hurdles, costs and limitations on appropriate lID test sites.75 In addition, the agencies cited the 9 subcategories of combination tractors used in the regulatory framework as a substantial hurdle for using dynamometer testing in this regulatory sector. With regard to vocational vehicles, as noted above, EPA and NHTSA relied on existing regulatory categories for such vehicles despite the obvious differentials in the normal use and operation of different types of vehicles. Altogether, the proposed rulemaking suffers from a lack of empirical evidence and testing to support the regulatory alternatives that are offered. [EPA-HQ-OAR-2010-0162-2735.1, p.39]

While Allison appreciates the constraints attendant to this rulemaking, EPA and NHTSA should reevaluate whether the lack of available information is of such extent that the better course of action is to defer finalization of any rulemaking until additional information can be assembled. For example, it is notable that in presenting arguments against the use of dynamometer testing, the large number of possible axle types, axle ratios, engines, transmissions and tire sizes are mentioned. EPA and NHTSA then indicate that even utilizing representative groupings, this would raise the potential for many different combinations to need testing. While there is validity to this argument - EPA and NHTSA do not utilize a similar lens to scrutinize the testing protocols that the agencies are actually proposing. That is, in the proposed testing and compliance system, the agencies simply ignore such differences, relying on engine-only testing and computer modeling. Thus a classic 'chicken and egg' situation unfolds - dynamometer testing is considered out of reach because to do so would involve assessing real world truck configurations and their effect on GHGs and FEs - yet without such information it is not possible to know the benefits and drawbacks of such a testing and compliance system versus the benefits and drawbacks of the regulatory system that is being proposed. [EPA-HQ-OAR-2010-0162-2735.1, p.39]

In seeking comments, the agencies indicate that a dynamometer testing approach may be more appropriate in the future if testing facilities become available and if agencies are able to address the complexity of tractor configurations. We would suggest, however, that the complexity of tractor configurations and their effect on GHGs and FE can only be assessed if additional testing is done. This information would be of value no matter what regulatory alternative is pursued; Allison would not suggest that the EPA and NHTSA must necessarily utilize dynamometer testing for compliance, but that having additional information produced from such testing would be of benefit to any regulatory alternative undertaken. At minimum, such information could serve to validate modeling information utilized in the proposed rule. [EPA-HQ-OAR-2010-0162-2735.1, pp.39-40]

The NAS Report, moreover, asserts that additional research should be undertaken before any regulatory program is attempted. A conclusion of the NAS Report that was overlooked with respect to this rulemaking is that additional information is needed before regulation of the entire MD/HD sector should be undertaken. In specific, the report stated that: [EPA-HQ-OAR-2010-0162-2735.1, p.40]

[See pp.40-41 of this comment summary for an excerpt from Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy- Duty Vehicles, Committee to Assess Fuel Economy Technologies for Medium- and Heavy-Duty Vehicles, National Research Council, The National Academies Press at 188.]

That is, a program to further explore this issue would need to be based on the very testing being assessed. Various research testing programs would be needed to assess what tractor configurations produced meaningful differentials in emission and FE results and what vocational vehicle segments would be appropriate. A research program could be used not only to explore new concepts, but to 'ground in truth' the actual impacts of the regulations that EPA is seeking to finalize. [EPA-HQ-OAR-2010-0162-2735.1, p.41]

Organization: American Automotive Policy Council

Separately, AAPC has significant concerns with the agencies “likely” consideration of applying the new heavy duty chassis test procedures (Part 1066) to light duty vehicle testing: [EPA-HQ-OAR-2010-0162-1762.1, p.16]

“…we will likely consider in the future applying these procedures also for other heavy-duty vehicle testing and for light-duty vehicles …” [EPA-HQ-OAR-2010-0162-1762.1, p.17]

These procedures are significantly different than current emission and fuel economy test procedures as specified in Parts 86 and 600. In addition to significantly different test procedures, the preamble also notes that the change to SI units (International System of Units) from English units would result in a significantly different tolerance for compliance with a drive cycle trace. This proposed transition of drive cycles from mph to kph or even m/s is a major departure from historical standards, regulatory requirements, and current compliance practices. AAPC has concerns over impacts to emissions, fuel economy and expensive facility upgrades for both MHDV and LDV. We recommend that additional study and discussion with EPA and stakeholders is necessary before further consideration in a rulemaking can be initiated. [EPA-HQ-OAR-2010-0162-1762.1, p.17]

For Class 2b-8 Vocational Vehicle chassis manufacturers, EPA and NHTSA are proposing a model-based CO2 and fuel consumption compliance approach. The only proposed inputs to the model are the rolling resistance of the steering and drive tires as determined by ISO test method 28580:2009. As proposed, this effectively amounts to a requirement that manufacturers use tires with rolling resistance in the range of 8.0-8.1 or better with allowances for averaging, banking, and trading on a volume-weighted basis. [EPA-HQ-OAR-2010-0162-1762.1, p.19]

Response:

The agencies understand the concerns raised by industry related to the migration of test requirements to 40 CFR 1066 and the existing Part 86 Complete Vehicle testing requirements for Class 2b/3 vehicles will not be migrated to 40 CFR 1066 at this time.

Organization: American Council for an Energy-Efficient Economy (ACEEE)

We conclude this section by noting that the agencies cite the small number of chassis-test facilities as the reason for proposing separate vehicle and engine standards for tractor trucks and vocational vehicles, rather than a chassis-test-based standard (p.74162). The ability to use of chassis testing instead of simulation modeling would not in itself allow the formulation of full-vehicle standards, however. In fact the primary obstacle to a full-vehicle test and standard is not the acknowledged difficulty of chassis-testing all vehicle configurations but rather the diversity of test cycles and multiplicity of standards that would be required to fairly capture the duty cycles of all the full range of vehicles covered by these standards. [EPA-HQ-OAR-2010-0162-1894.1, p.5]

Response:

The agencies agree with the commenter that the only obstacle to full vehicle chassis testing is not the availability of test sites. To address the issue of the variability of vehicles and duty cycles, the agencies would not seek to develop a unique duty cycle for every potential application. The agencies would focus more on ensuring that the duty cycle(s) used ensure a level playing field for market participants and accurately reflect appropriate improvement associated with the technology being tested.

Organization: ArvinMeritor, Inc.

- Chassis Dynamometer Testing for Vehicle Certification - In the section of the regulation document that discussed “future regulations,” the potential use of chassis dynamometers for certification testing was mentioned. ArvinMeritor does not recommend that chassis dynamometers be used for certification of all chassis configurations. [EPA-HQ-OAR-2010-0162-1605.1, p.9]

o Chassis dynamometers are expensive, and even by 2020, the number of fully capable systems is likely to be insufficient to handle all certification testing needs.

o Chassis dynamometer testing is expensive and time consuming, and could be burdensome to the industry.

o A robust simulation program as described above should eliminate the need for chassis dynamometer testing for all but a few vehicle configurations. Limited chassis dynamometer testing can be used to validate accuracy of new or modified simulation programs.

o Do consider chassis dynamometer testing for evaluation of less conventional powertrains, such as diesel-electric hybrid systems. The chassis dynamometer test protocol may be more capable of quantifying the full benefits of the complete system, versus simulation. [EPA-HQ-OAR-2010-0162-1605.1, p.10]

Response:

The agencies agree that chassis dynamometer testing could present near term challenges if required for the entire industry.

Organization: Clean Air Task Force (CATF)

However, the simulation modeling approach is not appropriate for vocational trucks, for which hybridization and advanced transmissions are likely to be the most important technologies available to reduce fuel use in the long term. These technologies are difficult to simulate in an open and transparent way because they rely on complicated and proprietary control strategies. To fully capture the benefits of these technologies (in terms of stringency of the standards as well as providing incentives for market uptake) EPA will almost certainly need to move from simulation modeling to chassis or hardware-in-the-loop testing for certification of most, if not all, vehicles in the proposed “vocational” regulatory sub-category. While we are aware of the advantages of EPA’s proposed simulation modeling approach for vocational vehicles, we are concerned about the potential strength of any precedent that may be set by this rule-making relative to the structure of certification procedures, and the difficulty that EPA may face in changing to a completely different structure for future rule-making. [EPA-HQ-OAR-2010-0162-2734.1, p.11]

In view of the above, we urge EPA to consider moving in this rulemaking to chassis-based full vehicle testing and/or hardware-in-the-loop testing of vehicle drive trains for vocational vehicles. EPA’s proposed alternate test procedures for hybrid systems, to be used for determination of advanced technology credits under ABT, could provide an acceptable starting point for development of alternate certification procedures for these vocational trucks. We note that EPA is proposing three alternate test procedures, and we do not think that all of these procedures are functionally equivalent. In particular, we do not support the use of FTP engine dynamometer testing to certify pre-transmission hybrid systems. [EPA-HQ-OAR-2010-0162-2734.1, pp.11-12]

Response:

The agencies agree with the commenter that many improvements may be appropriately characterized using whole vehicle chassis testing. Given the constraints regarding test site availability, it is important that options for certification not be limited in a way that precludes other viable options for accurately reflecting performance improvements. While the commenter raised concerns regarding the use of pre-transmission FTP testing, it is important to not constrain options for certification to quantify hybrid improvements. The agencies are interested in providing broad incentives to incorporate various options for hybrid technologies.

8.3. Hybrid Technologies

Organizations Included in this Section:

Daimler Trucks North America
Cummins, Inc

Organization: Cummins, Inc.

Existing test procedures as described by SAE J2711 are appropriate for the chassis dynamometer evaluation. The chassis dynamometer procedure in the GHG/FC proposal is a vehicle-specific evaluation of the hybrid powertrain. In order to reduce proliferation of certifications, Cummins proposes allowing hybrid powertrain certification using average vehicle characteristics developed from the GEM to determine friction load for the chassis test. This hybrid powertrain certification could then be applied to many vehicles. Using vehicle cycles based on the FTP and SET as previously discussed will allow evaluation of the hybrid powertrain versus the engine standard and would not require the comparative evaluation. Cummins believes that ensuring a fair and consistent A-to-B comparison will be problematic, and that it will be challenging to isolate the potential benefit of the hybrid powertrain. [EPA-HQ-OAR-2010-0162-1765.1, pp.41-42]

The Agencies have proposed allowing a simulated chassis dynamometer procedure under § 1036.615. However, very few details are provided in the proposed rule. Better definition of the procedure will provide more clarity and ensure consistent evaluations by all manufacturers. [EPA-HQ-OAR-2010-0162-1765.1, p.42]

The use of simulation in hybrid evaluation can play a significant role in reducing development cost and time. However, in the case of hybrid technology, simulation presents challenges in accurately modeling energy storage and interaction of hybrid and engine components. For this reason, Cummins proposes that all critical hybrid components be included as hardware in the evaluation. Critical components are defined as those which contribute to providing torque, e.g., in the case of an electric hybrid this would include controllers, engine, power electronics, electric motors and energy storage. As with the chassis dynamometer evaluation, Cummins supports the use of average vehicle characteristics based on the GEM. Again, Cummins proposes the use of vehicle cycles based on the FTP and SET and an evaluation against the engine standard. [EPA-HQ-OAR-2010-0162-1765.1, p.42]

Organization: Daimler Trucks North America

Hybrid drivetrains have the potential to offer significant fuel savings and GHG reductions, yet hybrid HDVs are tens of thousands of dollars more expensive than comparable conventional vehicles. Unfortunately, such a price differential dissuades some potential purchasers from buying the hybrids. We share the Agencies' desire to see increased proliferation of hybrids in the market. Hence, we recommend ways in which the Agencies could (1) incent hybrid sales and (2) reduce burden on hybrid production, in that doing so will further incent hybrid sales. Moreover, as the Agencies move forward with the present regulatory program, we recommend that the Agencies study in-use hybrid vehicles to better understand hybrid drive cycles in order to align certification procedures with in-use vehicle profiles and in-use driving patterns. [EPA-HQ-OAR-2010-0162-1818.1, p.76]

Modeling Of Vehicles Is The Appropriate Method For Certification, While Chassis Dynamometer Is Not Yet Suitable For A Program Such As The Currently Proposed One. [EPA-HQ-OAR-2010-0162-1818.1, p.55]

The Agencies state that they considered developing respective alternative standards based on the direct testing of the emissions and fuel consumption of the entire vehicle for this category of vehicles, as measured using a chassis test procedure. This would be similar to the proposed approach for standards for HD pickups and vans discussed below. The Agencies believe that such an approach warrants continued consideration. However, the Agencies state that they are not prepared to propose chassis-test-based standards at this time, primarily because of the very small number of chassis-test facilities that currently exist. Rather the Agencies propose only the tractor standards and the engine-based standards in the NPRM and seek comment on the potential benefits and trade-offs of chassis-test-based standards for combination tractors. (75 Fed. Reg. 74162) The only technology neutral way to regulate GHGs or FE is to develop a full vehicle test procedure with appropriate drive cycles. DTNA supports the development of such a test procedure and corresponding standards over the long-term, so long as we can keep test / certification burdens to a reasonable level, which means modeling of most variants of vehicles. But, lacking time to develop such a procedure and standard even for just a few vehicles, Daimler supports the agencies' general approach as set forth in the NPRM subject to the many concerns raised in these comments. [EPA-HQ-OAR-2010-0162-1818.1, pp.55-56]

The Agencies believe a full-vehicle chassis test approach could be appropriate in the future, if more testing facilities become available and if the Agencies are able to address the complexity of tractor configurations issue described above. In turn, the Agencies request comments on the potential use of chassis based test procedures in the future to augment or replace the model based approach that they propose. (75 Fed. Reg.74189) The Agencies are proposing only the compliance-model based standards and engine standards discussed above, and seek comment on the appropriateness of chassis-testbased standards for the vocational vehicle category.(Pg32) Daimler does not agree that lack of chassis-test facilities is the limiting factor. Rather, a full vehicle test procedure should be model based, regardless of facility capabilities. Daimler accepts model-based standards only as an interim step in developing an appropriate full vehicle model approach that can be harmonized world wide. But, it is far too early to propose any chassis dynamometer testing, with so few details worked out, so few dynamometers available, so little experience running vehicles on those few dynamometers that are available, etc. Better the Agencies should focus on programs that are realistic in the short-term like model-based programs that incorporate full-vehicle fuel consumption estimates. [EPA-HQ-OAR-2010-0162-1818.1, p.56]

In short, Daimler does not agree with a chassis based test procedure for a future regulation but suggests that a full vehicle based model approach that could be harmonized worldwide should be the next step in the GHG regulatory process. [EPA-HQ-OAR-2010-0162-1818.1, p.56]

Clarification Of Agency Coast-Down Test And Chassis Dynamometer Test Procedures Would Be Useful If The Agencies Want To Convince Interested Parties That The Procedures Are Accurate. [EPA-HQ-OAR-2010-0162-1818.1, p.66]

On page 75 Fed. Reg. 74180, the Agencies indicate that they performed comparison of GEM results to chassis dynamometer tests and found accurate results. Both GEM and chassis dynamometer tests require aerodynamics input, which the Agencies propose to require through coast-down testing. If the Agencies are running repeated tests, either with GEM or with a chassis dynamometer, in order to demonstrate comparability and/or repeatability, then the Agencies should be testing the entire procedure, start to finish. In turn, the Agencies should be running a new coast-down test for each repetition of their GEM analysis or dynamometer test. Otherwise, the Agencies will have tested a procedure with one major source of variability held unnaturally fixed and constant. Doing so will mask variances. It is not clear from the NPRM how the Agencies ran their testing, so we request that clarification in order that we can properly judge whether the Agencies' purported 4% correlation is accurate. [EPA-HQ-OAR-2010-0162-1818.1, p.66]

Response:

The agencies are allowing use of multiple options for certification of hybrid engines and vehicles. Given the range of options, the agencies will not require the use of chassis testing as a method for demonstrating hybrid vehicle benefit for GHG emissions and fuel consumption. Additional, with this action, the agencies are providing additional details regarding the test protocols for hybrid vehicle testing, including additional details for chassis testing test procedures, as well as other options for certification. The coastdown method used for testing will be based upon the comments the agencies received from commenters regarding test site and test article condition.

8.4. Chassis Test Cycle

Organizations Included in this Section:

Eaton Corporation
International Council on Clean Transportation
Engine Manufacturers and Truck Manufacturers Associations

Organization: Eaton Corporation

PowerPack testing is an important alternative to full chassis testing that does not add further cost or complexity to the test procedures already outlined in the N-PRM. Furthermore, PowerPack testing is a cost-effective alternative to full chassis testing, and thus, having it as an available option, improves flexibility for the industry and adds consistency in testing among several technologies. [EPA-HQ-OAR-2010-0162-1649.1, p.5]

Organization: Engine Manufacturers and Truck Manufacturers Associations

EMA and TMA also endorse another of the Agencies' basic tenets for this rulemaking - the conclusion that chassis-dynamometer testing should not be relied on at this time for assessing whether the larger HD vehicles at issue are in compliance with the Proposed GHG/FE Standards. First, there are very few chassis dynamometers in the United States that are large enough to accommodate HD vehicles, and constructing additional facilities is a very costly and time consuming proposition. Additionally, chassis-dynamometer testing has not yet developed to the point where all of the inputs that are relevant to the relative efficiency of HD vehicles can be assessed in a standardized and cost -effective manner. While development efforts continue, the fact remains that dynamometer testing is not sufficiently sophisticated at this juncture to account in a fair and repeatable manner for all of the design attributes and variables that contribute to the overall fuel-efficiency (and greenhouse gas emissions) of a HD vehicle. Moreover, even if chassis dynamometer testing were sufficiently sophisticated, and there were enough facilities available, the diversity of vehicle designs and specifications that impact fuel efficiency precludes cost-effectively testing each one. Considering the foregoing, the Associations believe that vehicle modeling is the only practical approach for assessing vehicle compliance with the Proposed GHG/FE Standards. Thus, the Agencies' decision to use a customized vehicle simulation model -- the Greenhouse Gas Emissions Model ('GEM') - in lieu of chassis dynamometer testing is appropriate (assuming that the necessary revisions and refinements to GEM are implemented). [EPA-HQ-OAR-2010-0162-1940.1, pp.3-4]

Organization: International Council on Clean Transportation (ICCT)

MJ Bradley & Associates have done some preliminary work to “translate” the FTP engine test cycle into an equivalent chassis cycle. It is known that the EPA created the FTP cycle and the UDDS chassis test cycle from the same sets of in-use data, and it is generally presumed that they are related if not equivalent cycles. As such, the analysts used the speed-time trace of the UDDS [6] and evaluated whether or not an engine installed in a "typical" truck would provide the right amount of power to drive the vehicle on the UDDS cycle if the engine operated over the FTP. We used the published torque curve for a 475 HP Caterpillar C15 engine, and assumed that it would be installed in a Class 8 truck with 80,000 pound gross weight and typical aerodynamic drag and rolling resistance coefficients. [EPA-HQ-OAR-2010-0162-1945.1, p.12]

We found that the "motoring" sections of the FTP (i.e. sections with zero torque) time-align well with the speed changes in the UDDS, confirming the general equivalence of the cycles. However, the total power output under the FTP can only be reconciled with the UDDS speed trace if one assumes that the FTP includes terrain effects[7]. For example, there are times when the engine is putting out little to no power but the vehicle is accelerating (i.e. going downhill) and other times when the engine is putting out high power and the vehicle is decelerating (i.e. going up hill). See figure 3. [EPA-HQ-OAR-2010-0162-1945.1, pp.12-13]

[Figure 3 can be found on page 13 of this comment.]

The fact that the FTP engine cycle appears to include terrain effects significantly complicates the ability to "translate" it into an equivalent chassis cycle. While it is theoretically straight forward to mimic terrain on a chassis dynamometer there are two issues that limit ones ability to do so in practice: [EPA-HQ-OAR-2010-0162-1945.1, p.13]

1) To mimic terrain the power absorption capability of the dynamometer would need to be increased. The larger the hill the greater the amount of power that would need to be absorbed. Preliminary analysis indicates that to mimic terrain a dynamometer might need to have twice as much power absorption capability as typical current dynamometers. [EPA-HQ-OAR-2010-0162-1945.1, p.13]

2) Typically, current dynamometers do not have motoring capability (i.e. they cannot supply additional power other than inertia as if the vehicle was going downhill) – this capability would have to be added. [EPA-HQ-OAR-2010-0162-1945.1, p.14]

3) Typically, a driver manually operates a vehicle on a chassis dynamometer by following a moving speed trace on a computer screen. It would be very difficult for a human to follow a speed trace that includes terrain because there would be no visual cues as to the approach of a hill, and more power would be required to maintain the set speed. [EPA-HQ-OAR-2010-0162-1945.1, p.14]

Another possibility would be to abandon the actual UDDS and try to create a different, more transient drive cycle that would absorb the amount of engine power put out by the FTP but assuming level terrain. The problem with this approach is that during certain sections of the FTP the engine is putting out so much power that it would likely require a vehicle to accelerate more quickly than it is capable of doing, and/or it would require the vehicle to accelerate to unrealistically high speeds (above 75 mph). [EPA-HQ-OAR-2010-0162-1945.1, p.14]

A third possibility would be to create the terrain conditions of the FTP on a test track and to conduct "chassis" certification testing on this track over the UDDS speed-time trace, using portable equipment (PEMS) to measure CO2 emissions. While technically feasible, this option is not likely to be practical in the context of regulatory certification testing. [EPA-HQ-OAR-2010-0162-1945.1, p.14]

---

[6] The actual UDDS cycle is 1,060 seconds long as written. It was shortened it to 960 seconds by deleting that last element, which is repeated from the beginning, but which is not repeated in the FTP. For this analysis UDDS was stretched to match the FTP elements by inserting extra idle during stops and by adding "coasting " when the vehicle was at speed. [EPA-HQ-OAR-2010-0162-1945.1, p.12]

Response:

The agencies agree with the commenter that there are technical challenges in creating a chassis cycle from the FTP and is not finalizing a vehicle equivalent cycle to the engine FTP.

Organization: Natural Resources Defense Council (NRDC)

Specifically, we support the further development of test procedures, including powertrain, chassis and hardware- in- the- loop simulation, to capture the benefits of advanced and innovative technologies under the program. This is particularly important for the vocational vehicle segment since the proposed compliance certification only captures improvements in engines and tire rolling resistance. Other technologies, such as hybrid power systems, advanced transmissions, as well as engine-off power take-off (PTO) operation, have the potential to offer significant fuel savings and greenhouse gas reductions in the vocational segment over the timeframe of the standards. The test procedures should be designed to capture the benefits of these important technologies. The standards should also provide a clear and consistent process for evaluating and crediting fuel efficiency technologies. [EPA-HQ-OAR-2010-0162-1776.1, p.9]

Response:

The Agency agrees that continual development to test procedures may be necessary to fully capture the benefits of ever-changing GHG reducing technologies as applied to the heavy duty and vocational market space. Specific test procedures are currently being proposed to identify and accurately credit such systems as hybrids, engine off PTOs as well as other advanced technologies that can serve to improve fuel efficiency. In addition, the Agency has incorporated information from its own testing as well as industry stakeholders to revise these procedures so as to provide a realistic match to real world vehicle operation.

8.5. **Test Cycles**

Organizations Included in this Section:

Southwest Research Institute
Navistar, Inc

Organization: Navistar, Inc.

Navistar supports the extension of chassis dynamometer testing to include heavy-duty vehicles as outlined in 40 CFR part 1066. We recognize this provision will allow manufacturers to optimize vehicle, engine and transmission systems to achieve the lowest possible GHG emission rate. This provision is particularly important for manufacturers of hybrid powertrains in vocational applications. In addition, the provision will afford manufacturers the opportunity to develop new calibration approaches for conventional vehicles as well. [EPA-HQ-OAR-2010-0162-1871.1, p.42]

We support EPA's efforts to improve testing cycles to better represent "real world" conditions, including EPA's participation in the World Harmonized Test Cycle ("WHTC"). As EPA correctly recognizes, improvements in the current test cycles (i.e., the FTP and SET) are needed in order to maximize efficiency and advancements in technology. The current test cycles are designed to capture "worst case" emission scenarios and do not necessarily represent "real world" application because of current weighting factors, especially for line-haul cruising conditions. By contrast, the WHTC's weighting factors better represent "real world" application for commercial vehicles. Navistar encourages the Agencies to continue to investigate test cycles like the WHTC that more accurately reflect line-haul duty cycles. A change is necessary to direct the right technology to its maximum efficiency and proper implementation. [EPA-HQ-OAR-2010-0162-1871.1, p.59]

Organization: Southwest Research Institute (SwRI)

SwRI is commenting only on technical procedures language which have been proposed to CFR 40 Part 1066. This part concerns proposed vehicle test procedures using a chassis dynamometer. At present, it is understood that the proposed regulations primarily are concerned with heavy-duty vehicles (i.e., GVW > 8,600 lbs). SwRI has operated a heavy-duty chassis dynamometer facility for the past 35 years, and therefore has considerable background and test experience in this particular area. [EPA-HQ-OAR-2010-0162-1778.1, p.1]

(1) For light-duty vehicles and for heavy-duty vehicles with GVWR at or below 14,000 lbs, the nominal roll diameter must be 1.20 to 1.25 meters (this is commonly referred to as a 48-inch roll dynamometer).

(2) For heavy-duty vehicles with GVWR above 14,000·lbs, the nominal roll diameter must be at least 1.20 meters and no great than 1.85 meters. Use good engineering judgment to ensure that the dynamometer roll diameter is large enough to provide sufficient tire-roll contact area for avoiding tire overheating and power losses from tire-roll slippage. [EPA-HQ-OAR-2010-0162-1778.1, p.2]

SwRI Comment: Although the heavy-duty chassis dynamometer at SwRI currently uses one 48-inch roll per drive axle, it is believed that larger rolls or a single roll that is large enough to accommodate tandem drive axles are acceptable for heavy-duty vehicle testing. SwRI is aware of a number of such installations that are technically sound. SwRI comments that EPA should remove the restriction of one independent drive roll for each axle. In addition SwRI comments that the roll diameter maximum should be re-examined in order to permit installations with a tandem axle on a single larger roll. [EPA-HQ-OAR-2010-0162-1778.1, p.2]

1066.110 (5) Measured values of road load force may not differ from the corresponding calculated values at any operating conditions by more than ± 1 % or ± 2.2 lbf, whichever is greater. [EPA-HQ-OAR-2010-0162-1778.1, p.2]

SwRI Comment: SwRI comments that it is believed to be impractical to restrict the road load force error to less than ± 1 % or ± 2.2 lbf during transient tests as the load may vary between ± 4,000 lbf. One percent of full range would be 80 lbf. It is recommended that the current standard of load validation using coastdowns is sufficient for chassis dynamometer testing as long as the dynamometer's load capacity is not exceeded during testing. [EPA-HQ-OAR-2010-0162-1778.1, p.2]

During dynamometer operation, position a road-speed modulated cooling fan that appropriately directs cooling air to the vehicle. This generally requires squarely positioning the fan within 30 centimeters of the front of the vehicle and directing the airflow to the vehicle's radiator. Use a fan system that achieves a linear speed of cooling air at the blower outlet that is within ±3 mph of the corresponding roll speed when vehicle speeds are between 5 to 30 mph, and within ±10 mph of the corresponding roll speed at higher vehicle speeds. The fan must provide no cooling air for vehicle speeds below 5 mph, unless we approve your request to provide cooling during low-speed operation based on a demonstration that this is appropriate to simulate the cooling experienced by in-use vehicles. If the cooling specifications in this paragraph (b) are impractical for special vehicle designs, such as vehicles with rear-mounted engines, you may arrange for an alternative fan configuration that allows for proper simulation of vehicle cooling during in-use operation. [EPA-HQ-OAR-2010-0162-1778.1, p.3]

SwRI Comment: Variation in available cooling air may produce large test result variations, particularly in heavy-duty vehicles equipped with a clutched cooling fan. Heavy-duty vehicle fans consume up to 20 hp at high engines speeds which is significant considering the 50 mph road load power is approximately 120 hp for a Class 8 tractor-trailer. SwRI uses a large fan with a 30 ft2 opening powered by a 300 hp electric motor to provide air flow that is proportional to vehicle speed in front of the test vehicle. [EPA-HQ-OAR-2010-0162-1778.1, p.3]

Hybrid powertrain vehicles are often equipped with additional heat exchangers for electric or hydraulic components. Ambient temperature and air flow affect the performance of the heat exchangers. If there is insufficient air flow to the heat exchangers or battery pack, the performance of the hybrid system will deteriorate and produce reduced fuel economy and emissions benefits than it might produce during on-road use. [EPA-HQ-OAR-2010-0162-1778.1, p.3]

SwRI recommends that a minimum fan flow rate and fan opening requirement at 50 mph be adopted for consistency between testing facilities. The SwRI fan flow rate at 50 mph is approximately 130,000 cfm. [EPA-HQ-OAR-2010-0162-1778.1, p.3]

SwRI believes that the alternative language proposed above will provide a reasonable and technically appropriate amount of flexibility, while at the same time providing assurance that measurements will be made in an accurate manner. [EPA-HQ-OAR-2010-0162-1778.1, p.4]

Response:

SwRI, Horiba, and Volvo comment that single roll drives should be allowed to drive tandem axles. EPA agrees with the need for the proposed changes and will make the changes as requested.

SwRI comments that it is impractical to restrict the road load force error to less than ±1 % or ±2.2 lbf during transient tests as the load may vary between ±4,000 lbf, of which 1% would be 80 lbf. EPA agrees with the need for a change to grant flexibility and will make a change as requested.

SwRI comments that variation in available cooling for a test vehicle could produce large test result variations. They recommend setting a minimum limit of 30ft2 on the fan opening and a minimum flow rate of 130,000 cfm at a vehicle speed of 30 mph. EPA will make the requested change, but the specifications will be a recommendation in 1066. While we believe that these specifications are important when procuring a road speed modulated fan, we believe that the fan speed requirements will ensure that the fan produces the desired cooling over the vehicle.

8.6. Engine dynamometer test

Organization: Cummins Inc.

In the Preamble at 75 FR 74257, the Agencies propose an option for engine dynamometer evaluation for hybrid engine systems, including pre-transmission hybrids. The Preamble states that the control volume 'would need to be the most accurate representation of real world functionality. The test methodology would be considered valid to the extent the test is performed on a test article that does not mischaracterize criteria pollutant performance or actual system performance.' The Preamble proposes the use of the FTP cycle for evaluation of hybrid engine performance. [EPA-HQ-OAR-2010-0162-1765.1, p.42]

However, in § 1036.525, the description of the hybrid engine evaluation is ambiguous, stating that the Agencies “may allow” an engine dynamometer evaluation of hybrid powertrains if energy capture is consistent with engine motoring. This approach offers many manufacturers a low cost way to accurately evaluate hybrid powertrain performance, but the language should be modified to explicitly define acceptable procedures. Clear definition of control volume and test methodology will ensure a common understanding among all stakeholders, and a rigorous, accurate evaluation. [EPA-HQ-OAR-2010-0162-1765.1, p.43]

We propose that all engine and all hybrid components which contribute to recovering or providing traction power be included in the control volume. This would include motors, energy storage devices and power conversion devices like power electronics. Power converters for non-traction devices like dc-dc converters for accessory loads would not be included. If evaluation of PTO performance is desired, necessary hardware would be included in the test according to good engineering judgment, and the PTO cycle in Part 1037 would be used. [EPA-HQ-OAR-2010-0162-1765.1, p.43]

To better define test procedures for hybrid engines, we propose the following modifications of Part 1065 HD engine test procedures:

- Use of system (hybrid + engine) torque curve to define speed and torque requirements (instead of engine torque curve)

- Reference to SAE J2711 for management of energy storage devices

- Emissions calculation consistent with conventional calculation (only positive work counted)

- Specification of available brake energy (explained below) [EPA-HQ-OAR-2010-0162-1765.1, p.43]

The FTP defines speed and torque requirements as a function of the torque curve. While the cycle does include negative torque (motoring portions of the cycle), this negative (braking) torque is not defined. In order to ensure that energy capture is consistent with real world performance, there must be a specification of available kinetic energy. We propose creating a vehicle cycle based on the engine FTP cycle to appropriately limit available kinetic energy. [EPA-HQ-OAR-2010-0162-1765.1, p.43]

The engine FTP cycle is based on vehicle data from a range of HD vehicles. Comparison of the FTP with real world engine operation shows a reasonable match. This means that the power demands of the FTP engine cycle match real world vehicle power demands reasonably well. As previously discussed, the FTP engine cycle can be used to develop a vehicle cycle. This vehicle cycle would match the FTP cycle in length and power output and would allow for the specification of maximum available brake power. This brake power would define the upper limit for energy capture. The actual energy capture would depend on the capabilities of the particular hybrid system being tested. [EPA-HQ-OAR-2010-0162-1765.1, pp.43-44]

Response:

The agency agrees with the commenter on the need for more details in the test procedures and has added more detail in the following areas: engine hybrid mapping, engine speed during idle portions of the FTP, regenerative power limit, hardware needed for tests, calculating positive and negative work, and RESS energy storage change from the beginning to the end of the test.

Organization: Daimler Trucks North America

In §1036.530 EPA describes their recommended method for correcting manufacturer's CO2 emissions test results to account for differences between the test fuel and reference fuel. Included are instructions to use ASTM D240-09 to determine both the percent carbon content of the fuel and the net energy content of the fuel. This ASTM test procedure is appropriate for determining the heat content of the fuel; however the recommended test procedure for determining carbon content is ASTM D5291. Accordingly we recommend that EPA change the referenced ASTM test procedure for determining carbon content. [EPA-HQ-OAR-2010-0162-1818.1, p.38]

Response:

The importance of the test procedure in properly reflecting the performance of engine and vehicle systems has a direct impact on the real-world improvement. The Agencies will continue to evaluate the impact of the appropriate duty cycle and other factors with future GHG and fuel consumption improvements.

Organization: Robert Bosch, LLC

Compliance with the engine standards should be demonstrated over the steady-state Supplemental Emission Test engine cycle (for combination tractor engines) and the Heavy-Duty Federal Test Procedure (HD FTP) engine cycle (for vocational vehicle engines), and Bosch fully agrees with EPA that the test procedure issue, both for GHG emissions standards and criteria pollutant emissions standards, should be revisited once a World Harmonized Duty Cycle is introduced. [EPA-HQ-OAR-2010-0162-1630.1, p.9]

Response:

The importance of the test procedure in properly reflecting the performance of engine and vehicle systems has a direct impact on the real-world improvement. The agencies will continue to evaluate the impact of the appropriate duty cycle and other factors with future GHG and fuel consumption improvements.

Organization: Clean Air Task Force (CATF)

The proposed Rule needs to provide greater incentive for advanced technologies and other efficiency improvements that are not necessary to meet the standards as proposed. To that end, EPA should:

- further develop the supplemental powerpack testing options and ensure they are applicable to a range of technologies, and

Response:

The agencies acknowledge the importance of the test procedure in actually characterizing and incentivizing the introduction of advanced technology options. The agencies have refined both pre-transmission and post-transmission power pack testing procedures to better reflect real vehicle operation in the real world, as well as to provide the appropriate comparison to chassis dynamometer vehicle performance. Improvements to the driver and vehicle models, as well as to the performance criteria for system control will help to ensure the incentives for advanced technologies are appropriately sized relative to their benefit.

Organization: Engine Manufacturers and Truck Manufacturers Associations

With respect to the specifics of correlating emission results, there is an error in the regulatory provisions relating to the calculation of GHG emission rates. Specifically, §1036.530(b)(1) references ASTM D240-09 as the appropriate test method for calculating the carbon content of the test fuel. The correct test method is ASTM D5291. A similar correction needs to be made to §1036.810(b)(1) as well. [EPA-HQ-OAR-2010-0162-1940.1, p.14]

Response:

The agencies would like to thank the commenter for this feedback and we have corrected this reference in the final rule.

8.7. Drive cycles

Organization: ACEEE, Eaton Corporation, CALSTART, NRDC, and UCS

In addition to powertrain testing, the agencies should further refine the vehicle test cycles to more accurately reflect actual drive cycles. Analysis of the proposed drive cycles suggests that modification of existing cycles can provide more realistic comparisons to in-service fuel consumption for vocational applications. The agencies should seek to develop appropriate test cycles that better reflect in-use fuel economy, without unduly adding certification cost or complexity. [EPA-HQ-OAR-2010-0162-1941.1, p.1]

Response:

The vehicle and engine duty cycles are designed to reflect the performance improvement expected from advanced technologies. Based on comments and data provided by various industry sectors and additional analysis by the agencies, the duty cycles will essentially remain as proposed for purposes of assessing GHG performance and fuel consumption improvements. The agencies reviewed data which addressed factors such as the number of starts and stops for a given duty cycle, the kinetic intensity of a duty cycle, the amount of braking energy available in a given duty cycle, as well as average speeds and loads. The conclusion reached by the agencies is that a reweighting of the original duty cycles would provide for a GHG emissions characterization that closely matches real-world operation and performance improvements that were seen in real world operation.

Organization: Robert Bosch, LLC

Compliance with the engine standards should be demonstrated over the steady-state Supplemental Emission Test engine cycle (for combination tractor engines) and the Heavy-Duty Federal Test Procedure (HD FTP) engine cycle (for vocational vehicle engines), and Bosch fully agrees with EPA that the test procedure issue, both for GHG emissions standards and criteria pollutant emissions standards, should be revisited once a World Harmonized Duty Cycle is introduced. [EPA-HQ-OAR-2010-0162-1630.1, p.9]

Response:

The importance of the test procedure in properly reflecting the performance of engine and vehicle systems has a direct impact on the real-world improvement. The agencies will continue to evaluate the impact of the appropriate duty cycle and other factors with future GHG and fuel consumption improvements.

The agencies agree with the commenter that the wrong metric can limit uptake and acceptance of technology which could have a positive impact on GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles.

Organization: Allison Transmission

The NAS Report Recognized Relationship Between Average Speed, Fuel Efficiency and Emissions But Proposed Incomplete Metric [EPA-HQ-OAR-2010-0162-2735.1, p.5]

The NAS Report fully recognized the relationship between average speed and efficiency in fuel use when it stated that '[v]ehicles in the real world do not operate at a steady speed. For a given segment of activity, or for a cycle, it is therefore important to use the metric of average speed in discussing fuel use.' The NAS report also indicated that '[t]he fuel efficiency of a truck is not readily characterized by a single number, but rather by a curve against average speed.' The LSFC-and the metric proposed by EPA and NHTSA for combination tractors and vocational vehicles -- only takes into account payload and fuel economy (i.e., through use of a gallons/1000 ton-miles form). Thus, it is missing a vital component of measuring true GHG emissions and FE, average speed. [EPA-HQ-OAR-2010-0162-2735.1, p.5]

Failure to take into account average speed will have significant adverse effects on any program intended to improve the FE of MD/HD vehicles, particularly for vocational vehicles which often operate in urban conditions of 'stop and go' traffic. In this regard, NAS recognized that the majority of wasted energy in transient operation resulted from use of service brakes and the associated need for propulsion energy during subsequent acceleration events. Powertrains that maximize propulsion energy and/or recapture energy lost during braking would have significant advantages in terms of fuel efficiency (i.e., powershifting transmissions or hybrid systems that utilizing regenerative braking and electrical storage systems to minimize energy losses). Yet a gallons/ton-miles form would not recognize any of this inherent and demonstrable efficiency. EPA and NHTSA should instead utilize a complete metric based on: [EPA-HQ-OAR-2010-0162-2735.1, pp.5-6]

$$\frac{\text{Gallons}}{\text{1000 ton miles}} \times \frac{\text{Average Vehicle Speed (Reference)}}{\text{Average Vehicle Speed (Actual)}}$$

[EPA-HQ-OAR-2010-0162-2735.1, p.6]

This metric would utilize current EPA vehicle certification technology and utilize drive cycles that are appropriate to the particular vehicle types and classes being tested. In the equation presented above, average vehicle speed (reference) refers to the average speed prescribed by the appropriate vehicle drive cycle for the vehicle tested while average vehicle speed (actual) refers to the average speed actually achieved by the vehicle on the drive cycle. In effect then, the actual performance of any vehicle relative to the drive cycle serves as a necessary correction to the measurement of gallons consumed in order to move weight a certain distance - it provides a better measurement of the actual 'work' done by the vehicle. [EPA-HQ-OAR-2010-0162-2735.1, p.6]

In the preamble, EPA has stated several factors that Allison agrees with in respect to vehicle drive cycles. EPA indicates correctly that the choice of a drive cycle has significant consequences for the technology that will be employed to meet regulatory standards. EPA has also stated that the 'drive cycle should focus on promoting technology that produces benefits during the primary operation modes of the application. Despite these observations, however, the Agency has proposed that all engines in the combination tractor category meet a steady-state SET test cycle. EPA proposes to base the drive cycle for combination tractor compliance testing on the California ARB Heavy Heavy-duty Truck Mode 5 Cycle and utilize three of the cycles on the basis of information in EPA's MOVES model. [EPA-HQ-OAR-2010-0162-2735.1, p.26]

While EPA's proposed approach is fairly direct and straightforward, it is also wrong with regard to its primary assumptions. First, the approach does not account for variation of speeds in cruise conditions caused by numerous external factors (e.g., grades, wind, traffic conditions, etc.). Instead, incorporation of the High Speed Cruise and Low Speed Cruise utilizes constant speed cycles of 65 miles per hour (mph) and 55 mph which are overestimated. Second, acceleration rates employed are too low. EPA should instead consider the following additional data and information with regard to establishing applicable drive cycles for combination tractor compliance: [EPA-HQ-OAR-2010-0162-2735.1, p.26]

(1) Attachment 3 [See Docket number 2738.1 to these comments. This attachment outlines why requiring adherence to duty cycles in testing - or incorporation of a suitable

adjustment factor to the testing results - is necessary to better reflect the true fuel efficiency and emission performance of vehicles. [EPA-HQ-OAR-2010-0162-2735.1, p.26]

(2) Appendix 1 to Attachment 2 [See Docket number 2737.1] of these comments. This attachment addresses assumptions made within the NAS Report and contained within this proposed rule as to the operation of long-haul vehicles and the amount of steady-state operation of Class 7-8 vehicles. A. EPA Should Utilize Test Protocols As Outlined in 2007 Working Draft. [EPA-HQ-OAR-2010-0162-2735.1, p.26]

In November 2007, EPA published the Working Draft of the SmartWay Fuel Efficiency Test Protocol for Medium and Heavy Duty Vehicles. The purpose and scope of that document was to 'provide a standardized, objective, consistent test procedure to measure the fuel consumption of heavy duty vehicles used in on-road operation.' Within the report, in the discussion of drive cycle selection criteria, it was noted and observed that the duty cycles of heavy-duty vehicles 'vary greatly by application.' The report included a highway line haul duty cycle, a regional haul cycle, a local pick up and delivery cycle, a neighborhood refuse truck, a utility service truck, transit bus cycles, and an intermodal drayage truck cycle. Unique drive cycles were provided for each different vehicle type, including two different candidate drive cycles for transit buses, the Manhattan bus cycle and the Orange County bus cycle. [EPA-HQ-OAR-2010-0162-2735.1, p.27]

While Allison appreciates the rationale that EPA and NHTSA offer for not pursuing dynamometer testing of vehicles, it is also clear that the rulemaking structure proposed by each Agency could incorporate additional drive cycles and vehicle subcategorization beyond that proposed. Indeed, the issue of dynamometer testing is not intrinsic to the selection of drive cycles; instead, EPA and NHTSA have the ability to model compliance with drive cycles and propose this alternative as part of the utilization of the GEM. Within the preamble to the proposed rule, neither agency has offered an argument why additional drive cycles could not be utilized. EPA and NHTSA should therefore reevaluate the drive cycles utilized in this proposed rule taking into account the 2007 draft report. The test protocols outlined by EPA in 2007 are also supported by additional work performed by the Oak Ridge National Laboratory in 2008. This report specifically noted that line-haul vehicle operation varies from the high levels of cruise estimated for purposes of the proposed rule. In specific, the report noted that: [EPA-HQ-OAR-2010-0162-2735.1, p.27]

Heavy truck-based long-haul operations (i.e., operations in areas beyond 300-to-500 miles of a garaging area) have typically been stereo-typed as long-periods of driving many miles with few stops. However, when considering refueling, topography, congestion, size/weight/safety inspections, anti-idling laws and hours-of-service, there is considerably more stop-and-go behavior than is popularly believed. In long-haul operations, the drivers usually do not return to their home terminal each evening and they maintain a daily logbook of operation statistics. [EPA-HQ-OAR-2010-0162-2735.1, p.27-28]

Within this report, an EPA modified cruise module was also cited. As demonstrated in the graphic provided below, we would note the variance between the drive cycle contemplated by this effort and the drive cycle(s) proposed to be incorporated within this proposed rule. In effect, more transient operation is forecast for HD vehicles even in cruise operation than proposed to be incorporated within the compliance mechanism for this rule. [EPA-HQ-OAR-2010-0162-2735.1, p.28]

[See p.28 of this comment summary for Fig. 4 Modified HHDDT Cruise Module for Highway Line Haul Operations]

Altogether, the weighting of drive cycles proposed does not reflect real-world conditions. In the proposed rule, EPA and NHTSA estimate that sleeper cabs operate 86% of the time at 65 mph and that day cabs operate 64% of the time at 65 mph. EPA and NHTSA should revisit these estimates and reconsider recent work conducted by both the SmartWay program and Oak Ridge National Laboratory. [EPA-HQ-OAR-2010-0162-2735.1, p.28]

In whatever drive cycles EPA and NHTSA may ultimately require for certification and compliance of MD and HD engines and vehicles, substantial testing will need to be undertaken under controlled conditions. In such testing, various engine/vehicle configurations may be assessed with respect to an ability of the equipment to follow a duty cycle (e.g., follow the 'trace' of acceleration and deceleration events that are incorporated into the cycle). [EPA-HQ-OAR-2010-0162-2735.1, p.34]

In the Light-Duty Vehicle ('LDV') sector, the ability to follow a 'trace' is generally not an issue. The power-to-weight ratios of passenger cars often far exceed the levels needed to comply with particular drive cycles. For example, a 2-ton passenger car with a 250 horsepower ('hp') engine, would have a power-to-weight ratio of 125 hp/ton. In the MD/HD sector, however, such ratios are simply unachievable given the far higher vehicle weights and the normal commercial loads transported by the vehicles. For example, a tour coach may weigh 25 tons and utilize a 400 hp engine, producing a power-to-weight ratio of 16 hp/ton. A day cab line haul truck could weigh from 11 to 35 tons (depending on loading) and use a 425 hp engine, producing power-to-weight ratios of 39 hp/ton and 12 hp/ton respectively. For a 33 ton cement mixer using a 350 hp engine, the power-to-weight ratio would decline to 11 hp/ton. In short, the typical passenger car has a power/weight ratio which is at least an order of magnitude higher than a commercial truck. [EPA-HQ-OAR-2010-0162-2735.1, p.34]

In testing MD/HD vehicles as against a drive cycle then, meeting the trace is not a foregone conclusion. The slower acceleration of vehicles and the lag times between 'stops' and 'starts' are inherently greater than in the LDV. The additional time it takes to shift gears for manual and AMT transmissions and recover lost speed on acceleration events is also considerable when compared to an AT. A Ts are the most often specified and purchased transmission type in vocational vehicles in the U.S. As outlined in Attachment 3, the ability of some vehicles to reliably follow a trace is then, at best, questionable. EPA should not simply ignore this factor, but instead account for the real-world operation of vehicles relative to drive cycles by either adopting a metric which applies a vehicle speed factor, or otherwise account for or 'correct' test results to apply a penalty for vehicles which cannot meet the trace. [EPA-HQ-OAR-2010-0162-2735.1, p.34]

Such correction is needed to preserve the integrity of the engine/vehicle testing and compliance system. Duty cycles are drawn from vehicle testing information and generally strive to replicate real-world operation of vehicles. It thus seems incoherent to focus drive cycles on replication of real-world traffic conditions while ignoring the ability of vehicles to either meet or not meet such cycles. Second, as noted above, Allison would encourage continuing development and testing of drive cycles; especially drive cycles which are focused on the transient conditions in which many vehicles of all classes operate on a daily basis. While perfection is unachievable and the variety of different vehicle types in the MD/HD sector greatly complicates the agencies' tasks, continual improvement of the methodology and testing protocols is possible. [EPA-HQ-OAR-2010-0162-2735.1, pp.34-35]

EPA's proposed emission testing regulations, however, allow vehicles that cannot maintain compliance with the duty cycle trace to 'pass' the test and be certified as compliant. See proposed 40 CFR § 1066.330(e)(4)(iii)). This essentially promotes two results. First, this provision does not provide impartial treatment between those engines and vehicles that can pass the test and those that are unable to pass a test draw from 'real world' vehicle operation. Where there is no penalty for not following the trace, there is no incentive to design and build equipment which may be able to follow acceleration and deceleration events. Second, allowing an exception ignores the fact that inability to follow the trace means the vehicle cannot keep up with traffic in real world, thereby distorting EPA emission/fuel economy analysis. In the real world, vehicles that cannot follow the trace will fall behind other vehicles in traffic, requiring additional fuel and time to reach its destination. Simply ignoring this likely result does nothing to serve the GHG emission and FE goals of the rulemaking. [EPA-HQ-OAR-2010-0162-2735.1, p.35]

By comparison, for many years it has been the standard EPA practice during certification testing for LDVs to assure that vehicles must precisely follow a carefully-prescribed 'speed vs. time' drive cycle. This is based upon the sound principle that the energy put into a vehicle (energy derived ultimately from the fuel) is highly dependent upon the vehicle's acceleration and speeds during the cycle. Such an important, long-standing principle and testing protocol should not be abandoned simply because there is a broad range of variation in a commercial vehicle's ability to faithfully meet the prescribed drive cycle. Instead, EPA should take the required time to develop appropriate drive cycles that replicate the real world conditions experienced by Class 2b to Class 8 vehicles. To account for variability in individual vehicle performance, EPA has discretion to certify engines or vehicles that cannot meet the prescribed drive cycle, but to instead correct GHG and FE results on the basis of differences experienced by vehicles able to comply with a required drive cycle and vehicles that cannot follow the prescribed trace of a drive cycle. [EPA-HQ-OAR-2010-0162-2735.1, p.35]

Response:

The agencies agree with the commenter that the wrong metric can limit uptake and acceptance of technology which could have a positive impact on GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles.

Organization: Cummins, Inc.

The Agencies propose the use of existing criteria pollutant certification test cycles for GHG/FC certification. Specifically, they propose that the steady-state SET will be used to evaluate tractor engines, and the transient FTP cycle will be used to evaluate vocational engines. As shown in the Cummins paper “Framework for the Regulation of Greenhouse Gases from Commercial Vehicles”, these test cycles correlate well to the real-world duty cycles of engines in tractors and vocational vehicles and are appropriate. [EPA-HQ-OAR-2010-0162-1765.1, p.19]

Response:

The agencies agree that use of the FTP and SET duty cycles are appropriate for evaluating the GHG and fuel consumption performance of engines.

Organization: Daimler Trucks North America

We agree that the regulation of CO_2, CH_4 and N_2O emissions on a brake specific basis over existing test cycles currently used for measurement of criteria pollutants is appropriate for the first phase of GHG regulations. In general, doing so appropriately limits the additional burden of testing for GHG compliance and is helpful to achieving implementation of the first phase of GHG regulations in the timeframe prescribed by the administration. [EPA-HQ-OAR-2010-0162-1818.1, p.37]

We also agree with EPAs assessment that the variability of CO_2 measurements is not insignificant, especially in relation to the magnitude of changes in the CO_2 regulations. In order to reduce known sources of variability in determining CO_2 emissions levels, we recommend an alternative approach to that currently proposed. Measurement of fuel consumption over the prescribed test cycles is more direct, accurate and repeatable than measurement of brake specific CO_2 emissions which relies on more measured inputs, each of which have inherent inaccuracies. Measured fuel consumption can then be converted directly to mass of CO_2 emissions using an appropriate nominal conversion factor, and applying appropriate adjustments for fuel characteristics (as determined by recognized ASTM procedures). [EPA-HQ-OAR-2010-0162-1818.1, p.37]

The Agencies also propose to use a conversion factor of 10,180 grams CO_2 per gallon of diesel fuel, and to use this conversion factor to calculate volumetric fuel consumption from brake specific CO_2 measurements recorded for EPA CO_2 compliance. We agree that the proposed conversion factor is appropriate for conversion of CO_2 mass to gallons of diesel fuel as proposed as well as with use of the above recommended method for CO_2 determination. [EPA-HQ-OAR-2010-0162-1818.1, p.37]

Response:

The importance of the test procedure in properly reflecting the performance of engine and vehicle systems has a direct impact on the real-world improvement. The agencies will continue to evaluate the impact of the appropriate duty cycle and other factors with future GHG and fuel consumption improvements.

Organization: American Council for an Energy-Efficient Economy (ACEEE)

While this information may imply a fuel consumption and GHG emission benefit from increasing engine horsepower, this is not generally the case, for two reasons. First, an engine is most efficient at or near full load. An oversized engine spends more time at lower percent load and consequently achieves a lower efficiency. This is shown quantitatively in the brake-specific fuel consumption map in the draft RIA. The SET and FTP tests measure emissions at points on the engine map that are normalized to engine peak torque and speed, so the amount of time the vehicle operates at inefficient points on the engine map is not captured by the test protocol. Second, a vehicle with an overpowered engine is likely to be driven in a manner different from a vehicle with lower rated power; in particular it may accelerate and climb hills faster. These differences will not be reflected in engine test results, either, because the drive cycle is fixed across vehicles. Also, idle emissions of a bigger engine will be higher. The bigger engine also increases curb weight and consequently reduces payload. [EPA-HQ-OAR-2010-0162-1894.1, p.10]

Real-world data supports these concerns. For example, the CRC Study E-55/59 tested more than 40 heavy heavy-duty (HHD) Class 8 tractor trucks. These trucks had engines ranging from 7.6 liter (L) to 15 Lin size and from 215 hp to 530 hp in rated power. The wide range of rated horsepower contributed to a wide range of fuel economy, varying from 5.61 mpg to 8.11 mpg, when tested at a fixed load of 56,000 lbs (See Figure 2). [EPA-HQ-OAR-2010-0162-1894.1, pp.10-11]

[Figure 2 can be found on page 11 of this comment.]

To prevent the rule from promoting larger engines and higher fuel consumption, the agencies should specify the typical size range for each of the engine subcategories, as EPA has done in its criteria emissions rule. Any engine with horsepower outside the range suited to the intended application should be shown to meet the standard using the same load as a properly sized engine, i.e., without scaling the load to the outsized engine's peak power. [EPA-HQ-OAR-2010-0162-1894.1, p.11]

While the horsepower ranges discussed in the above-cited EPA regulation give no upper bound for a heavy heavy-duty diesel engine, the authors' calculation using the road-load equation shows that a Class 8 truck with 90,000 pounds gross vehicle weight rating (GVWR) will operate 93 percent of its duration with less than 500 horsepower if operated on a CARB HD High Cruise Cycle. The average speed of this cycle is 50 mph, with a maximum speed of 67 mph, a reasonable upper bound for a line-haul trucking duty cycle. [EPA-HQ-OAR-2010-0162-1894.1, p.11]

Recommendation (engine test cycles): Develop new test cycles for heavy-duty engines, reflecting intended applications and real-world driving characteristics. [EPA-HQ-OAR-2010-0162-1894.1, p.12]

The agencies have proposed testing heavy-duty engines for vocational applications on the HD Federal Test Procedure (FTP) Cycle and-engines intended for tractor application on the Supplemental Emissions Test (SET) Cycle (p. 74366). These two cycles are currently used to certify criteria pollutants from the heavy-duty engines. The FTP Cycle was developed in the 19705, when most vehicles had low power density and were equipped with mechanical fuel injection. Gear ratios in these vehicles during that time were used to limit maximum vehicle speed. Today's heavy-duty engines are more dynamic, have significant but complex electronic control, and more importantly have different transient fuel and air management. Therefore, there is a need for a new, comprehensive engine cycle that reflects today's real-world driving characteristics for vocational vehicles. The FTP Cycle should be replaced with a new, comprehensive set of cycles, at least in the next phase of regulation. [EPA-HQ-OAR-2010-0162-1894.1, p.12]

The agencies propose to use only the SET Cycle for CO2 emissions certification for tractor truck engines. Long-haul trucks do not spend all of their time in steady state driving, however; cycle development for these trucks indicates that they spend a significant amount of their time in transient operation, where fuel consumption and GHG emissions are higher. Indeed, the drive cycle the agencies propose for tractor trucks (not engines) includes a 19 percent share of transient operation for tractors with day cabs. Therefore, there is a need to include certification testing for these engines over a transient cycle. [EPA-HQ-OAR-2010-0162-1894.1, pp.12-13]

The agencies express the concern that setting standards based on both transient and steady-state operating conditions could lead to undervaluation of technologies such as turbocompounding that offer benefits primarily in steady-state driving (p.74188). However, the benefits of technologies clearly will be best represented by the use of a weighted set of drive cycles that corresponds most closely to real-world operation. [EPA-HQ-OAR-2010-0162-1894.1, p.13]

It would also be in the best interest of the truck manufacturers to develop a comprehensive engine test cycle that can adequately test modern engines and mimic real-world benefits. The European Transient Cycle (ETC), the Worldwide Harmonized Transient Cycle (WHTC), and the Coordinating Research Council's Advanced Collaborative Emissions Test Schedule (ACES) should be examined as candidate test cycles in the future. Alternatively, the agencies could develop a new, comprehensive set of cycles that can be applied to all heavy-duty engines in the next phase. [EPA-HQ-OAR-2010-0162-1894.1, p.13]

Recommendation (test cycles for heavy-duty pickups and vans): Choose test cycles for heavy-duty pickups and vans that adequately represent real-world driving conditions, including high-speed driving, use of air conditioning, and cold-temperature operation. [EPA-HQ-OAR-2010-0162-1894.1, p.22]

In choosing test cycles for this new regulatory program, the agencies should take advantage of the experience of several decades with the light-duty program to adopt realistic test cycles for heavy-duty pickups and vans. The light-duty test cycles were shown in EPA's 2006 light-duty labeling rule to overstate fuel economy by more than 20 percent on average across vehicles and to be unable to detect certain technology- and weight-related determinants of fuel economy. The agencies have proposed to use these same cycles (the FTP and the HFET) as test cycles for heavy-duty pickups and vans. While choosing more representative cycles over which to test the fuel economy of cars for certification purposes would require a change in law, there is no such limitation on test cycles for heavy-duty pickups and vans. Moreover, the EPA has already developed a more a more representative set of test cycles (the 5-cycle test') for light-duty labeling purposes, which provides at least a good starting point for establishing a cycle for heavy-duty pickups and vans. [EPA-HQ-OAR-2010-0162-1894.1, pp.22-23]

Response:

The importance of the test procedure in properly reflecting the performance of engine and vehicle systems has a direct impact on the real-world improvement. The agencies will continue to evaluate the impact of the appropriate duty cycle and other factors with future GHG and fuel consumption improvements.

Organization: American Trucking Associations, Inc. (ATA)

ATA will continue to advocate for lower average speed of all vehicles, including the mandatory electronic speed governing of large trucks. This is a simple and cost-effective approach to improving fuel economy and reducing GHG emissions. To this end, we seek workable solutions to encourage fleets to select a speed limiting option when they order a new tractor. ATA proposes the following:

- Pro-rate the GEM input credits to average fleet trade-in cycles

- Allow fleets to reset and lower their speed limiters if company policies change during the ownership cycle in which the manufacturer is receiving GEM input credit

- Allow manufacturers to account for additional GEM input credits associated with the resetting of speed governors made within the useful life of a vehicle [EPA-HQ-OAR-2010-0162-2263.1, p.8]

Q. Hybrid Drive Cycle Weightings Should be Changed

The proposed drive cycle weightings for hybrid vehicles, with and without power take-off (PTO), do not match typical real-world hybrid applications thereby under-representing the advantages and benefits of hybrid technologies. There is a need to establish new hybrid duty cycles to reflect the actual duty cycle use of a these vehicles. [EPA-HQ-OAR-2010-0162-2263.1, p.14]

ATA believes that that the PTO time in Table IV-3 is greatly underweighted for these vehicles. Further, the proportions of driving time at 55 mph and 65 mph are almost nonexistent and certainly much lower that the percentages set out in Table IV-3. Based on our experience, coupled with input from our members, similar concerns apply to other applications such as residential waste hauling trucks. [EPA-HQ-OAR-2010-0162-2263.1, p.14]

Response:

The importance of the test procedure in properly reflecting the performance of engine and vehicle systems has a direct impact on the real-world improvement. The agencies will continue to evaluate the impact of the appropriate duty cycle and other factors with future GHG and fuel consumption improvements. The agencies have revised the duty cycle weightings associated with hybrid vocational applications to more appropriately reflect the operation of these vehicles for those applications most likely to be used in or as hybrids in the near-term. Regarding the use of Vehicle Speed Limiters (VSLs), the agencies continue to encourage the use of technology options that improve fuel consumption and reduce greenhouse gas emissions. To that end, fleets are encouraged to improve VSL performance and targets as appropriate for the fleet in a manner consistent with the engine and vehicle certification To the extent the VSL may be changed throughout the useful life of the vehicle, it will be difficult for the agencies to maintain a moving average for certified products dependent upon the value individual fleets may choose. The overall VSL cap provided at the time of certification by the certificate holder must govern the certification and compliance aspects of the credit determination process.

Organization: BAE Systems

The test cycles proscribed under §1037.510(a) and the weighting factors proscribed by §1037.510(b) are inconsistent with the duty cycles for the urban transit bus vocation and will unnecessarily penalize hybrid electric technology, with the unintended consequence of hindering the growth potential of this fuel-saving technology and market. [EPA-HQ-OAR-2010-0162-1948.1, p.1]

Recommendations: (see Discussion section below for more detail) [EPA-HQ-OAR-2010-0162-1948.1, p.2]

a. Preferred Solution: Implement the Standardized On-Road Test (SORT) cycles for vocational vehicles operating in the urban environment, combined with a Weighting Table for the 3 different SORT cycles for the various vocations. [EPA-HQ-OAR-2010-0162-1948.1, p.2]

b. Secondary Solution: Adopt the Orange County duty cycle for the urban transit bus vocation [EPA-HQ-OAR-2010-0162-1948.1, p.2]

c. Tertiary Minimum Solution: Create an Urban Transit Bus vocation to Table-I of §1037.510(b) which has weighting factors of either: [EPA-HQ-OAR-2010-0162-1948.1, p.2]

i. 100% transient, 0% at 55 mph, 0% at 65 mph (15.3 mph avg speed) or [EPA-HQ-OAR-2010-0162-1948.1, p.2]

ii. 90% transient, 10% at 55 mph, 0% at 65 mph (17.2 mph avg speed) or [EPA-HQ-OAR-2010-0162-1948.1, p.2]

iii. 90% transient, 7% at 55 mph, 3% at 65 mph (17.4 mph avg speed) [EPA-HQ-OAR-2010-0162-1948.1, p.2]

Discussion: The urban transit vocation is characterized by relatively low average speed, little high-speed operation, frequent stops/starts, and substantial periods of idle time. Table-1 is from the 2010 American Public Transportation Association (APTA) 'Fact Book', which shows that the National average speed tor urban transit buses is 12.6 mph, and that this speed has been steadily declining over the past 12-years. [EPA-HQ-OAR-2010-0162-1948.1, p.2]

[See p.2 of this comment summary for Table 10: Average Vehicle Speed By Mode In Revenue Service]

Additionally, there are several standard urban transit bus duty cycles that are used both in the United States and in Europe that have characteristics similar to the APTA historical data. Key characteristics of these standard transit industry duty cycles are compared to the Appendix A Transient Cycle in Table-2. [EPA-HQ-OAR-2010-0162-1948.1, p.2]

[See p.2 of this comment summary for table comparing Selected Cycle Metrics]

As can be seen, the average of the various urban transit bus cycles shows substantially higher idle (zero speed) percentage, substantially lower average speed and higher available regenerative energy potential compared to the Appendix-A Transient cycle. These data rapidly become much more divergent when the 55 mph & 65 mph cruise segments are added resulting in a vocational average speed of 32.6 mph, almost 3 times that of the typical urban transit bus duty cycle. Consequently, we do not believe that the proposed Appendix A Transient cycle nor the Weighting Factors adequately or properly represent the duty cycle of the urban transit bus vocation, the consequence of which is to penalize hybrid-electric propulsion systems used in the urban transit vocation. [EPA-HQ-OAR-2010-0162-1948.1, pp.2-3]

Based on the above, an alternative duty cycle for the urban transit bus vocation is warranted and necessary to demonstrate the fuel efficiency value and therefore foster the continued implementation of hybrid electric propulsion in this market segment. [EPA-HQ-OAR-2010-0162-1948.1, p.3]

SORT Cycle: To this end, BAE Systems recommends the adaptation of the Standardized On-Road Test (SORT) cycles developed jointly and cooperatively between European industry groups and manufacturers of vehicles and transmissions. (See Attachment 1) [EPA-HQ-OAR-2010-0162-1948.1, p.3]

Brochure SORT_EN. pdf [EPA-HQ-OAR-2010-0162-1948.1, p.3]

Adoption of the SORT cycles has several key benefits when dealing with urban vocational vehicles: [EPA-HQ-OAR-2010-0162-1948.1, p.3]

• The simple but representative geometric profile of the SORT cycles permits less costly "track testing' of vehicles if not for certification, at least for development, tuning, and pre-certification testing, which will lessen the financial and logistical burdens of using the relatively few chassis dynamometer facilities. [EPA-HQ-OAR-2010-0162-1948.1, p.3]

Additionally, since other (non-hybrid) vehicles are permitted to certify through computer simulation, it does seem somewhat uneven that hybrids are required to use a chassis or power train dyno. A less expensive and burdensome road test procedure should be implement, whether SORT or some other procedure, so as not to unfairly burden hybrid propulsion and vehicle manufacturers. [EPA-HQ-OAR-2010-0162-1948.1, p.3]

• The SORT protocol provides three different cycles that can be used to tailor, by means of weighting factors, the various urban vocational vehicle types to include transit buses [EPA-HQ-OAR-2010-0162-1948.1, p.3]

• Using the SORT cycles and protocols would harmonize with European testing and measurement procedures, further lessening the testing and certification burden on manufacturers. [EPA-HQ-OAR-2010-0162-1948.1, p.3]

At an 11.2 mph average speed, the SORT-2 cycle lines up most closely with the average of transit bus duty cycles at 9.9 mph as well as the overall US National average of 12.6 mph. [EPA-HQ-OAR-2010-0162-1948.1, p.3]

CBD-14 & Orange Co. Cycles: Alternatively, two other standard transit vocational cycles, not as desirable or as flexible as the SORT, but which would still be a superior alternative for urban transit compared to the to the Appendix-A Transient cycle. [EPA-HQ-OAR-2010-0162-1948.1, p.3]

• One is the CBD-14, a long time transit industry standard and benchmark; it is also a simple geometric cycle which would lend itself to less expensive road test implementation. However, it is a single cycle with only one base profile versus the SORT which has 3 different cycles using 5 different base profiles. [EPA-HQ-OAR-2010-0162-1948.1, p.3]

• The second is the Orange County cycle which due to its highly random nature would not lend itself very well to the desirable and less expensive road test application. [EPA-HQ-OAR-2010-0162-1948.1, p.4]

At an average speed of 12.3 mph, both these cycles were developed for urban transit use and therefore match well with the 12.6 mph National average, but may not be suitable for other vocational use. [EPA-HQ-OAR-2010-0162-1948.1, p.4]

Modification to §1037.510(b) Table-I: At an absolute minimum, in order come as dose as possible to urban transit vocational duty cycle an "urban transit bus' weighting factor should be added to §1037.510(b) Table-I reflecting little to no utilization of the 55 mph and 65 mph cruise segments, leaving only the 15.3 mph transient segment. While this still does not represent the transit vocation as well as the other above solutions, and is far from ideal, it will have a lesser adverse affect on the fledgling heavy-duty hybrid propulsion industry than the currently proposed vocational weighting distribution. [EPA-HQ-OAR-2010-0162-1948.1, p.4]

Response:

The agencies agree that technically sound data and test methods are essential for compliance for engines, aerodynamic features, and other systems. The agencies have continued to refine the test protocols for advanced technologies as a result of the comments received. An updated protocol for testing advanced technology applications, as well as updates to the duty cycles have been addressed as a result of both comments from the industry and other stakeholders, as well as additional Agency testing and data analysis. The duty cycle weightings have been modified for hybrid vehicles to better reflect real world performance improvements. Additionally, the agencies have avoided simulating control logic or algorithms which may be native to or unique to specific systems and for that reason, hybrid system performance and improvements must be characterized with actual system tests rather than through component interaction and system simulation.

Organization: Bendix Commercial Vehicle Systems LLC (Bendix)

The proposed vocational drive-cycle in the NPRM does not provide enough variation to capture true performance of vehicles in the vocational space. Bendix recommends that the agencies provide CILCC as the general purpose mixed urban/freeway cycle, potentially with a 20 percent freeway weighting and to use four representative cycles (mixed urban/freeway, city bus, refuse, utility). The cycles should be used for both power pack and full chassis. [EPA-HQ-OAR-2010-0162-1888.1, p.7]

Response:

The agencies agree that technically sound data and test methods are essential for compliance for engines, aerodynamic features, and other systems. The agencies have continued to refine the test protocols for advanced technologies as a result of the comments received. An updated protocol for testing advanced technology applications, as well as updates to the duty cycles have been addressed as a result of both comments from the industry and other stakeholders, as well as additional Agency testing and data analysis. While the agencies have not decided to use the CILCC duty cycle, the duty cycle weightings have been modified for hybrid vehicles to better reflect real world performance improvements.

Organization: Bridgestone

According to a 2010 Transportation Research Board study "…. Tires, like most products, must satisfy a range of performance criteria (e.g. rolling resistance, wear, noise, traction, durability, cost), and several inherent design trade-offs exist when balancing the tire performance for a particular use....." [EPA-HQ-OAR-2010-0162-2120.1, p.3]

For regulatory requirements to be appropriate, cost-effective and technologically feasible, any tire Rolling Resistance Coefficient (RRC) targets or thresholds need to be data-driven. In a public hearing on this NPRM, Mr. French, the Director of the Assessment & Standards Division of the US EPA states that there is limited data (for vocational vehicle tires) regarding tire performance tradeoffs such as traction and wear. It is the Bridgestone Americas position that any market reduction in tire RRC driven by regulatory purposes must be highly data-driven to avoid potential un-intended consequences; and therefore a comprehensive study encompassing tires for all vehicle types to be regulated may be needed where only anecdotal evidence or limited data exists. [EPA-HQ-OAR-2010-0162-2120.1, p.3]

Response:

The agencies concur with the commenters concern regarding a data-driven regulatory process. To that end the agencies have completed a detailed study of tire performance which may be viewed in the Public Docket to this action . Additionally, the agencies have engaged with tire manufacturers to better understand performance impacts associated with the standards for impacted applications.

Organization: California Air Resources Board (ARB)

ARB staff would like to bring to your attention an incorrect statement noticed in Section 3.4.1, Drive Cycle Considered, in the agencies Draft Regulatory Impact Analysis. On page 3-23, the last paragraph on the page states, 'The ARB 5-mode cycle was developed from data gathered by the University of California Riverside in collaboration with California ARB from 270 1993 - 2001 MY trucks and over 1 million miles of activity. ' Correction: The ARB 5-mode heavy heavy-duty diesel truck (HHDDT) chassis dynamometer cycle was developed by ARB staff based on data collected during two ARB-sponsored research projects (Jack Faucett Associates and Battelle) that collected in-use heavy-duty truck activity data using GPS-equipped data loggers. The University of California Riverside performed data collection and analysis of the HHDDT cycle, but they were not involved in the development of the cycle. Also, ARB staff only had about 60,000 miles worth of activity data (about 5.8 million seconds of data), not 1 million miles. The balance of the paragraph describing how the cycle has been used is accurate.[EPA-HQ-OAR-2010-0162-2354.1, p. 8]

Response:

The agencies thank the commenter for the correction.

Organization: Allison Transmission

The metric, proposed above in Section I.B, also provides for a better measurement of a vehicle's fuel efficiency and greenhouse gas emissions. Vehicles that are able to accomplish more work during a given time period produce greater overall vehicle fuel efficiency. Vehicles that are able to avoid power losses and accelerate more effectively in urban traffic over the course of a day can make more stops, deliver more goods and complete more tasks required of them. Relatively small time savings, when replicated repeatedly over the course of a day or week, greatly enhance the productivity of a vehicle. Therefore, the work needed to be performed by a vehicle can be accomplished with relatively less running time (in the case of a single vehicle) and the work needed to be accomplished by a fleet can be accomplished with relatively fewer vehicles. 12 [EPA-HQ-OAR-2010-0162-2735.1, p.6]

EPA and NHTSA have recognized that personal vehicles, regulated pursuant to the 2009 LDV Rule and MD/HD vehicles, addressed by this proposed rule, are utilized differently and are affected by different external factors. But EPA and NHTSA have not fully incorporated this differential in the utilization of different vehicle classes into the proposed metric. The use of commercial vehicles addressed by this proposal is largely driven by the demands of the U.S. economy; it is the responsibility of the transportation industry to provide the required ton-miles of freight transport in any given year. This contrasts starkly with personal vehicle use that is affected by multiple non-economic factors, including recreational use, and other personal driving. [EPA-HQ-OAR-2010-0162-2735.1, p.7]

Within the LDV Rule, EPA and NHTSA accounted for changes in fuel cost per mile, personal income, vehicle prices, vehicles per capita, and other factors in deriving an estimate of the 'rebound effect.' EPA and NHTSA stated that '[the fuel economy rebound effect for light-duty vehicles has been the subject of a large number of studies since the early 1980s. Although they have reported a wide range of estimates of its exact magnitude, these studies generally conclude that a significant rebound effect occurs when vehicle fuel efficiency improves.' In other words, when the costs of driving decrease, individual vehicle use can increase. [EPA-HQ-OAR-2010-0162-2735.1, p.7]

In this proposed rule, EPA and NHTSA have recognized that the commercial and business purpose of MD/HD vehicles will predominate with regard to considerations of vehicle use. For example, driver pay is estimated to constitute 44% of the operating cost per mile of trucks. There is minimal, if any, personal or recreational use of most commercial vehicles. EPA and NHTSA have also properly recognized that there may be short-term and longer-term factors that could affect truck usage and vehicle miles traveled ('VMT'). But the agencies have not fully incorporated these factors into their regulatory approach for the MD/HD vehicle sector. Overall, there needs to be a greater recognition in this proposed rule that commercial vehicle use is driven by profit motive, and that broader economic factors are paramount in creating the demand for commercial vehicle VMT. [EPA-HQ-OAR-2010-0162-2735.1, p.7]

Simply put, the relative state of the national economy and individual commercial decision-making by businesses will dictate MD/HD vehicle use. EPA and NHTSA have recognized this difference in their qualitative assessment and comments with respect to the 'rebound effect' for commercial vehicles. 16 What EPA and NHTSA have not done, however, is to take the next logical step in this observation. That is, EPA and NHTSA should recognize that if vehicles can accomplish the work dictated by the economy in less time, utilizing fewer vehicles, this will result in an overall increase in fuel efficiency within the MD/HD sector. Allison's proposed metric acknowledges this fact and would account for these efficiency and emission benefits. The simple ratio of fuel consumed to 1000 ton-miles, as proposed by EPA and NHTSA, will not address such benefits. [EPA-HQ-OAR-2010-0162-2735.1, pp.7-8]

Moreover, improving fuel efficiency within the MD/HD sector via utilizing fewer vehicles to accomplish the work required of the trucking industry will directly reduce overall GHG emissions. EPA has long recognized and taken steps to reduce the time that MD/HD vehicles idle through SmartWay program grants and planning. If more trucks are required to do the economy-prescribed transport task, there will be more overall truck idling time, which will consume more fuel, less efficiently, even when accounting for possibly higher rates of fuel consumption at higher speed. In addition, more trucks in traffic will add to congestion, creating additional idling time for automobiles, too. Since GHG emissions are overwhelmingly based on fuel combustion 17, using fuel more efficiently to complete the required work of MD/HD vehicles directionally reduces GHG emissions. In addition, the manufacture and maintenance of fewer vehicles reduces net GHG emissions from the MD/HD sector. [EPA-HQ-OAR-2010-0162-2735.1, p.8]

It has been observed that lower vehicle speeds can increase the fuel economy of individual trucks. At least in some instances, moving freight at lower speeds could consume less fuel due to lower wind resistance on a vehicle and the possible ability to operate at lower engine revolutions per minute ('rpm'). But this observation is of limited utility with regard to the promulgation of standards which would regulate the MD/HD sector. Commercial vehicles have inherent incentives to deliver goods more efficiently. In the commercial sector, time undoubtedly is money and the cost of operating a vehicle is only partially reflected in the fuel consumed. External factors - e.g., hourly wages paid, customer needs for prompt delivery play an intrinsic and undeniable role in vehicle utilization. In other words, theory cannot replace hard commercial facts. [EPA-HQ-OAR-2010-0162-2735.1, p.9]

In seeking to design appropriate metrics to measure and improve the FE and lower GHG emissions from MD/HD vehicles, both EPA and NHTSA thus need to more fully consider vehicle operational realities in the commercial sector. Assuredly, the focus of this rulemaking is broad-based with respect to addressing climate change and reducing the consumption of transportation fuels. EPA's statutory focus must necessarily reside with respect to the emission of GHGs from MD/HD vehicle sector. NHTSA, operating within its own statutory framework, is required to focus on 'maximum feasible improvement' for a fuel efficiency improvement program. 19 Overall policy direction has been framed with respect to preservation of our environment and decreased utilization of petroleum. [EPA-HQ-OAR-2010-0162-2735.1, p.9]

Using fewer vehicles to perform the work dictated by the U.S. economy is consistent with such aims. That is, a metric incorporating average vehicle speed, thereby truly reflecting how the commercial sector measures work performed, serves the complementary goals that EPA and NHTSA seek in this rulemaking-less GHGs and improved FE. [EPA-HQ-OAR-2010-0162-2735.1, p.9]

As noted, EPA and NHTSA are not required to propose or promulgate a metric based on the NAS Report recommendation for a measure of load specific fuel consumption ('LSFC'). This being said, under the accelerated rulemaking schedule that the agencies are following, it may be difficult to re-propose a different metric and adhere to the July 2011 deadline for a final rulemaking package. In the event that EPA and NHTSA decide to adhere firmly to the announced deadline, an alternative approach to the Allison proposed metric would be to include a 'correction factor' to the proposed metric. [EPA-HQ-OAR-2010-0162-2735.1, p.10]

The correction factor would be applied when HD engines are tested on a given duty cycle representing the classes and duty cycle of particular vocations. That is, EPA and NHTSA would utilize the proposed metric, but then adjust the certification of vehicles based on measured or modeled performance relative to drive cycles based on real-world driving conditions. The resulting compliance values would essentially be corrected based on the actual distance a vehicle travels when trying to meet the 'vehicle speed vs. time' trace for the specified duty cycle. [EPA-HQ-OAR-2010-0162-2735.1, p.10]

In this regard, the proposed gallons/1000 ton miles standard is not a 'self-correcting' metric. If a vehicle is tested on an appropriate drive cycle and covers less distance on the drive cycle, it is true the denominator of the gallons/1000 ton miles metric will be smaller and thus produce a higher (i.e., worse) FE or GHG 'rating.' However, in this case, the numerator of the FE ratio will also decrease, which would improve the FE ratio. EPA and NHTSA should recognize this effect and not simply assume that the proposed metric automatically accounts for the different operation of different vehicles being tested (or simulated) on a drive cycle utilized for compliance. [EPA-HQ-OAR-2010-0162-2735.1, p.10]

As a simple example, suppose the goal of a drive cycle used for compliance is to compare the FE of two trucks at a steady cruising speed for one hour. It would be contrary to the purpose of the drive cycle to operate one truck at 65 mph and the other at 50 mph and then directly compare the FE of the two trucks, as measured in gal/1000 ton-mile. Yet such a result might be possible if the slower truck is allowed to 'pass' a drive cycle test (on the theoretical basis that because the slower truck goes a lesser distance over the 1 hour test period, the resulting performance of the truck is 'corrected' by the FE ratio in gal/1000 ton-mile). In short, it is logically inconsistent and not reflective of real world conditions to directly compare the FE of vehicles when they are operated at different average speeds and when their performance varies widely from that prescribed by a drive cycle.. Such an approach also would be misleading to ultimate purchasers of the vehicle who might rely on the vehicle's performance on a drive cycle as being indicative of real-world performance. [EPA-HQ-OAR-2010-0162-2735.1, p.10]

Drive cycles are designed to simulate real world traffic conditions. Therefore, the inability of any vehicle to follow the 'trace' of a drive cycle is not simply a failure without consequence. It means that the vehicle in the real world will not be able to keep up with traffic, will take more time to complete the work required of it and will consume more fuel to complete the work required of it (or, in the aggregate, a fleet will require more vehicles to fulfill its business obligations). Therefore, a correction factor is necessary to account for this failure, either in the form of a correction based on average speed as incorporated within the Allison-proposed metric, or with respect to a correction based on the distance a vehicle travels on the duty cycle versus the distance that would be covered by a vehicle which was following the trace. [EPA-HQ-OAR-2010-0162-2735.1, pp.10-11]

Altogether, Allison recognizes and appreciates that EPA and NHTSA are operating under tight timeframes in this rulemaking proceeding and that there are also constraints related to testing facilities and funding which might be needed in order to develop a more robust GHG/FE metric that would directly incorporate average speed or support a different approach to compliance than the approach in the proposed rules. Applying an adjustment factor would address these practical limitations, yet allow each agency to implement a more direct complete measure of each vehicle's FE and GHG emissions. [EPA-HQ-OAR-2010-0162-2735.1, p.11]

Given EPA and NHTSA intention for follow-on rulemakings, it is also incumbent upon both agencies to continue their evaluation of appropriate metrics for fairly comparing the relative GHG emissions and FE of different MD/HD vehicles. EPA and NHTSA should therefore recognize the limited focus of the NAS report, carefully evaluate alternatives to the proposed metric and work cooperatively with affected industries on a going-forward basis. An adjustment factor could serve as a bridge to the broader evaluation of appropriate FE and GHG metrics in follow-on rulemakings. [EPA-HQ-OAR-2010-0162-2735.1, p.11]

EPA and NHTSA are proposing to utilize drive cycle weighting for vocational vehicles based on 37% of 65 mph cruise, 21% of 55 mph cruise and 42% transient operation While this weighting reflects a substantial difference from the combination tractor weighting being proposed, the operating assumption is that real-world operation of these vehicles occurs nearly 60% at highway speeds. Given the vast differential of vehicles in this category, including very slow-moving vehicles like garbage trucks, vehicles with heavy transient utilization (urban and school buses, larger pick-up and delivery vehicles, urban transit and school buses), EPA's continued and over applied focus on steady-state operation is misplaced. [EPA-HQ-OAR-2010-0162-2735.1, p.29]

As indicated above, EPA's previous assessment of vocational vehicles for the SmartWay program indicated many distinct use patterns. This work is not reflected within the proposed rule. Instead, EPA and NHTSA have chosen to propose three different vehicle categories for vocational vehicles: Light Heavy-Duty Class 2b-5, Medium Heavy-Duty Class 6-7, and Heavy Heavy-Duty Class 8 driving. [EPA-HQ-OAR-2010-0162-2735.1, p.29]

The preamble to the proposed rule offers little rationale for this oversimplification of a diverse vehicle sector. As indicated by our comments with respect to buses, Allison believes that more distinct vehicle categories may be possible without creating an excessive administrative burden. While the proposed rule indicates that these vehicle categories 'use the groupings EPA currently uses for other heavy-duty engine standards' and that the categories are 'consistent with the nomenclature used in the diesel engine classification' the Agency offers no additional rationale beyond a reference to the fact that aerodynamic streamlining may not yield benefits in this sector. In contrast to the three categories for regulation for the vocational vehicle sector, EPA and NHTSA are proposing a total of nine different categories for regulation with respect to Class 7 and 8 tractor cabs. [EPA-HQ-OAR-2010-0162-2735.1, p.29]

As reflected by the chart below, supported by data contained in Attachment 4 [See Docket number 2738.1], vocational vehicles are primarily characterized by transient operation. Vehicles such as transit buses, shuttle buses, coaches and school buses operate overwhelmingly in transient modes with some vehicles approaching 100% transient operation. The proposed rules, however, would impose artificial and unrealistic assessments of such vehicles based on vast overweighting of on-highway, high speed operation. [EPA-HQ-OAR-2010-0162-2735.1, pp.29-30]

[See p.30 of this comment for a figure showing the Bus Duty Cycle Weighting - % Time; Time Stopped Removed]

<u>Response:</u>

The agencies agree with the commenter that the wrong metric can limit uptake and acceptance of technology which could have a positive impact on GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification of engines used in vocational vehicles. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles.

Organization: CALSTART

While we understand the need for a streamlined approach, we do believe that EPA/NHTSA needs to be cautious in terms of the duty cycles used in testing and evaluating vehicles and technologies. We strongly encourage flexibility and the use of duty cycles in addition to FTP to better quantify the value of high efficiency technology. A limited but slightly expanded range of duty cycles would allow for a more accurate assessment of advanced truck fuel economy and emission benefits. CALSTART and HTUF have been integral in identifying and promoting a limited number of discrete duty cycles that better reflect how trucks are used in the real world. [EPA-HQ-OAR-2010-0162-2121, p.4]

The FTP testing cycle is not a useful reflection of real world conditions, particularly for vocational trucks. While we accept the value and need of using this cycle for continued engine testing, we strongly recommend using accepted real-world duty cycles, such as those already listed in the SmartWay Fuel Efficiency Test Protocol for Medium and Heavy Duty Vehicles. CALSTART via HTUF has helped develop or validate several of these, including for parcel delivery, refuse and utility truck, including work site power take-off applications, and some use the CILCC duty cycle for the driving component. Additionally, CALSTART and HTUF are currently working with partners to develop and validate better Class 8 tractor duty cycles, including regional heavy delivery (working with food and beverage partners), drayage (working with port partners) and a more refined line haul quantification. [EPA-HQ-OAR-2010-0162-2121, p.4]

Response:

The agencies agree with the commenter that the wrong metric can limit uptake and acceptance of technology which could have a positive impact on GHG emissions reduction and fuel consumption improvement. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles.

Organization: Chamber of Commerce of the United States

$$\frac{\text{Gallons}}{\text{1000 ton miles}} \times \frac{\text{Average Vehicle Speed (Reference)}}{\text{Average Vehicle Speed (Actual)}}$$

This metric would utilize current EPA vehicle certification technology and utilize drive cycles that are appropriate to the particular vehicle types and classes being tested. In the equation presented above, average vehicle speed (reference) refers to the average speed prescribed by the appropriate vehicle drive cycle for the vehicle tested while average vehicle speed (actual) refers to the average speed actually achieved by the vehicle on the drive cycle. In effect then, the actual performance of any vehicle relative to the drive cycle serves as a necessary correction to the measurement of gallons consumed in order to move weight a certain distance—it provides a better measurement of the actual “work” done by the vehicle. [EPA-HQ-OAR-2010-0162-2152.1, p.8]

Response:

The agencies agree with the commenter that the wrong metric can limit uptake and acceptance of technology which could have a positive impact on GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles.

Organization: Cummins, Inc.

In § 1036.501(f) and § 86.1362-2010, the Agencies propose to require continuous sampling to determine separate emission rates on each mode of the RMCSET for both GHG and criteria pollutants. Consistent with our core principle to build upon and align with existing protocols, Cummins does not agree with this proposal. First, this requirement is unnecessary and burdensome. Second, manufacturers should still be allowed to do bag sampling. Finally, the instruction in § 1036.501(f) to 'Perform this emission sampling using good engineering judgment...' is not detailed enough to ensure consistent measurement across the industry. Cummins requests the Agencies withdraw this requirement. [EPA-HQ-OAR-2010-0162-1765.1, p.21]

Cummins supports the use of a common set of cycles for evaluation of all vehicles. There is a wide range of duty cycles for vocational vehicles where application of hybrid technology is attractive. One cycle or set of cycles will never perfectly match every application. While a given cycle will under-predict hybrid benefit for some vehicles and over-predict hybrid benefit for others, the use of a common cycle will ensure a fair and consistent evaluation of hybrid system performance and will help keep development costs low compared to using multiple application- or vehicle-specific cycles. [EPA-HQ-OAR-2010-0162-1765.1, p.39]

The cycles and weightings as proposed by the Agencies will under-represent the GHG/FC reductions that hybrid vehicles will achieve in the real world. For evaluation of hybrid vehicles, there are two critical features of the duty cycle which most strongly influence the potential GHG/FC reduction: idle/stop time and transient stop-and-go driving. The Agencies' proposal uses three cycles: transient cycle, 55 mph cycle and 65 mph cycle. While the transient cycle includes accelerations and decelerations and some vehicle stop time, the 55 mph and 65 mph cycles are steadystate cycles and do not include stop-and-go driving or braking. As a result, the potential for hybrid fuel consumption reduction in these cycles is significantly less than is available in most real world vocational applications where hybridization is attractive. [EPA-HQ-OAR-2010-0162-1765.1, p.40]

When compared with actual data shown in Figure 5, the proposed cycles seem more appropriate for evaluation of a tractor than a vocational application suitable for hybridization. The weightings proposed by the Agencies in Figure 6 place more emphasis on steady driving (55 mph and 65 mph) as compared to the transient operation typical of the attractive applications for hybridization (such as urban transit bus, refuse truck and urban delivery vehicle). The proposed weightings will not recognize the appropriate GHG/FC improvement for hybrid systems. [EPA-HQ-OAR-2010-0162-1765.1, p.40]

[Figure 5 can be found on page 40 of this comment. Figure 6 can be found on page 41 of this comment.]

To ensure an evaluation that is consistent with real world performance, Cummins suggests the use of vehicle cycles that are based on the engine FTP and SET. These cycles are representative of engine operation in vocational and tractor markets and have been adopted for use in evaluating engines in the proposed rule. The engine FTP and SET should also be used to develop vehicle cycles representative of vocational and tractor vehicle operation. Furthermore, the use of vehicle cycles that are functionally equivalent to the engine cycles would ensure that any evaluation of GHG/FC performance is comparable whether the technology is evaluated at the vehicle or engine level. [EPA-HQ-OAR-2010-0162-1765.1, p.41]

While more work is required, vehicle FTP and SET cycles are feasible and representative of hybrid operation in the real world. See pages 19-23 in the Cummins paper titled “Regulation of Emissions from Commercial Hybrid Vehicles” for a methodology on creating a vehicle FTP cycle. [EPA-HQ-OAR-2010-0162-1765.1, p.41]

Cummins has some concerns about specific provisions in the vehicle portion of the regulation. The vehicle evaluation cycles for HD tractors need the addition of road grade to align with real truck driving cycles. Cummins supports the use of a vehicle model for vehicle regulation but suggests some changes. [EPA-HQ-OAR-2010-0162-1765.1, p.45]

As stated in Section VI, the transient certification cycle should be changed to the vehicle FTP. Also, the Agencies' 65 mph and 55 mph cycles should change to the vehicle SET cycle (described below), which has the added benefit of allowing the incorporation of road grade effects so that the engine operation on the cycles is representative of real vehicle behavior. Inconsistency between the engine operation on the vehicle certification cycle and the engine certification cycle can lead to double counting if the engine is included in any vehicle evaluation, such as for innovative technology certification. [EPA-HQ-OAR-2010-0162-1765.1, p.45]

The 65 mph and 55 mph cycles are for level roads which do not push the engine to high enough power. Real HD tractor data9 shows that engines burn a considerable amount of fuel above the power required for level road operation, as shown in Figure 7. [EPA-HQ-OAR-2010-0162-1765.1, p.45]

[Figure 7 can be found on page 46 of this comment.]

As shown by the GEM results in Figure 8, engine operation at the higher power points of the SET is driven by road grade effects. However, grade effects are ignored in the proposed regulation. The Agencies did not create cycles with grade because “grade and altitude changes cannot be incorporated into a chassis dynamometer or track test” (see Draft RIA 3.4.1). Yet, chassis dynamometers can be programmed to simulate grade effects. Grade is the most practical way to have the engine operate in the power region of its performance map which represents real world driving and is consistent with the SET engine cycle. [EPA-HQ-OAR-2010-0162-1765.1, p.46]

[Figure 8 can be found on page 46 of this comment.]

An illustrative example of adding grade to the vehicle cycle is a vehicle SET, shown in Figure 9. This cycle has realistic road grades and vehicle speeds and matches the speed and load operation of the engine SET, enabling comparisons between engine certification and engine performance during vehicle certification. [EPA-HQ-OAR-2010-0162-1765.1, p.47]

[Figure 9 can be found on page 47 of this comment.]

Response:

The agencies agree with the commenter that the wrong metric can limit uptake and acceptance of technology which could have a positive impact on GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way is to allow for a single set of duty cycles and to avoid the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. Regarding the comment to add grade for whole vehicle evaluation in the timeframe for which this rulemaking would be implemented would be impractical given the infrastructure requirements and the additional testing and validation required for protocol development for such a test site configuration adaptation. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles. Regarding provisions to obtain continuous data for individual SET modes, the agencies have taken the approach of allowing data to be provided from development engines that closely match the production engines. The agencies' focus is on developing a data set which provides sufficient information to aid in the improvement of future engine and vehicle models. Individual SET modal data collected for the HD GHG rulemaking is not intended as a new compliance responsibility for criteria pollutants.

Organization: Daimler Trucks North America

The Agencies propose unique diesel GHG standards that are a function of the engine classification (ie. light-heavy, medium-heavy, or heavy-heavy) and its intended application; vocational or tractor. For vocational applications EPA proposes that GHG compliance be based on tests run on the combined cold/hot-cycle FTP test and for tractor applications, the SET cycle. EPA describes that setting standards based on the most representative test cycle encourages engine manufacturers to design engines for the best GHG and fuel consumption performance over their expected duty cycle. We agree that of the test cycles that are currently defined for criteria pollutant emissions certification testing, the SET cycle is the most appropriate for measurement of CO2 emissions for tractor application engines and that the transient FTP is the most appropriate for vocational application engines. We also believe that although these cycles may be the most appropriate of the available test cycles, they are not as representative of actual tractor or vocational operation as they could or should be. [EPA-HQ-OAR-2010-0162-1818.1, p.39]

We believe that the Agencies should continue to work with industry to design test cycles that more accurately represent the actual duty cycles of tractor and vocational applications. Continued use of a test cycle that does not adequately represent actual operation will, as standards increase in stringency, drive manufacturers to develop technologies and/or tune calibrations to achieve desired improvements over the test cycle results while not achieving similar improvements in actual operation. An example improvement of the SET test cycle would be the adjustment of modal weighting factors to more heavily weight the typical over the road cruise modes to yield a more representative composite emissions result. Derivation of GHG emissions using a unique, more appropriate, set of weighting factors would yield more meaningful GHG results with no impact on actual test resources since no modification would be required of the SET cycle itself. [EPA-HQ-OAR-2010-0162-1818.1, pp.39-40]

Variation of emissions test procedures are a major obstacle for a global vehicle or engine manufacturer to market a single engine worldwide. While emissions levels and consequently engine technology are converging rapidly (in the timeframe between 2010 and 2015) between Euro VI, EPA 2010 and the Japanese Post New Long Term Targets, the disparate test cycles require very significant development resources to tune products differently according to different test procedures. This additional costly development questionable benefit over designing to well developed generic test cycle given that the basic engine design improvements and implementation of highly effective aftertreatment designs drive down overall emissions in real use. The added burden of non-harmonized requirements will otherwise continue to increase product cost to American (and worldwide) customers. [EPA-HQ-OAR-2010-0162-1818.1, p.40]

In concert with worldwide governmental administrations the commercial vehicle manufacturers initiated the Worldwide Harmonized Duty Cycle (WHDC) process at the UN ECE in Geneva, which led to the final adoption in 2010. When work on this program started in 1997, despite the challenges in reaching consensus, worldwide support grew over time as the merits of the program became increasingly apparent. After 12 years of effort including a multitude of test programs, finalized WHDC test procedures were defined and necessary compromises made to the satisfaction of all stakeholders including the EPA. Much to DTNA’s satisfaction, EPA’s acceptance of the WHDC was significant in paving the way towards global harmonization. [EPA-HQ-OAR-2010-0162-1818.1, p.40]

EPA is encouraged to now move forward with its formal adoption of WHDC and is kindly requested to include the formal adoption of the UN ECE gtr No 4 (WHDC) within the EPA GHG regulation as expeditiously as possible. [EPA-HQ-OAR-2010-0162-1818.1, p.40]

Response:

The agencies agree with the commenter that the wrong metric can limit uptake and acceptance of technology which could have a positive impact on GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles. EPA will continue to consider the best strategies for alignment of test procedures, however adoption of the World Harmonized Duty Cycle (WHDC) for GHG testing only would be inappropriate as the cycle was developed in the context of criteria pollutant performance. Future harmonization activities would also include not only criteria pollutant but GHG performance and may necessitate the need for new solutions for both, including Hardware-in-the-Loop simulation (HILS). As such, EPA will continue to follow international HILS development, as well as continue its own research into the appropriate cycles and test protocols for long-term certification and compliance needs.

Organization: Eaton Corporation

The drive-cycle proposed in the rule for PowerPack testing (ARB with high speed weighting) does not provide enough variation to capture true performance of vehicles in the vocational space. [EPA-HQ-OAR-2010-0162-1649.1, p.7]

Eaton recommends that the Agencies use industry recognized cycle CILCC as the general purpose mixed urban/freeway cycle, potentially with a 10-20% freeway speed weighing. We recommend using four representative cycles based on the usage of vehicles in the Vocational category: (mixed urban/freeway, urban, refuse and utility). The same cycles should be used for both PowerPack and full chassis testing. [EPA-HQ-OAR-2010-0162-1649.1, p.7]

The current ARB cycle is not representative for the vocational market but CILCC is. Field data acquired by fleets of city delivery vehicles in mixed urban and suburban environments demonstrate in three different metrics (kinetic intensity, average driven speed and stop density) that the ARB cycle is not representative. Figures 1-3 below show that the ARB cycle (marked CARB in Figures 1-3 below) is consistently outside the spread measured by the fleet operations (the fleet is marked CCE in the figure). Similarly, the Orange County and CBD cycles that form the SAE J2711 tests 3 and 4, fall outside the fleet usage. Note that the ARB cycle augmented with 55 mph and 65 mph as proposed in the rule has a significantly higher average driven speed than real commercial delivery fleets. This is consistent with the industry data that reports average speeds of 30-40 mph in the vocational space. [EPA-HQ-OAR-2010-0162-1649.1, p.7]

[Figure 1 can be found on page 7 of this comment.]

[Figures 2 and 3 can be found on page 8 of this comment.]

Eaton maintains that one cycle will distort the market towards one solution. As seen in the Figures above, city bus and delivery tractors behave very differently in the three metrics. Using one cycle will create a market distortion biased to one vocation; hence need for "urban/city bus" and "mixed urban/freeway" cycles. The Agencies already recognized the need for PTO cycles as opposed to non-PTO cycles. However, there is a significant difference between the "utility-PTO" and "refuse-PTO" described below. The "refuse-PTO" cycle will drive solutions that deal with high transients and simultaneous drive and PTO, while a "utility-PTO" will drive solutions based on good mixed urban/freeway that optimize fuel efficiency and GHG at extended power idle. One PTO cycle will skew the market in one direction or the other. [EPA-HQ-OAR-2010-0162-1649.1, pp.8-9]

We recommend the following specific cycles that provide enough differentiation between vocations to drive specific fuel savings technologies but are generic enough to avoid cycle proliferation.

• Mixed urban/freeway: CILCC with potentially 10-20% constant freeway (60 mph) weighing

• Urban (City Bus): a combination(concatenation or weighted) of standard bus cycles in the industry, specifically WVU, Orange County and Manhattan

• Refuse PTO: HTUF refuse cycle with 1 or 2 PTO hydraulic circuits

• Utility PTO: CILCC with a long power idle (single PTO) [EPA-HQ-OAR-2010-0162-1649.1, p.9]

A practical testing option is to concatenate the two non-PTO cycles thus testing both cycles for all vehicles, but then weigh 100% the cycle of intended use. Should the PowerPack or Chassis be used in another vocation, no new testing would be needed. [EPA-HQ-OAR-2010-0162-1649.1, p.9]

The choice of the four cycles is technology neutral: it is driven by differences in usage, not by enhancing the value of certain technologies. Should the Agencies opt for using one cycle only, Eaton recommends the choice of CILCC, potentially augmented with 10%-20% constant freeway speed (60 mph). For consistency, we recommend the same duty cycles across the entire vocational segment, regardless of the driveline technology, including hybrid systems. [EPA-HQ-OAR-2010-0162-1649.1, p.9]

Response:

The agencies agree with the commenter that the wrong metric, such as a duty cycle which influences technology development that targets the duty cycle without corresponding real world improvement could have a negative impact on GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have considered and rejected the request for multiple cycles, but rather we have chosen a composite cycle for PTO testing and retained the tractive operation cycles originally proposed with a weighting that reflects hybrid benefit more effectively, as requested by the commenter. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. The agencies have considered and rejected the request for multiple cycles, but rather we have chosen a composite cycle for PTO testing and retained the tractive operation cycles originally proposed with a weighting that reflects hybrid benefit more effectively, as requested by the commenter. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles.

Organization: Florida Power & Light Co.

Florida Power & Light, along with International Truck and Engine Company, Eaton Corporation, and Calstart-Weststart led the utility industry's development of a medium duty hybrid bucket truck and in May 2006 Florida Power & Light became the first company in the United States to put such a truck in service. We also deployed our first plug in hybrid vehicle in March of 2008 and the first plug in hybrid bucket truck in September of 2008, for use in the Miami area. Our hybrid electric trucks use 40 to 60 percent less fuel than traditional diesel burning trucks and when used with biodiesel, they reduce our exhaust emissions as much as 90 percent. [EPA-HQ-OAR-2010-0162-2115.1, p.3]

Because of the significance of these vehicles in our fleet, and the potential for significant fuel conservation and emission reduction, we welcome the opportunity to submit the comments below. [EPA-HQ-OAR-2010-0162-2115.1, p.3]

1) The Proposed Drive Cycle Weightings for Hybrid Vehicles with PTO (Table IV-3, Page 74257) should be adjusted to reflect the actual duty cycle use of a these vehicles. [EPA-HQ-OAR-2010-0162-2115.1, p.3]

As part of the hybrid utility truck development effort, Calstart-Weststart coordinated testing of the first truck using a side by side "truck A, truck B" protocol, by an independent research laboratory, Southwest Research Laboratory, to measure the fuel consumption and emissions from the hybrid vs. an identical "standard" truck. When designing the test, input was requested from utility fleets, to establish the proportion of time that the vehicle is stopped alongside the road and the PTO is used, as well as the proportions of time the vehicle is driven at various speeds. The report summarizing this work is "Southwest Research Institute, Emissions and Fuel Economy Testing of Three Utility Trucks, SwRI Project No. 03.11602, (2007). It is available from Mr. Bill VanAmburg, Calstart- Weststart, 2181 East Foothill Boulevard, Pasadena, California, 91107. [EPA-HQ-OAR-2010-0162-2115.1, p.4]

In addition, the USEPA has developed the "Smartway Fuel Efficiency Test Protocol for Medium and Heavy Duty Vehicles, Working Draft, EPA420-P-07-003" with the goal of providing a standardized, objective, consistent test procedure to measure the fuel consumption of medium and heavy duty vehicles used in on-road applications. [EPA-HQ-OAR-2010-0162-2115.1, p.4]

Furthermore, at the request of the USEPA, the Southwest Research Report was provided to Environment Canada, and Florida Power & Light subsequently provided a hybrid utility truck and an identical "standard" truck, to the Environment Canada test facility, for the conduct of a similar evaluation. That work resulted in the report "Evaluation of the Proposed Smartway Fuel Efficiency Test Protocol for Medium and Heavy –duty Vehicles, Report A: Conventional and Hybrid Utility Trucks, ERMS Report No 08-38, Environment Canada, Air Quality Research, Science and Technology Branch, 335 River Road, Ottawa, Canada K1A 0H3. The first recommendation of this report states: "Considering the varied results obtained under different driving conditions, care should be taken when selecting the drive cycle to insure that it is representative of real world operation. [EPA-HQ-OAR-2010-0162-2115.1, p.4]

FPL has 60 had of these vehicles in service for several years, and recognizing that their main savings results when there is high PTO use, and a high proportion of stop and go driving, they are deliberately assigned to urban environments, a practice that is followed by most utilities in the country that have them. It is our opinion that based upon the initial consensus of several utilities in our initial test design, and the subsequent urban assignment of these vehicles in actual service, that the proportions of driving time at 55mph and 65mph proposed in the rulemaking are almost non existent in the real world, and certainly much lower that the 15% and 27% in Table IV-3. We also feel that similar comments would apply to garbage trucks. [EPA-HQ-OAR-2010-0162-2115.1, p.4]

While FPL does not have a great deal of statistical data in this area, we sampled our GPS speed information for 10 of our hybrid utility trucks operating in urban areas of our service territory last week, with the following results. [EPA-HQ-OAR-2010-0162-2115.1, p.4]

Speed 0-19MPH 20-39MPH 40-59MPH 60 +

Percent of driving time 50.6% 40.8% 8.0% 0.6% [EPA-HQ-OAR-2010-0162-2115.1, p.4]

Based on all of the above, we recommend that you consider one of the following three approaches to the development of an appropriate test cycle for these vehicles.

1. Select the Calstart-Weststart Southwest Research methodology. [EPA-HQ-OAR-2010-0162-2115.1, p.4]

2. Select the EPA Smartway methodology as modified by the EPA Canada recommendations.

3. Require the manufacturer of the vehicle to conduct real world logging of vehicle operation, as mentioned in the EPA Canada recommendations, and use that to define the duty cycle. [EPA-HQ-OAR-2010-0162-2115.1, p.5]

This comment responds specifically to the request at page 74256 of the notice of proposed rulemaking. [EPA-HQ-OAR-2010-0162-2115.1, p.5]

Response:

The agencies agree with the commenter that the wrong metric, such as a duty cycle which influences technology development that targets the duty cycle without corresponding real world improvement could have a negative impact on GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles. The agencies have included Power Take-Off (PTO) testing as part of the test protocol for hybrid vocational applications when appropriate to effectively quantify the benefit associated with hybrid systems augmenting that operation. Additionally, the agencies thank the commenter for its previous support of hybrid and conventional vehicle comparison testing conducted by EPA in partnership with Environment Canada.

Organization: National Solid Wastes Management Association (NSWMA)

Route distance and number of stops: The distance a refuse truck travels in a day varies primarily by population density. In a densely populated urban area the truck can travel as little as 50 miles from the time it leaves the fleet yard to its return at the end of the day. In less densely populated suburban and rural areas, the daily route can be longer, as much as 200 miles or more, due to the longer distances between individual “stops”. [EPA-HQ-OAR-2010-0162-1870.1, pp.5-6]

More importantly, refuse trucks constantly stop and go while on-route in order to collect a load of waste or recyclables. This constant stopping and going has a major impact on fuel consumption. As an example of the number of daily stops, residential routes normally have somewhere between 800 and 1200 stops per day. Some automated collection routes, however, are capable of as many as 1500 stops in a day. Commercial routes tend to have fewer stops than residential routes, but can easily have well over 100 stops. Moreover, those stops often involve more backing up and maneuvering to obtain access to the container. Unfortunately, the proposed rule treats refuse trucks as if they drive non-stop for long periods of time. [EPA-HQ-OAR-2010-0162-1870.1, p.6]

Power take-off units: One of the most unique attributes of a refuse truck is its use of power take-off (PTO) units. PTOs are used to lift and dump a container of solid waste into the truck and then return that container to its original position and to compact the solid waste. They consume fuel that would otherwise be used to drive the truck. In some instances, these uses can consume as much as 40 percent of the truck's fuel. This use must be taken into account when fuel consumption standards are being developed. [EPA-HQ-OAR-2010-0162-1870.1, p.6]

Response:

The agencies thank the commenter for the additional detail regarding refuse hauler operation. The commenter suggested Power Take-Off operation ought to be considered in setting GHG and fuel consumption standards. The agencies agree with the commenter and as such, we have included a PTO duty cycle for certification of vocational applications which make use of PTO operation with hybrid technology to improve GHG and fuel consumption performance. The agencies will continue to review the operation of vocational applications future actions are contemplated.

Organization: Truck Renting and Leasing Association (TRALA)

The agencies state that they were influenced by the recommendations of the 2010 NAS study in the development of the Proposed Standards (75 Fed. Reg. at 74160). The 2010 NAS study, however, highlighted the role of average speed and drive cycles in determining vehicle efficiency. We believe that it is critical for EPA and NHTSA to take careful note of manufacturer input on the extent to which the Proposed Standards fail to properly take into account average speed and drive cycles [EPA-HQ-OAR-2010-0162-1816.1, p.6]

Response:

The agencies agree with the commenter that it is important to have a metric that accurately assesses the performance engines and vehicles in-use. The agencies have revised its approach to drive cycles based on input from manufacturers and other stakeholders as recommended by this commenter.

Organization: International Council on Clean Transportation (ICCT)

In the tractor portion of the proposed regulation, the stringency levels are based on the adoption of currently available technologies and include improvements in aerodynamic design, use of lower rolling resistance tires, vehicle weight reduction, and extended idle reduction technologies. Focusing on aerodynamics and rolling resistance, the agencies have designed a regulatory program for tractors in which manufacturers will need to measure "actual" values for the coefficient of drag (Cd) and rolling resistance (Crr) and input these two parameters into the Greenhouse gas Emission Model (GEM) to determine a tractor truck's fuel consumption and GHG emissions performance.

The discussion below explains the issues within the proposed approach for tractor certification and provides options to change the regulatory program for the better, while maintaining model simplicity and using the lowest cost method of experimental testing, coastdowns, as the primary data collection method. By making this change, the original goals for aerodynamic and rolling resistance improvements can be enhanced, all the while creating a more feasible and real-world data collection method. [EPA-HQ-OAR-2010-0162-1945.1, p.17]

Response:

The agencies thank the commenter and agree with the commenter that maintaining a straightforward and accurate program for quantifying vehicle performance is a critical element to successful implementation of the GHG and fuel consumption standards.

Organization: Honeywell

As set forth below, Honeywell has a long history of innovation resulting in real world benefits. The regulatory structure should also promote real world benefits. The test cycles should encourage the use of fuel saving technologies by replicating real world uses, and credit programs should be implemented to encourage advanced and innovative technologies. Honeywell supports the agencies' proposal to use the steady state SET test with regard to combination tractor/trailers. The agencies should also consider this test cycle for vocational vehicles that operate over longer distances and that therefore could additionally benefit. [EPA-HQ-OAR-2010-0162-1891.1, pp. 1-2]

The proposal recognizes the importance of aligning regulatory procedures with real world benefits. While test cycles may be necessary to ensure consistency and a compliance methodology, the protocols chosen should represent actual drive cycles. An important aspect of the proposal is the decision to test combination tractor/trailer engines through the steady state SET cycle. The steady state SET test cycle best replicates the typical drive cycle of combination tractor/trailers. As the agencies recognize, the steady state SET test cycle advantages and therefore encourages the expanded application of turbo-compounding, an advancement capable of providing substantial real world benefits. The steady state SET test may also provide benefits to some vocational vehicles. While many vocational vehicles operate largely in transient urban modes, there are vocational vehicles (such as motorcoaches) which operate over longer distances and which may benefit from the steady state test cycle. As the agencies develop more specific programs, consideration should be given to how particular vocational vehicles are used to determine whether the steady state SET test cycle could garner additional real world benefits. [EPA-HQ-OAR-2010-0162-1891.1, p. 2]

Response:

The agencies agree with the commenter that it is important to have a metric that accurately assesses the performance engines and vehicles in-use. The agencies have revised its approach to drive cycles based on input from various stakeholders.

Organization: Motor & Equipment Manufacturers Association (MEMA)

MEMA agrees with the inclusion of the power pack testing and certification process included in the NPRM. It is the cornerstone of the rules flexibility, as it allows those technologies that contribute to fuel consumption and emissions reductions, but cannot be captured in the engine test procedure, to be measured. [EPA-HQ-OAR-2010-0162-1752.1, p.6]

Vocational truck vehicle and duty cycle diversity requires a power pack framework to ensure the deployment in the market of hybrid and, as we propose, other drivetrain technologies that best realize fuel efficiency and maintain fleet choice. The most flexible testing and certification regime includes a three pronged approach: (1) engine-centric (with enhanced credits for approved drivetrain contributions like hybrid power systems to vehicle fuel economy. A whole-vehicle testing strategy will inherently restrict the diversity of solutions tailored to a very specific set of vocations and duty cycles, ultimately impeding the introduction of fuel efficiency improvements via the drivetrain, as well as being extremely complicated. A power pack framework will help avoid the unintended consequences of certification methodologies that are restricted to engine only and/or whole vehicle testing protocol. [EPA-HQ-OAR-2010-0162-1752.1, pp.6-7]

Expanding the power pack test proposed for hybrid technologies to other drivetrain and nonengine technologies such as engine boosting to allow them to receive credits under the Advanced Technology and Innovative Technology Programs will drive innovation and reduce emissions with little to no cost. [EPA-HQ-OAR-2010-0162-1752.1, p.7]

Since the power pack testing proposed for quantifying the benefits of advanced drivetrain and engine boosting technologies is identical to that developed by the EPA for hybrid systems, there is no incremental cost on the procedural side of the testing. From a testing perspective, MEMA believes that power pack testing is a more cost-effective alternative to full vehicle chassis test. As the proposed testing would be voluntary in the first phase, it will not add undue effort to the manufacturers. [EPA-HQ-OAR-2010-0162-1752.1, p.7]

The CARB transient duty cycle weighting proposed in the rule will not properly capture the efficiencies of the advanced technologies in the vocational segment. Re-weighting the program to better reflect vocational and transient cycles is appropriate to insure that the performances of advanced technology vehicles are captured. The CARB cycle, as proposed, has too high of a speed to be representative of mixed city-highway driving and urban work cycles, which is the typical realworld experience of vocational vehicles. The addition of the 55 mph and 65 mph segments skews the test even further away from typical urban cycles. In order to capture the full benefit of these new technologies in the vocational cycle, the testing duty cycles must more closely represent their real world application. Additional duty cycles are needed including transient and power-take-off (PTO) cycles, to provide the flexibility needed to capture fuel efficiency and GHG benefits of the varying applications to which hybrid systems can be applied. [EPA-HQ-OAR-2010-0162-1752.1, p.7]

The proposed vocational drive-cycle in the NPRM does not provide enough variation to capture true performance of vehicles in the vocational space. MEMA recommends that the agencies provide CILCC as the general purpose mixed urban/freeway cycle, potentially with a 20 percent freeway weighting and to use four representative cycles (mixed urban/freeway, city bus, refuse, utility). The cycles should be used for both power pack and full chassis. [EPA-HQ-OAR-2010-0162-1752.1, p.13]

Response:

The agencies agree with the commenter that the appropriate metric, such as a duty cycle may positively influences technology that impacts GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles. The agencies have included Power Take-Off (PTO) testing as part of the test protocol for hybrid vocational applications when appropriate to effectively quantify the benefit associated with hybrid systems augmenting that operation. With today's action, the agencies are encouraging an approach to generating Innovative Technology credits that provides an incentive to those who wish to certify new technologies or those not currently considered on existing test procedures to make the appropriate performance demonstration.

Organization: National Solid Wastes Management Association (NSWMA)

Refuse truck fuel consumption metric: EPA and NHTSA's choice of gallons per thousand ton-miles as the fuel consumption metric for their proposal is a simple way to calculate fuel consumption by load-carrying vehicles. This also was the metric advocated by the National Academies of Science (NAS) in its study "Technologies and Approaches to Reducing the Fuel

Consumption of Medium- and Heavy-duty Vehicles" (2010). Nonetheless, because of the unique equipment and operating conditions for refuse trucks, gallons per hour is the common metric used by the waste services industry to measure fuel efficiency. As noted above, refuse trucks commonly stop to collect and load refuse and recyclables, yet the truck is still working and consuming fuel while containers are being lifted and lowered and refuse is being compacted. As a result, the industry metric more closely conforms to the alternate performance metric cited by the NAS for service duty-cycle vehicles (see Figure 8-2-1, page 196) than the proposed metric. [EPA-HQ-OAR-2010-0162-1870.1, p.6]

Compounding the problem, the proposed drive cycles for heavy, heavy-duty vocational vehicles are equally unrealistic when considering the daily operational realities of refuse vehicles. Whether the truck is a front, rear or side-loading garbage or recycling collection truck, or a roll-off container truck, or any of the other specialized industry vehicles, the proposed drive cycle does not fit the operational realities of a truck that makes frequent stops in a short distance, travels at a low rate of speed between stops and consumes a significant amount of fuel while stopped but its equipment is lifting and compacting material. [EPA-HQ-OAR-2010-0162-1870.1, p.9]

Response:

The agencies agree that the appropriate drive cycles ought to be considered when quantifying the benefit associated with the improvements being made to reduce greenhouse gas emissions and fuel consumption. While a unique drive cycle for each application would be an ideal solution for specific application based standards, it is impractical to develop application specific duty cycles for the diversity of applications and vehicle uses that exist. The approach the agencies have taken helps to broadly quantify the benefit for the vocational vehicle sector, while also ensuring a level playing field for those chassis manufacturers who will certify to the vocational vehicle standard. The agencies have considered and rejected the request for multiple cycles, but rather we have chosen a composite cycle for PTO testing and retained the tractive operation cycles originally proposed with a weighting that reflect hybrid benefit more effectively, as requested by the commenter.

Organization: Natural Resources Defense Council (NRDC)

NRDC also recommends that the agencies develop, and make available by 2017, an alternative compliance process for vocational trucks and tractors that captures full vehicle performance over the appropriate drive cycles, using a complete integrated vehicle model, supported by selective chassis and/or on-road testing. [EPA-HQ-OAR-2010-0162-1776.1, p.9]

Response:

The agencies agree that whole vehicle testing is an option that has benefits. The agencies will continue to work with industry and other stakeholders to develop the test data and protocols necessary to address whole vehicle performance in future actions.

Organization: Odyne Systems, LLC

Odyne uses an advanced telematics systems to monitor many of its existing hybrid systems in the field. Based upon this data from a variety of locations and different customers, the test duty cycle in the proposed regulations appears to understate the idle time and PTO time relative to drive cycle time and energy. The currently proposed PTO drive cycle also substantially overstates miles driven for utility vehicles and other work trucks. Odyne has shared additional confidential duty cycle information with the EPA and has proposed an alternative PTO and hydraulic load duty cycle more closely matching data from existing vehicles in the field. [EPA-HQ-OAR-2010-0162-1853.1, p.4]

Provisions should also be made to test the system as it is used in the field, including tests compatible with charge depleting plug-in hybrid systems. In the field the Odyne plug-in hybrid system is typically charged overnight with off-peak grid power and then operated in charge depleting mode while driving to the job-site. At the job-site the battery system continues to charge deplete while it powers equipment on the truck, often including electrically driven air conditioning. After work at the job-site has been completed, the truck returns to the truck depot or garage and recharges again using lower cost, cleaner grid power. An intermittent hydraulic duty cycle may be present for hours during normal operation at the job-site. Odyne did not see this duty cycle represented in the proposed EPA testing. Odyne strongly recommends the inclusion of provisions for charge depleting operation in tests. [EPA-HQ-OAR-2010-0162-1853.1, p.4]

In summary, the plug-in hybrid technology developed by Odyne enables medium and heavy duty trucks to more effectively achieve lower GHG emission goals. We are working on engineering design improvements, cost reductions and flexible installation methods that offer a logical path to continually reduce medium-duty and heavy-duty vehicle greenhouse gas emissions over time, by enhancing the scalability, scope and technology capabilities of plug-in hybrid electric heavy-duty vehicles made by OEMs, intermediate stage manufacturers and latter-stage manufacturers. [EPA-HQ-OAR-2010-0162-1853.1, p.4]

Odyne commends the EPA and NHTSA for efforts to develop efficiency regulations, several suggestions have been submitted for consideration in broadening and strengthening the proposed regulations. Odyne looks forward to working more closely with the agencies to help further improve truck efficiency. [EPA-HQ-OAR-2010-0162-1853.1, p.4]

- Require both drive cycle and job-site efficiency improvement due to incomplete understanding of likely duty cycle or change in duty cycle. [EPA-HQ-OAR-2010-0162-1853.1, p.10]

EPA Vol. 75 No. 229 pg. 74256: The agencies welcome comments on the proposed drive cycle weightings and the proposed PTO cycle. The proposed weightings for the hybrids with PTO are included in Table IV-3. The agencies welcome comments on the proposed drive cycle weightings and the proposed PTO cycle. [EPA-HQ-OAR-2010-0162-1853.1, p.11]

Odyne proposes different weighting than shown in Table IV-3, which more closely match data from the NAS report and the data gathered by Odyne through advanced telematic systems on actual applications. The PTO cycle test should include both a driving test and a stationary test. A standard test should reflect a typical day of applications. For example a “bucket truck” typically drives approximately 40 miles a day and works at the jobsite for 4 hours a day. The combined cycle would account for the efficiency improvements of the hybrid. The agencies should also allow for the PTO test cycle to be tested in a charge depleting mode, in lieu of a charge sustaining mode to take advantage of the benefits of being able to charge the battery packs from the grid. The hybrid manufacturer should be allowed to submit telematics data to support the validity of different duty cycles. The PTO cycle should also describe the hydraulic flow and pressure and type of pump, or match those parameters with a load that is easily replicated and used by all hybrid manufacturers. Different types of truck mounted equipment tend to draw different amounts of power. The failure to adequately characterize those loads can cause a PTO test to over-estimate or under-estimate the actual performance and fuel savings of a hybrid system. [EPA-HQ-OAR-2010-0162-1853.1, p.11]

Table IV-3 represents the proposed drive cycle weighting for hybrid vehicles with PTO that was developed by the EPA and shown in the draft regulations. Assuming a 6.5 hour work day, the Proposed Drive Cycle Weighting for Hybrid Vehicles with PTO: the vehicle would drive 193.1 miles (Transient of 25.35 miles assuming an average speed of 13 mph, 53.63 miles at 55mph and 114.1 miles at 65mph) and work in PTO mode for 1.82 hours. [EPA-HQ-OAR-2010-0162-1853.1, p.11]

[Table IV-3 can be found on page 12 of this comment]

Although the proposed cycle may be accurate for some vocational vehicles, not all vocational vehicles have a similar drive and PTO cycle. Odyne is recommending to the EPA that a limited number of multiple drive cycle weightings be used to encompass the varying vocational vehicle work cycles. The high miles driven in the proposed EPA duty cycle does not match average miles driven data gathered by Odyne from telematics systems installed on customer vehicles in the field. The EPA proposed cycle also does not match the average miles driven reported by NAS, “average annual mileage of 13,300 miles as found by one study of 31 utilities.” (Reference P. 6-14 Technologies and Approaches to Reducing the Fuel Consumption of Medium- and Heavy-Duty Vehicles http://www.nap.edu/catalog/12845.html). Using 250 days per year the average miles driven is 53.2 miles per day. Odyne strongly recommends an alternative Drive Cycle Weightings for Hybrid Vehicles with PTO which would have fewer miles driven and more time at the job-site. [EPA-HQ-OAR-2010-0162-1853.1, p.12]

Vocational trucks are used in many different applications. One example of a vocational vehicle is a Utility bucket truck/work truck. These vehicles tend to be stationed throughout the territory of a utility or similar entity in strategic garages or staging areas to minimize the time that vehicles would take to respond to an issue or perform upgrades with the utility’s infrastructure. In general the vehicles will drive short distances (less than 20 miles) to a job-site and perform work with the vehicle and on board equipment. While at the job-site the vehicles’ engine is running to provide power to the tools and safety accessories on the vehicle. The amount of time at the job-site varies depending on the work that needs to be completed. After reviewing data of multiple work trucks a typical utility bucket truck will travel an average of approximately 40 miles per day with approximately 4 hours at the jobsite with the PTO engaged. [EPA-HQ-OAR-2010-0162-1853.1, p.12]

[Table can be found on page 12 of this comment.]

Response:

The agencies agree with the commenter that the appropriate metric, such as a duty cycle may positively influences technology that impacts GHG emissions reduction and fuel consumption improvement. Additionally, the agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, hybrid system, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. To address actual vehicle, engine, and / or powertrain system performance, the agencies have adopted cycle performance criteria modeled after the performance criteria typically utilized for engine testing to ensure that systems tested have an obligation to being completely exercised in a way that is consistent with the reference duty cycles. The agencies have included Power Take-Off (PTO) testing as part of the test protocol for hybrid vocational applications when appropriate to effectively quantify the benefit associated with hybrid systems augmenting that operation. Specifically, the agencies are adopting an approach to PTO testing that allows for charge depleting performance evaluation for hybrid vehicles for which that approach more appropriately reflects the system design.

Organization: Oshkosh Corporation

Vocational Vehicle Duty Cycles Vary Dramatically Vocational vehicle duty cycles vary considerably, both between vocations, and within the same vocation. The most important factor to consider is that most vocational vehicles do not perform the majority of their work by transporting cargo. Consider the following examples: [EPA-HQ-OAR-2010-0162-1592.1, p.2]

The cargo carried by a utility truck is typically limited to lineman's tools. Once on site, the bucket truck will idle just to run the hydraulics that operate the bucket while the lineman performs his/her work on the overhead lines. [EPA-HQ-OAR-2010-0162-1592.1, p.2]

Mechanics trucks carry tools, spare parts, and lubricants for repairing equipment in the field. The truck may idle to keep it warm during cold weather. [EPA-HQ-OAR-2010-0162-1592.1, p.2]

Recovery vehicles, or "wreckers" will spend some amount of time on the road towing disabled vehicles, and some time operating the recovery equipment (winches, cranes, and towing devices). [EPA-HQ-OAR-2010-0162-1592.1, p.2]

Ready mix concrete trucks spend approximately half their time driving to the delivery site, and half their time dispensing the load. Part of this time will be spent waiting for the crew to be ready for the pour, and the other portion of time is spent pouring concrete. If the pour is a remote site, the concrete may be moved from the truck to the site via wheelbarrows or other means. In this case the wait time will be considerable. [EPA-HQ-OAR-2010-0162-1592.1, p.2]

Refuse trucks come in a variety of configurations. Roll-on-Roll-off vehicles will pick up a single container and haul it to the land fill. Type T container haulers will pick up loads from many containers. A large type T container can take 10 minutes to empty with the truck at high idle most of the time. Residential trucks will have aggressive stop-drive cycles while loading, and then some period of mixed urban and country driving to reach the land fill. [EPA-HQ-OAR-2010-0162-1592.1, p.2]

The snow plow may carry a load of sand or salt while plowing at the same time. Some of the engine power goes into hauling the load, but a significant amount of power is consumed pushing the snow. [EPA-HQ-OAR-2010-0162-1592.1, p.3]

Electronic news gathering and incident command vehicles carry communications transmission equipment as well as audio and video processing capability. These vehicles become on-site production or emergency response offices that idle for long periods of time to provide power and climate control for the occupants. [EPA-HQ-OAR-2010-0162-1592.1, p.3]

Similarly to utility trucks, the tree-trimming industry uses bucket trucks to obtain overhead access to their work. Tree trucks will spend most of the day logging no road miles, but running the truck engine for hydraulic power to operate the bucket. [EPA-HQ-OAR-2010-0162-1592.1, p.3]

Fire apparatus typically drive a short distance and then run at the scene to pump water, generate power, or operate aerial devices. [EPA-HQ-OAR-2010-0162-1592.1, p.3]

It is apparent from each of these examples that you cannot measure the work accomplished by each of these vehicles in fuel consumed per ton-mile. In several cases the majority of the work being accomplished is performed at zero road speed. It is therefore obvious that you cannot apply the same criteria to measure the efficiency of a vocational truck that you can when measuring a line-haul truck. The GEM model, however, does just this. [EPA-HQ-OAR-2010-0162-1592.1, p.3]

The GEM model uses a single duty cycle and a single assumed cargo load to model all vocational trucks. From the examples cited above it is obvious that this modeling is seriously flawed. [EPA-HQ-OAR-2010-0162-1592.1, p.3]

Many vocational trucks use an automatic transmission that includes a torque convertor. Vocations that typically employ automatic transmissions include fire apparatus, buses, refuse vehicles, front discharge concrete mixers, and ambulances. The GEM tool as presented in the NPRM only includes a manual transmission model. The lack of an automatic transmission fails to capture time-based efficiency offered by faster acceleration rates. [EPA-HQ-OAR-2010-0162-1592.1, p.3]

The current use of GEM in the vocational rule is unnecessary since all the variables other than tire CRR are provided by the rule. The agency could reach the same end by simply stating that any tire on a vocational vehicle must be lower than 8.0 kg/metric ton. Our concern is that adoption of the NPRM as it is may set a precedent where GEM could be used with erroneous effect in future rule-making. Any attempt to accurately model vocational vehicles would be an extremely complicated endeavor which we believe would be beyond the capability of such a model. The simplification necessary would undoubtedly lead to unintended and undesired consequences. [EPA-HQ-OAR-2010-0162-1592.1, pp.3-4]

Since much of a vocational vehicles life is spent in a stationary mode it is natural that there have been efforts to improve efficiency of the non-driving aspect of the work. Examples of this include:

- Variable output hydraulic pumps to reduce engine load during refuse packing.

- Battery banks and electric motors to provide hydraulic power for engine-off operation of cranes and booms.

- Use of shore power for engine-off climate control and electronics operation. [EPA-HQ-OAR-2010-0162-1592.1, p.4]

Improvements such as these are costly to implement but they are unrewarded by any variables within GEM. [EPA-HQ-OAR-2010-0162-1592.1, p.4]

We have analyzed the GEM tool and it do not believe it sufficiently represents the positive technology impacts that could be employed in a vocation. By limiting the inputs and the effects of individual areas of efficiency improvement, it can not be adjusted to represent most of the technologies available to the industry. [EPA-HQ-OAR-2010-0162-1592.1, p.4]

Response:

The agencies agree with the commenter that the GEM tool as designed may benefit from the addition of capabilities that characterize additional aspects of non-tractive operation and in the context of future regulatory action this can be considered.

Organization: Robert Bosch, LLC

- urges the agencies to add to the proposed test procedure for combination tractors and vocational vehicles a drive cycle with an Urban Stop-and-Go profile as well as a drive cycle with an Intermediate Distance Stop-and-Go profile, and to recalibrate appropriate drive cycle weighting factors for vocational vehicles; [EPA-HQ-OAR-2010-0162-1630.1, p.3]

Bosch also agrees that the test procedure for PUVs should be the same as that for light-duty pickup trucks and vans, and that any revisions made in the future to the latter test procedure (that reflect the current city-highway driving mix) also should apply automatically to the test procedure for PUVs. [EPA-HQ-OAR-2010-0162-1630.1, p.9]

As discussed more fully below, Bosch also urges the agencies to include two additional drive cycles in the proposed test cycle: (1) a drive cycle with an Urban Stop-and-Go profile; and (2) a drive cycle with an Intermediate Distance Stop-and-Go profile. [EPA-HQ-OAR-2010-0162-1630.1, p.14]

The discussion above leads directly to a discussion of drive cycle applicability for vocational vehicles. As with combination tractors, EPA and NHTSA propose to subject vocational vehicles to three modes from “a modified version of the” CARB Heavy Heavy-Duty Diesel Truck (HHDDT) test cycle: (1) the HHDDT Transient mode; (2) a Low Speed Cruise Robert Bosch LLC Comments EPA-HQ-OAR-2010-0162 Page 17 mode, modified to maintain a constant (i.e., steady-state) 55 miles per hour (mph) speed; and (3) a High Speed Cruise mode, modified to maintain a constant 65 mph speed. Combination tractors have proposed mode weightings of, for day cabs, 19 percent (Transient), 17 percent (55 mph steady-state Cruise), and 64 percent (65 mph steady-state Cruise), and for sleeper cabs, 5 percent (Transient), 9 percent (55 mph steady-state Cruise), and 86 percent (65 mph steady-state Cruise). In view of “the known differences in driving patterns between” combination tractors and vocational vehicles,28 EPA and NHTSA propose different mode weightings for the latter: 42 percent (Transient), 21 percent (55 mph steady-state Cruise), and 37 percent (65 mph steady-state Cruise), referred to below as 42/21/37. [EPA-HQ-OAR-2010-0162-1630.1, pp. 16-17]

While the agencies’ Draft Regulatory Impact Analysis (Draft RIA) includes some discussion of how the combination tractor weighting factors were determined, no description is provided of how the agencies arrived at the vocational vehicle weighting factors.29 Bosch’s understanding, nonetheless, is that the vocational vehicle factors are based on a large, straight delivery truck travelling long distances (i.e., Point-to-Point under the subcategorization approach set forth in section III.C.2.a immediately above). This is of considerable concern to Bosch, because such a basis arguably does not represent the majority of the overall average usage of vocational vehicles (i.e., a large, straight delivery truck is not a middle-of-the-curve vocational vehicle) and, as a result, biases the effectiveness of all technologies that are to be assessed using the proposed 42/21/37 drive cycle weightings. It also biases the Greenhouse gas Emissions 28 Id. at 74205. 29 See EPA and NHTSA, “Draft Regulatory Impact Analysis” (Oct. 2010) (Draft RIA), at 3-24 – 3- 26. Robert Bosch LLC Comments EPA-HQ-OAR-2010-0162 Page 18 Model’s (GEM) CO_2 emissions and fuel consumption results for the vocational vehicle class as a whole, because assuming primarily steady-state highway operation yields a higher average fuel economy and lower CO_2 emissions and fuel consumption levels, thereby underestimating those levels and the reductions actually needed to achieve compliance. [30] [EPA-HQ-OAR-2010-0162-1630.1, pp.17-18]

[For additional comments on Drive Cycle, Weightings, and Stop-and Go Operation, see pages 18-22 of this comment document.]

In the end, while Bosch agrees that “[t]he variety of vocational vehicle applications makes it challenging to establish a single drive cycle which is representative of all such trucks,” this does not mean that the selected drive cycles and weightings should not be as broadly representative as possible. For GEM simulation modeling simplicity, and for all of the reasons discussed above, Bosch urges the agencies to add to the proposed test procedure for combination tractors and vocational vehicles an Urban Stop-and-Go drive cycle (i.e., the NYBus Cycle or the Manhattan Bus Cycle) and an Intermediate Distance Stop-and-Go drive cycle (i.e., HTUF Class 4 PDDS or HTUF Class 6 PDDS). [EPA-HQ-OAR-2010-0162-1630.1, p.22]

With respect to vocational vehicles, appropriate weighting factors for the Urban Stopand-Go and Intermediate Distance Stop-and-Go cycles should be determined for each of the nine subcategories identified above (section III.C.2.a), and the remaining three weighting factors (i.e., the HHDDT Transient, 55 mph Cruise, and 65 mph Cruise modes) should be adjusted accordingly (i.e., downward). Inasmuch as all vocational vehicles, regardless of GVWR, that operate primarily on a certain drive cycle (e.g., Urban Stop-and-Go) will exhibit a particular combination of drive cycle weightings, the Light HD, Medium HD, and Heavy HD vocational vehicles can all be grouped together. Hence, for weighting determination purposes, the number of vocational vehicle subcategories can be reduced from nine to three. Bosch agrees with the proposed drive cycle mode weightings for combination tractors, so to maintain the agencies’ existing results for these vehicles, the Urban Stop-and-Go and Intermediate Distance Stop-and-Go cycle weighting factors for combination tractors should be set at 0 percent. [EPA-HQ-OAR-2010-0162-1630.1, p.23]

The table below summarizes the appropriate weighting factors, where A<B, B<C, D<E, E<F, D>A, and B>E. [EPA-HQ-OAR-2010-0162-1630.1, p.23]

[Table can be found on pages 23-24 of this comment.]

Bosch's Drive and Control Technology Division, Bosch Rexroth, possesses a large amount of in-use vehicle operational data for a wide variety of vocational vehicles (e.g., refuse trucks, shuttle buses, school buses, and package delivery vehicles). This data was collected with a SoMat eDAQ-lite ruggedized data acquisition system, primarily collected directly from the Controller Area Network data bus. Bosch would be pleased to share this data (appropriately excised to ensure anonymity) with EPA and NHTSA on a confidential basis to assist the agencies in the development of additional drive cycles and appropriate/adjusted weighting factors, as Bosch proposes, as well as to assist in the future development of application-specific drive cycles. [EPA-HQ-OAR-2010-0162-1630.1, p.24]

---

[30] Similarly, some vocational vehicles utilize a vehicle speed limiter and have a maximum speed under 65 mph, so requiring the use of the 65 mph steady-state Cruise mode would not result in an accurate assessment of these vehicles. [EPA-HQ-OAR-2010-0162-1630.1, p.18]

Response:

The agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, hybrid system, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements.

Organization: Union of Concerned Scientists (UCS)

As part of the development of full vehicle compliance testing, additional efforts must be undertaken to establish drive cycles that accurately represent the in-use operation of these vehicles. The proposed standards apply to a wide range of vehicles and applications which have varying operating characteristics. Application-specific drive cycles will more accurately capture the fuel consumption and emissions from these vehicles and allow the performance standards to both reflect these operational characteristics and the benefits of fuel efficiency technology improvements. Examples of applications that should be considered for drive cycle development include tractor-trailers, package delivery trucks, refuse vehicles, and buses. [EPA-HQ-OAR-2010-0162-1764.1, p.5]

Response:

The agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, hybrid system, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. The agencies will continue to review the application of the duty cycles and whether or not updates will be needed in the future to better characterize urban, as well as other types of operation.

Organization: Autocar, LLC

The defined duty cycle (37% 65-mph cruise / 21% 55-mph cruise / 42% transient performance) bears no relation to the constant stop-and-go duty cycle of a refuse vehicle. A typical refuse vehicle may be 100% transient on a given day. The infinite variation in residential and commercial collection routes and in geographic areas traveled prevents any safe assumption of duty cycle for refuse vehicles when combined with the rest the class 2b-8 vocational vehicles. [EPA-HQ-OAR-2010-0162-1617.1, p.5]

Response:

The agencies recognize the unique nature of the operation seen by vocational applications. Given the diversity of applications, it would be impractical to both develop unique drive cycles for each application and ensure a level playing field for all participants. It is for this reason the agencies have made three decisions regarding the duty cycles used for certification. The agencies will continue to utilize both steady state and transient duty cycles to characterize the operation of the vehicles for both chassis testing and modeling. The agencies have reweighted the drive cycles to more appropriately reflect the operation and performance impacts of vehicles and engines utilizing advanced technology. The agencies have focused whole vehicle chassis testing on comparison testing which accounts for the improvement associated with the use of GHG reducing technologies and then to relate that improvement to a base GEM vehicle performance. The intent of the decision to address duty cycles in this way allows for a single set of duty cycles and avoids the cycle proliferation which would otherwise introduce uncertainty in the market. Based on stakeholder input from transmission, engine, hybrid system, and truck manufacturers as well as, analysis of the operation of real-world operation versus the duty cycles produced by the agencies, the performance impacts based on the new weightings more appropriately reflect expected real-world improvements. The agencies will continue to review the application of the duty cycles and whether or not updates will be needed in the future to better characterize urban, as well as other types of operation.

Organization: National Association of Clean Air Agencies (NACAA)

The GHG Emissions Model (GEM) that the agencies propose for certification should be updated to reflect speeds above 65 miles per hour (mph), up to at least 75 mph. Such speeds are routinely experienced in nonattainment areas in off-peak hours, and contribute to significant NOx and PM2.5 emissions. Raising the maximum steady-state speed parameter in the GEM will provide GHG and fuel savings benefits – by requiring that standards be met over a wider range of speeds – along with important co-benefits associated with criteria pollutant and toxic emissions reductions.

Response:

The agencies analyzed the urban and rural interstate truck speed limits in each state to determine the national average truck speed limit. State interstate speed limits for trucks vary between 55 and 75 mph, depending on the state.[footnote: Governors Highway Safety Association. Speed Limit Laws May 2011. Last viewed on May 9, 2011 at http://www.ghsa.org/html/stateinfo/laws/speedlimit_laws.html] Based on this information, the national median truck speed limit is 65 mph. The agencies also analyzed the national average truck speed limit weighted by VMT for each state based on VMT data by state from the Federal Highway Administration as described in RIA section 3.4.2. Based on this information, the national average VMT-weighted truck speed limit is 63 mph. The agencies continue to believe that the appropriate high speed cruise speed should be set at the national average truck speed limit to appropriately balance the evaluation of technologies such as aerodynamics, but not overstate the benefits of these technologies. Therefore, the agencies are adopting as proposed a speed of 65 mph for the high speed cruise cycle.

Organization: Waste Management

Waste Management's fleet duty cycles are varied and far removed from the 'average' duty cycle used to formulate the HD Rule assumptions. WM's fleet of refuse and recycling collection vehicles comprise residential front end loaders and rear end loaders, commercial front end loaders and rear end loaders, commercial roll-offs, and automated and manual side loaders. Each type of truck has a specific application and a different duty cycle. Residential front and rear load trucks carry about ten to twelve tons per load, run two to three loads per day, and make between 600 and 1200 stops per day. Commercial vehicles carry about ten tons per load, run about two to three loads per day, but make far fewer stops than residential vehicles, averaging about 100 stops per day. [EPA-HQ-OAR-2010-0162-1854.1, p.6]

The heavy-duty vocational vehicle drive cycle proposed by the Agencies is 668 seconds long, with a travel distance of 2.84 miles, and includes five stops and 112 seconds of idling. The proposed drive cycle assumes vocational vehicles will travel at 65 mph about 37 percent of the route, 55 mph about 21 percent of the route and under 50 mph for 42 percent of the route. Refuse trucks, by contrast, are likely to experience over 100 stops within 2-3 miles, travel at 25 mph or less for about 90 percent of the route and between 35 and 55 mph for only 10 percent of the route. In addition, refuse vehicles typically idle far less than 112 seconds on their routes, but burn up to 30 to 40 percent of their fuel standing still, while operating container lifts and compactors. [EPA-HQ-OAR-2010-0162-1854.1, p.6]

Waste Management would be happy to meet with the Agencies to further acquaint them with the unique duty cycles associated with residential and commercial solid waste and recycling collection. We want to work with the Agencies to ensure that the engine and chassis certification models and other rule requirements reflect the challenging duty cycles which our vehicles must meet. [EPA-HQ-OAR-2010-0162-1854.1, p.6]

Response:

The agencies agree with the commenter that vocational applications and refuse haulers may have duty cycles that differ from the specific duty cycle chosen for certification and compliance testing. Additionally, the agencies recognize the diversity in the industry with respect to applications and operation. To that end, it is important to recognize that a level playing field for all market participants helps to ensure stability for technology development that results in implementation of control strategies and technologies that have real world benefit. Standardizing the duty cycle for certification and compliance testing allows for a common basis for comparison. The agencies will continue to review the application of the duty cycles and whether or not updates will be needed in the future to better characterize urban, as well as other types of operation.

Organization: Allison Transmission

The GEM incorporates a 55 miles per hour ('mph') steady state cycle that does not reflect real world vehicle operations. In specific, the GEM drive cycle allows 1.6 minutes in order for a heavy-duty vehicle to reach 55 mph and 3.3 minutes for a heavy-duty vehicle to reach 65 mph. Actual capabilities of such vehicles far exceed these extended acceleration curves and such lengthy accelerations of the sort modeled in the GEM are clearly not utilized or reasonable in the real world. As indicated below, actual tests performed as part of the Oak Ridge National Laboratory Class-8 Heavy Truck Duty Cycle Project Final Report demonstrate that HD vehicles can (and do) accelerate to 55 mph in far less time than the times utilized in the GEM. [EPA-HQ-OAR-2010-0162-2735.1, p.12]

The comparison between the GEM and actual testing of vehicles is stark. While the Oak Ridge testing did not accelerate to 65 mph, falling just short of that speed, MD/HD vehicles can accelerate much faster than the GEM 'presumes' and variation in speed is evident when HD vehicles operate in urban environments and elsewhere.. EPA's modeling of excessively long and smooth acceleration - combined with overweighting of steady-state operation - creates a gap between modeled and real world performance. If the goal of this combined rulemaking is to achieve gains in FE and improvement in GHG in the real world, NHTSA and EPA should revisit this critical issue and strive to utilize more realistic modeling of MD/HD vehicle operation in its regulatory program. [EPA-HQ-OAR-2010-0162-2735.1, p.12]

[See p.13 of this comment summary for Fig 52 - Heavy-Duty Urban Dynamometer Driving Schedule (EPA's UDDS Cycle D)]

As the above figure from the Oak Ridge report attests, real world driving conditions of MD/HD vehicles can be characterized by fairly rapid accelerations and decelerations. In the Drive Cycle above27 , the HD vehicle reaches speeds of 40 mph in a very short period of time; and appears to reach 50 mph in far less than 1.6 minutes. In this regard, there would also not be any technical reason why a MD/HD vehicle equipped with an advanced transmission would not be able to replicate a reasonably smooth acceleration from the 40 mph or 50 mph level to the GEM 'steady state' speeds of 55 or 65 mph. [EPA-HQ-OAR-2010-0162-2735.1, p.13]

Represented immediately below is the HD Drive Cycle that we currently understand is included within the GEM. Following the GEM Drive Cycle is another Drive Cycle from the Oak Ridge report representing Heavy-Heavy Duty Truck Cruise Mode. The difference between the GEM Drive Cycle and the Oak Ridge Drive Cycle above and immediately below the GEM Drive Cycle is obvious. In either comparison, the GEM Drive Cycle is overly simplified and does not represent anything close to real world transient or 'steady state' operation of vehicles. [EPA-HQ-OAR-2010-0162-2735.1, p.13]

[See p.14 of this comment summary for 2 figures: Greenhouse Gas Emissions Model Plot Model Year 2010 65 mph Steady-State Cycle Simulation]

It is also evident that the GEM Drive Cycle would rarely, if ever, be experienced in real world traffic and highway conditions. It could not be expected - and it contradicts common, everyday experience - that MD/HD vehicles seeking to merge into traffic on interstate highways would take 3.3 minutes to have their vehicle match the speed of other vehicles already on the highway. Moreover, as shown above, 'steady state' operation is itself subject to at least some variation in speed. Heavy-duty vehicles traveling on interstate highways are subject to various elements impact that their ability to keep speed constant. Long grades, headwinds, heavy traffic and other conditions impede the ability of HD vehicles to travel at 55 mph or 65 mph for extended periods of time. [EPA-HQ-OAR-2010-0162-2735.1, p.15]

Instead, vehicles operating in the real world experience driving conditions far closer to the Oak Ridge Drive Cycles than the Drive Cycle utilized by the GEM. And it is clear that many vehicles are actually able to meet such Drive Cycles. In specific, the Oak Ridge report not only presented various different drive cycles, but actual testing of vehicles on the Drive Cycles contained in the report was conducted. As noted in the report with reference to the chart below: 'Fig. 53 presents the actual implementation of the EPA Heavy Duty UDDS (run 5270-2 is shown). The implemented duty cycle was very close to the theoretical duty cycle shown in Fig. 52, in both shape and scale (i.e., the speeds and times were almost a perfect match).' [EPA-HQ-OAR-2010-0162-2735.1, p.15]

[See p.16 of this comment summary for Fig.53 Implemented Heavy Duty Urban Dynamometer Driving Schedule (UDDS) (Run 5270-2)]

Since the GEM effectively provides the compliance mechanism for original equipment manufacturers ('OEMs'), the model is intrinsic to both EPA and NHTSA's exertion of statutory authority. With regard to NHTSA, EISA requires the adoption of 'appropriate test methods' that are 'appropriate, cost-effective, and technologically feasible for commercial medium- and heavy-duty on-highway vehicles and work trucks.' With respect to EPA, the Agency relies on authority contained in CAA section 202(a)(1) for this rulemaking, and cites several statutory factors that are required for its analysis including the 'feasibility and practicability of potential standards.' [EPA-HQ-OAR-2010-0162-2735.1, p.16]

It is clearly both cost-effective and technologically feasible for all vehicle classes affected by this rulemaking to accelerate to 55 mph and 65 mph in timeframes far shorter than provided for in the GEM. Moreover, both agencies must recognize the complexities that are involved in the simulation of acceleration in MD/HD vehicles. Shift time, clutch profile, controller, shift schedule and lockup (LU) schedule are important factors in acceleration as well as transients, turbo lag and lug-up curve. In order to optimize the resulting FE and GHG of MD/HD vehicles, the drive cycles modeled in the GEM must be based on more appropriate real-world scenarios. EPA and NHTSA should therefore revise related GEM simulation parameters in order to better replicate actual FE and GHG performance. [EPA-HQ-OAR-2010-0162-2735.1, pp.16-17]

Allison's own analysis of this issue starkly departs from the weighting of different operating modes used in the GEM and supporting this proposed rule. As indicated by the chart contained below, for both combination tractor categories and vocational vehicles, the percentage of distance traveled that MD/HD vehicles spend in transient operation versus steady state operation at 55 mph and 65 mph is widely different from the percentages that EPA and NHTSA are proposing to incorporate in the GEM. Instead, Allison's analysis much more closely conforms to analysis of vehicle operating modes that EPA performed in 2008. [EPA-HQ-OAR-2010-0162-2735.1, p.17]

Data supporting the chart and the analysis are included as Attachment 4 of these comments. This data, representing several different types of vocational vehicles, sleeper cabs, day cabs, and buses indicates that much lower percentages of steady-state on-highway high speed operation of vehicles should be incorporated into the duty cycle weightings that EPA and NHTSA have proposed. This analysis was performed in an analogous manner to the analysis that EPA and NHTSA performed. [EPA-HQ-OAR-2010-0162-2735.1, p.17]

In the information provided in Attachment 4 [See docket 2738.1], weightings are calculated based on the percentage of time and distance experienced by the vehicles during monitored operation. As the summary chart demonstrates, transient operation of vocational vehicles and day cabs is much higher than EPA and NHTSA have proposed. For vocational vehicles, a minimal amount of time is spent at speeds exceeding 60 mph (consistent with EPA's 2008 analysis indicating 0.0% time and distance operation at speeds exceeding 60 mph). For day cabs, a similar finding can be made - Allison's data indicates that day cabs travel at speeds in excess of 60 mph only for 13.8% of the total distance traveled (compared with EPA's 2007 estimate of 32.9% and the proposed rule's incorporation of 64% of the distance traveled at over 60 mph). [EPA-HQ-OAR-2010-0162-2735.1, pp.17-18]

We would therefore request that EPA and NHTSA closely examine the submitted data and reconsider and recalculate the percentages of high speed steady-state operation proposed in the rulemaking for inclusion into MD/HD vehicle modeling. We believe this 'real world' data provides a strong indication that the proposed estimates, which form the basis of compliance with the GEM, are unsupported and arbitrary. [EPA-HQ-OAR-2010-0162-2735.1, p.18]

[See p.18 of this comment summary for a table entitled, Duty Cycle Mode Weightings]

Response:

The agencies analyzed the urban and rural interstate truck speed limits in each state to determine the national average truck speed limit. State interstate speed limits for trucks vary between 55 and 75 mph, depending on the state.[Governors Highway Safety Association. Speed Limit Laws May 2011. Last viewed on May 9, 2011 at http://www.ghsa.org/html/stateinfo/laws/speedlimit_laws.html] Based on this information, the national median truck speed limit is 65 mph. The agencies also analyzed the national average truck speed limit weighted by VMT for each state based on VMT data by state from the Federal Highway Administration as described in RIA section 3.4.2. Based on this information, the national average VMT-weighted truck speed limit is 63 mph. The agencies continue to believe that the appropriate high speed cruise speed should be set at the national average truck speed limit to appropriately balance the evaluation of technologies such as aerodynamics, but not overstate the benefits of these technologies. Therefore, the agencies are adopting as proposed a speed of 65 mph for the high speed cruise cycle. The agencies will continue to review the application of the duty cycles and whether or not updates will be needed in the future to better characterize urban, as well as other types of operation.

8.8. Test Configuration

Organization: BAE Systems

Urban Transit buses fall under the vocational Class-8 HHD category and as such are required to achieve the 10.5-10.7 gallons/1000 ton-mile consumption as stated in §535.5(b). However, given that most transit buses have a payload of only 7.5 tons, they will need to improve 2010 baseline efficiency by some 350% to about 12.5-12.7 mpg, hardly a reasonable or practical expectation whether it be conventional or hybrid propulsion. [EPA-HQ-OAR-2010-0162-1948.1, p.4]

Recommendations: (see Discussion section below for more detail) To account for vocational bus/truck payload capacity variations resultant from the various and unique vocations, EPA/NHTSA should consider using 'payload fraction' rather than 'Vehicle Weight Class' as the differentiator in determining which of the three vocational vehicle fuel consumption bins of §535.5(b) should be used. [EPA-HQ-OAR-2010-0162-1948.1, p.5]

Discussion: Class-8 Urban Transit buses are very different compared to trucks of the same weight class as they have relatively little payload. Most Class-8 40-foot transit buses, the industry's workhorse vehicle type, win typically have a GVWR of 42,000 lbs and a curb weight of 27,000 lbs yielding a payload of 7.5 ton and a payload fraction [payload /(payload+curb weight)] of 35.7%. A standard conventional transit bus has a 2010 fuel efficiency of about 3.5 mpg operating on a typical transit duty cycle. This yields a baseline consumption of 38.1 gallons/1000 ton-miles versus the §535.5(b) requirement of 10.7 gallons/1000 ton-miles. The vast discrepancy is due to what appears to be an assumed Class-8 payload fraction [payload /(payload+curb weight)] of 56.7% as identified in Preamble paragraph (C)(II)(D(2)(c)(iii). [EPA-HQ-OAR-2010-0162-1948.1, p.5]

At 35.7% buses actually have a payload fraction nearly equal to the Class2b-5 LH Trucks at 35.7%. Class 8 buses have a lower payload fraction largely due to their elevated curb weights resulting from functional and safety requirements necessary for their role in passenger transport. Features such as a floor height only 15' above grade to allow for passenger access precludes the use of efficient C-channel frames, 200+ square feet of heavy glass area, heavy duty seating for passengers, an 8-12 ton HVAC system, a roof structure which must be able to withstand 2-times GVWR statically to protect passengers in case of rollover and a side structure that must withstand a 25 mph side impact from a 3000 lb car without significant deformation, are among the major characterizes which reduce a buses payload fraction relative to similar weight class trucks. [EPA-HQ-OAR-2010-0162-1948.1, p.5]

In addition to buses, there are likely other Class-8 vocational trucks that, as a consequence of their vocation have lower than normal payload fractions (e.g.: refuse, concrete, fire, etc.), and will also have extreme difficulty in meeting the Class-8 gallons/1000 ton-mile requirements. To account for these variations, EPA/NHTSA should consider using 'payload fraction' rather than "Vehicle Weight Class' as the differentiator for vocational vehicle fuel consumption requirements. [EPA-HQ-OAR-2010-0162-1948.1, p.5]

Response:

The agencies will continue to collect data to update GEM for future action as appropriate to accurately reflect vehicle performance. The agencies received comments from several stakeholders regarding the proposed curb weights and payloads for vocational vehicles. Upon further consideration, the agencies are reducing the weight of heavy heavy-duty vocational vehicle in the GEM model. While we still believe the proposed values are appropriate for some vocational vehicles, we reduced the total weight to bring it closer to some of the lighter vocational vehicles. The agencies are adopting final curb weights of 10,300 pounds for the LHD trucks, 13,950 pounds for the MHD trucks, and 27,000 pounds for the HHD trucks. The agencies are also adopting payloads of 5,700 pounds for the Light Heavy-Duty trucks, 11,200 pounds for Medium Heavy-Duty trucks, and 15,000 pounds for Heavy Heavy-Duty trucks. Additional information is available in RIA Chapter 3.

Organization: Daimler Trucks North America

Vehicle Test Weights May Not Be Accurate In All Cases. If The Agencies Have A Further Phase Of The Program, Where Engine And Drivetrain Efficiencies Become Important, The Inaccurate Choice Of Vehicle Weights Will Need Revision. [EPA-HQ-OAR-2010-0162-1818.1, p.49]

In some categories the Agencies' assumed vehicle weights are significantly different than real in-use vehicle weights. For example, the heavy-heavy-duty vocational vehicle's default GVW for GEM is 67,000 lbs, while some heavy-heavy-duty buses have GVWRs around 42,000 lbs. Moreover, the buses have engines, chassis, and drivetrains optimized for passenger transportation and the lower vehicle weight but not optimized to haul 67,000 lbs. In turn, if in a future phase of the GHG rules GEM used engine and drivetrain parameters to predict fuel consumption, the bus calculations would be based on inaccurate inputs. In conclusion, the Agencies may need to refine vehicle weight definitions if the Agencies use engine or drivetrain characteristics in future regulations. [EPA-HQ-OAR-2010-0162-1818.1, p.49]

Response:

The agencies will continue to collect data to update GEM for future action as appropriate to accurately reflect vehicle performance. The agencies received comments from several stakeholders regarding the proposed curb weights and payloads for vocational vehicles. Upon further consideration, the agencies are reducing the weight of heavy heavy-duty vocational vehicle in the GEM model. Although we still believe the proposed values are appropriate for some vocational vehicles, we reduced the total weight to bring it closer to some of the lighter vocational vehicles. The agencies are adopting final curb weights of 10,300 pounds for the LHD trucks, 13,950 pounds for the MHD trucks, and 27,000 pounds for the HHD trucks. The agencies are also adopting payloads of 5,700 pounds for the Light Heavy-Duty trucks, 11,200 pounds for Medium Heavy-Duty trucks, and 15,000 pounds for Heavy Heavy-Duty trucks. Additional information is available in RIA Chapter 3.

Organization: Autocar, LLC

The agencies propose to use GEM, a customized vehicle simulation model, to determine compliance with vocational vehicle standards. However, the defined inputs proposed for the model cannot be meaningfully applied to refuse vehicles: [EPA-HQ-OAR-2010-0162-1617.1, p.5]

• The proposed curb weight specification is 29,000 pounds for HHD vehicles. However, due to the extra weight of trash compaction and other equipment, refuse vehicles' curb weight is typically 31,000 to 33,000 pounds or more. Similarly, there are limited opportunities for weight reduction on refuse vehicles because they are built with heavy hydraulic trash compaction devices and can and dumpster loaders. The proposed payload requirement is 38,000 pounds for HHD vehicles. As proposed, the assumed combined curb weight and payload may exceed state and federal weight restrictions currently in effect for refuse vehicles. A typical average refuse vehicle payload is 10,000 pounds, and a typical maximum refuse vehicle payload is 20,000 pounds. Further, a static payload requirement may make sense for over-the-road vehicles where the load stays constant over many, many miles, but the extreme variation in payload that refuse vehicles carry throughout a day renders this assumption, as well as the resulting measurement of emissions reduction and fuel economy, meaningless. [EPA-HQ-OAR-2010-0162-1617.1, pp.5-6]

Finally, EPA and NHTSA assume that low rolling resistance (LRR) tires will be used throughout the useful life of the vehicle. It is our experience that refuse fleet owners often remove all but the front two tires provided with the new vehicle immediately upon delivery, and replace them with recaps, using the manufacturer-supplied tires as front-end replacements only. Therefore, it cannot be assumed that refuse vehicles will be compliant at any point after delivery from the chassis manufacturer, that is, without further regulation of vehicle owners' practices. [EPA-HQ-OAR-2010-0162-1617.1, p.6]

Response:

The agencies received comments from several stakeholders regarding the proposed curb weights and payloads for vocational vehicles. Upon further consideration, the agencies are reducing the weight of heavy heavy-duty vocational vehicle. While we still believe the proposed values are appropriate for some vocational vehicles, we reduced the total weight to bring it closer to some of the lighter vocational vehicles. The agencies are adopting final curb weights of 10,300 pounds for the LHD trucks, 13,950 pounds for the MHD trucks, and 27,000 pounds for the HHD trucks. The agencies are also adopting payloads of 5,700 pounds for the Light Heavy-Duty trucks, 11,200 pounds for Medium Heavy-Duty trucks, and 15,000 pounds for Heavy Heavy-Duty trucks. Additional information is available in RIA Chapter 3.

Organization: University of Michigan Transportation Research Institute

The discussion on heavy-duty combination truck tractors mass, pages 47 and 74 of the regulation could benefit from clarification. The term gross combination weight rating (GCWR) seems to be confused with allowable weight limits as prescribed by federal size and weight policy. The 80,000 lb referenced in the regulation was established by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. It effectively limited vehicles weight to 80,000 lbs on federal highway system except in states with preexisting higher weights. In Michigan for example, tractor semi-trailers operate in excess of 160,000 lbs. GCWR and GVWR are determined by the lowest strength element within the tractor or trailer load related components such as frame rails, suspensions, brakes etc. GVWR and GCWR are not related to size and weight limits. These ratings can vary substantially and almost always exceeds the allowable weights governed by size and weight policy. It would seem more appropriate to explicitly tie the masses used in the GEM simulation to the federal size and weight limit given that such polices set the upper bound weight limit, effectively control vehicle productivity and therefore greatly influence vehicle fuel consumption and emission output per unit of cargo transported. [EPA-HQ-OAR-2010-0162-1852.1, p.1]

It is understood that truck payload equivalent factors are used to estimate the average payload of Class 7 and 8 trucks. Perhaps these could be expressed and a percentage of the size and weight limit. This would make the masses referenced by the regulation more robust, relevant and scalable in the likely event that size and weight reform were to occur. [EPA-HQ-OAR-2010-0162-1852.1, p.1]

Given that most vehicles operate at maximum size and weight limits during a significant portion of their working life and certain fleet segments such as bulk haulers, fuel tankers and flat bed operations almost always travel at maximum allowable GVW 50% of the time, there is an argument that supports the use of the maximum 80,000 vehicle weight for the GEM simulation instead of reducing it in accordance with payload equivalent factors. Reducing the complexity in this way would simplify compliance and would reflect the fully loaded vehicle state which almost all class 8 vehicles experience. [EPA-HQ-OAR-2010-0162-1852.1, p.1]

Another area that may require further consideration are the proposed vehicle component masses found in Table 4-6 on Pg 4-11 of the draft Regulatory Impact Analysis

[See p.2 of this comment for table 4-6 found on pg 4-11 of the draft Regulatory Impact Analysis]

The masses included in Table 4-6 appear to be the sum of the tractor and trailer excluding cargo. It would be less confusing if the masses of the tractors were presented in the table within a separate row and the mass of the trailer(s) presented within another row. From what was presented, this reader assumed that a single mass trailer was used for all cab styles in the class 8 category. If a constant trailer mass is used, the variations in vehicle mass as a function of cab style seems to be inconsistent and counter intuitive. For example the body mass for Class 8 sleeper low roof and the day cab high roof tractors are greater than the sleeper mid roof. Clarification is needed. Finally, given the small variation in vehicle mass found in the table, it might be more appropriate to represent the class 8 sleeper high roof, mid roof and low roof as a single mass value and the class 8 day cab high roof and low roof as a single value. This would help simplify compliance. [EPA-HQ-OAR-2010-0162-1852.1, p.2]

Response:

As described in Section II.B.3.h.iii in the preamble, the agencies are adopting the proposed tractor-trailer weights because the changes suggested by the commenters will not change the evaluation of the technologies on which to predicate standard levels included in this phase of the HD program. NHTSA and EPA will evaluate additional sources of weight information in future phases of the program.

The agencies provided the breakdown of the tractor tare weight, trailer weight, and payload in the draft RIA in Tables 3-10 and 3-11 and will continue to provide them in the final RIA and in Section II.B.3.h.iii of the preamble. The agencies assumed different trailer weights for the various types of trailers used in the program – box, flat, and tanker. This accounts for the difference in body mass of the various types of tractors included in the draft RIA Table 4-6, which may seem counterintuitive if one assumed the same trailer was used for all tractor types.

Organization: American Trucking Associations, Inc. (ATA)

As the Agency points out the total weight of a truck (tare-weight + cargo weight) is important because it directly impacts fuel economy and therefore impacts the calculations of GHG emissions and fuel consumption savings from different technologies. It is also important because in large measure it determines such things as stopping distance, fuel-efficiency, and overall productivity. [EPA-HQ-OAR-2010-0162-2263.1, p.11]

The agencies relied upon an analysis of the Vehicle Inventory and Use Survey (VIUS) undertaken by M.J. Bradley & Associates in 2009 to assess empty trailer weight and payload as a key factor in evaluating GHG emissions and fuel consumption. 75 Fed. Reg. 74152, 74186. From a modeling standpoint given that the establishment of baseline information is critical in serving as a gauge to measure the success of the rule. The analysis, however, is based on a survey that was completed in 2002 and, as a result, does not portray an accurate representation of the weight distribution of the national heavy truck fleet operating in the country today. Bradley's survey states that combination tractors travel 9% of their miles empty, 61% cube-out, and 30% weighed-out. [EPA-HQ-OAR-2010-0162-2263.1, pp.11-12]

ATA recommends that the agencies base their analysis of truck weights using the FHWA Long-Term Pavement Data Base on truck weights over the last several years. A copy of the latest data release (LTPP SDR25, Volume 5 LTAS Database) can by [sic] obtained at http://www.ltpp-products.com/index.asp. [EPA-HQ-OAR-2010-0162-2263.1, p.12]

The FHWA data base shows that the average weight of a 5-axle tractor semitrailer is 54,656 pounds when loaded. ATA's analysis of 5-axle trucks in this database suggests combination tractors travel 20% of their miles empty, 67% cubed-out, and 13% weighed-out. [EPA-HQ-OAR-2010-0162-2263.1, p.12]

Class 7 trucks are typically vocational trucks. Realizing that the gross vehicle weight rating of a Class 7 truck is limited to 33,000 pounds, it seems unlikely that the average cargo weight of Class 7 trucks is as high as 25,000 pounds. ATA recommends using a lower cargo weight assumption in developing these baseline weight standards. [EPA-HQ-OAR-2010-0162-2263.1, p.12]

From our analysis of the FHWA data, the average weight of a 3-axle truck is approximately 11,000 pounds gross vehicle weight. Three-axle trucks can be Class 2 through 8 vehicles. ATA recommends that the agencies use cargo weights of 5,000 to 10,000 pounds for Class 7 trucks and average cargo weights of 25,000 to 30,000 pounds for Class 8 trucks. [EPA-HQ-OAR-2010-0162-2263.1, p.12]

Response:

As described in Section II.B.3.h.iii in the preamble, the agencies are adopting the proposed tractor-trailer weights because the changes suggested by the commenters will not change the evaluation of the technologies on which to predicate standard levels included in this phase of the HD program. NHTSA and EPA will evaluate additional sources of weight information in future phases of the program.

8.9. Hybrid Test Procedures

Organization: ACEEE, Eaton Corporation, CALSTART, NRDC, and UCS

Finally, the agencies should support the continued data collection efforts on in service vehicles similar to that currently performed by NREL. The collection of the data must also be analyzed and characterized for each vocational application in a cooperative government/industry effort. This process should be transparent and non-confidential information should be made publicly available. Through these efforts it will be possible to refine hybrid technologies and improve GHG reductions in this vehicle segment. [EPA-HQ-OAR-2010-0162-1941.1, p.2]

Response:

The agencies agree that additional data collection to improve performance assessment for the next phase of standards. The agencies agree that there is a need for sharing heavy-duty emissions and fuel consumption information and therefore will make information publically available under this program.

Organization: Allison Transmission

As explained above, the alternative metric proposed by Allison incorporates concepts outlined in the NAS Report on vehicle average speed, while refining the NAS proposed metric to reflect how vehicles are actually used in the commercial sector. Thus the alternative metric provides a better (i.e., more complete) measurement of the actual productivity of the vehicles. In addition, however, utilizing such a metric in this rulemaking would incentivize the adoption of more efficient technologies, including hybrid drive systems. While EPA provides an alternative for the crediting of individual hybrid systems through A vs. B testing 18, the metric should directly recognize that hybrid vehicle operation is more fuel efficient due to how hybrid vehicles operate and how vehicle efficiencies are achieved, especially with regard to transient operation. This is not to advocate a theoretical measurement of hybrid efficiencies, but rather, to advocate a methodology for more direct measurement or, in the alternative, for robust modeling of hybrid systems. EPA should additionally make other changes to its proposed approach to crediting hybrid vehicles, as provided in the discussion in Section XI below. [EPA-HQ-OAR-2010-0162-2735.1, pp.8-9]

In the discussion of regulatory rationale that is provided in the preamble, EPA and NHTSA broadly indicate that the GHG and FE effect of different transmissions are essentially the same. EPA references a TIAX report that estimates that such effects range from 0 to 8 percent of vehicle emissions. [EPA-HQ-OAR-2010-0162-2735.1, p.30]

EPA and NHTSA must not rely on such sweeping and largely unsupported estimates in the characterization of the emission and FE effects of various transmission technologies. For example, as recognized by the NAS, there are large differences between the operational and emission effects of automatic transmissions ('ATs') automated manual transmissions ('AMTs') and manual transmissions. As indicated by NAS: [EPA-HQ-OAR-2010-0162-2735.1, p.31; see p.31 of this comment summary for excerpt from NAS Report at 66]

In addition, as referenced in Attachments 3 and 5, [See docket number 2738.1 for Attachment 3. Attachment 5 was not submitted to the docket] transient operating conditions accentuate the technical advantages of automated systems, including hybrids. While EPA seeks to model such effects for hybrid vehicles in the GEM, it cannot otherwise ignore fuel savings associated with non-hybrid ATs which represent the vast majority of fleet now and for the foreseeable future. [EPA-HQ-OAR-2010-0162-2735.1, p.32]

Despite the advantages of advanced transmissions, including ATs, adopting a 'transmission neutral' policy can be justified in the context of this rulemaking. As EPA and NHTSA indicated within the Proposed Rules, a transmission neutral policy can serve to let the current marketplace operate and let customers select the transmission and gearing that best meets their individual or fleet needs. While advanced transmissions and ATs offer certain FE and GHG advantages (as outlined throughout the comments that are being submitted by Allison for the Proposed Rules) it is far more preferable to not quantify this effect than to incompletely quantify the effect, or to quantify the effect erroneously. [EPA-HQ-OAR-2010-0162-2735.1, p.32]

Instead, Allison can support a system of MD/HD regulation that lets the current marketplace - a marketplace that is traditionally sensitive to obtaining the best possible vehicle acquisition and operating costs - select the transmission technology which best suits a buyer's needs and expectations of performance. Especially if accurate information regarding the real world FE of various transmission types is available, the natural economic incentives of the commercial MD/HD truck market will tend to select the most efficient option. Customers will naturally tend to select the engine/transmission/vehicle pairings that will cost them the least amount of money in the long-run when other issues (e.g.,unique vehicle demands, ease of servicing) are also adequately addressed. [EPA-HQ-OAR-2010-0162-2735.1, p.32]

There are several areas in which EPA and NHTSA proposed rules and underlying support documents regarding hybrid vehicles are unclear. Given the vital nature of this technology and the improvements to GHG emissions and FE that could be obtained by greater integration of hybrids into the MD/HD fleet, Allison believes that EPA and NHTSA should take additional time to clarify its regulatory intent and the precise nature of its proposed rules in this area. Specifically, we would pose the following questions: [EPA-HQ-OAR-2010-0162-2735.1, p.37]

(i) EPA and NHTSA have not precisely specified what the agencies will consider to be a 'complete hybrid system.' For example, the Draft RIA appears to indicate that pre-transmission systems constitute such a 'complete hybrid system.' yet there is not an accepted industry view of this term or what does and does not constitute a complete system. Transmissions are integral to many hybrids and hybrid vehicle systems and cannot be arbitrarily excluded. [EPA-HQ-OAR-2010-0162-2735.1, p.37]

(ii) EPA and NHTSA propose different testing systems for hybrid vehicles: testing of a complete vehicle and 'powertrain test cell' testing without adequate explanation or justification for this proposal. On what informational basis is this proposal made and would the use of such differential testing protocols be decided by EPA, NHTSA or those manufacturers seeking to test hybrid systems? [EPA-HQ-OAR-2010-0162-2735.1, p.37]

(iii) It is unclear as to how the proposed testing protocols for hybrids will account for expected aging of the systems and how such expected aging would affect the end crediting of the hybrid system. [EPA-HQ-OAR-2010-0162-2735.1, p.37]

(iv) EPA and NHTSA must give greater consideration to the baseline configuration of hybrids in 'A to B' testing. Within both the preamble and the draft RIA, it is not clear as to whether the agencies will require that the baseline vehicle be of the same model year and configuration as normally specified by vehicle purchasers and supplied by equipment manufacturers. [EPA-HQ-OAR-2010-0162-2735.1, p.37]

(v) The 'value' of hybrids relative to conventional vehicles can only be assessed with respect to a real world non-hybrid vehicle of substantially similar type. Given that the transmission/rear axle combination determines the engine torque/speed map for a brake power cycle, EPA should specify how 'pre transmission' drivetrain components will be taken into account in the intended testing protocol. [EPA-HQ-OAR-2010-0162-2735.1, p.37]

(vi) It is unclear as to whether hybrid manufacturers are to submit A vs. B test cycles for each vehicle or a family of hybrid vehicles, or whether some other methodology is intended in the proposed rules. [EPA-HQ-OAR-2010-0162-2735.1, p.37]

(vii) It is unclear how accessory/hotel loads will be specified or considered in the A vs. B testing. [EPA-HQ-OAR-2010-0162-2735.1, p.38]

(viii) It is unclear whether the test methods are focused specifically on sandwich hybrid and engine power take-off hybrid configurations and/or whether the test methods would be limited to such configurations. [EPA-HQ-OAR-2010-0162-2735.1, p.38]

(ix) Engine certifications have traditionally involved criteria pollutant standards. Since the proposed rules address FE and GHG standards, in the case of A vs. B hybrid testing, will criteria pollutants be considered with respect to the certification of a hybrid system or considered separately with respect to engine certification? [EPA-HQ-OAR-2010-0162-2735.1, p.38]

(x) It is unclear how EPA and NHTSA contemplate that hybrid vehicles will be certified and by whom. The proposed regulations generally provide that engine manufacturers must comply with Subpart A regulations Subpart G regulations, however, refer not only to engine and vehicle manufacturers but 'all other persons.' Given the non-engine components that are necessary for the testing, EPA needs to clarify whether a certification can be required from or held by an engine manufacturer, an OEM or a hybrid component manufacturer. [EPA-HQ-OAR-2010-0162-2735.1, p.38]

Otherwise, EPA states that 'typical operation' of non-PTO hybrid is similar to conventional vehicles. However the Agency provides no empirical support for this assertion. Drive cycles for both PTO and non-PTO assisted hybrids also overweight steady state operations (58% of vocational vehicle operation is assumed to be 55 mph and above; 81 % for day cab tractors and 95% for sleeper cabs). EPA regulations also appear to require that vehicle manufacturers submit testing data for crediting of hybrid vehicles. Finally, Allison would also request that EPA and NHTSA quantify the available testing capability for hybrid testing and any longer-term plans that EPA and NHTSA may have in this area. It appears that lack and the expense of dynamometers create a 'choke point' for greater penetration of hybrid technology. The marketplace would benefit from some iteration within the context of this rulemaking, of EPA's longer-range thinking regarding the ability of the marketplace to support hybrids and the infrastructure necessary to accommodate the testing and the certification of such vehicle systems. [EPA-HQ-OAR-2010-0162-2735.1, p.38]

Response:

The agencies agree with the concern that chassis testing only as an option for assessing hybrid performance is overly burdensome at this time. The purpose of the chassis testing option is to provide for a direct comparison of the performance improvement. The additional options available for certification of advanced technologies include powerpack testing using pre-transmission or post-transmission options. The agencies have defined hybrid engines and hybrid vehicles for purposes of certification. The hybrid engine must include energy storage. The hybrid vehicle must include regenerative braking to be considered advanced technology. The method of certification is chosen by the manufacturer seeking a certificate of conformity, based on the product being certified. With any certification, the expectation is compliance with the provisions of the certification for the full regulatory useful life and deterioration factors must be provided by the manufacturer at the time of certification. As described in 40 CFR 1037.610, the manufacturer must establish a baseline vehicle upon which to calculate the improvement factor for the hybrid. The baseline vehicle must be identical to the hybrid, with the exception being the presence of the hybrid vehicle. Should an identical vehicle not be available as a baseline, the baseline vehicle and hybrid vehicle must have equivalent power or the hybrid vehicle must have greater power. Additionally, the sales volume of the conventional vehicle from the previous model year (the vehicle being displaced by the hybrid), must be substantial such that there can be a reasonable basis to believe the hybrid certification and related improvement factor are authentic. Should no previous year baseline or otherwise existing baseline vehicle exist, the manufacturer shall produce / or provide a prototype equivalent test vehicle. For pre-transmission hybrid certification, drivetrain components will be not included in the testing as is the case for criteria pollutant engine certification today on a brake-specific basis. Manufacturers are expected to submit A to B test results for the hybrid vehicle certification being sought for each vehicle family. Manufacturers may choose the worst case performer as a basis for the entire family. The agencies continue to expect to use existing precedence regarding treatment of accessory loads for purposes of chassis testing. Accessory loads for A to B testing will not need to be accounted for differently for hybrid A to B chassis testing from criteria pollutant chassis testing. Based on the description of the hybrid engines and vehicles as found in 40 CFR 1036 and 1037.801, the agencies will not restrict hybrid configuration certification. The expectation is that hybrid engines and vehicles certified under the provisions for GHG will use certified engines that have not experienced tampering with the installation of the hybrid system and that the engines still comply with criteria pollutant program provisions. Hybrid system manufacturers are not required to certify as long as the installations of hybrids remain consistent with criteria pollutant, fuel consumptions, and GHG regulatory requirements. The hybrid provisions for advanced technology credits are part of a voluntary program for hybrid engines and vehicles such that is they are compliant would receive the incentive of bonus, flexible credits. To address the issue of properly characterizing the operation of hybrid applications, the agencies have revised the duty cycle weightings to more closely match real world performance data provided to the agencies.

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The rule would allow manufacturers to obtain credit for hybrids and certain other 'advanced' technologies using defined test protocols. The use ofall three methods sketched in the proposed rule to demonstrate hybrid benefits should be permitted: either chassis testing or 'power pack' testing, the latter in either the pre- or post-transmission versions. These protocols should be further developed in the final rule to ensure ease of use, reliable measurements of savings, and cross-test comparability. [EPA-HQ-OAR-2010-0162-1894.1, p.24]

Response:

The agencies agree with the concern that chassis testing only as an option for assessing hybrid performance is overly burdensome at this time. The purpose of the chassis testing option is to provide for a direct comparison of the performance improvement. The additional options available for certification of advanced technologies include powerpack testing using pre-transmission or post-transmission options.

Organization: BAE Systems

The provisions of §1037.610(b)(1) require that hybrid vehicles be tested using a costly and logistically burdensome chassis dynamometer test as specified in §1037.510. However, conventional vehicles are permitted to show compliance via imputing seven (7) coefficients into a computer simulation model. Consequently, the fledgling heavy-duty hybrid industry is being singled-out for uneven and excessive regulatory burden inconsistent with similar vehicle of a conventional design. This will unnecessarily penalize and burden hybrid electric technology and manufactures' of such technology, with the unintended consequence of hindering the growth potential of this fuel-saving technology and market. [EPA-HQ-OAR-2010-0162-1948.1, p.4]

Recommendations: The regulation should be "technology neutral' with regard to certification procedures. To this end, the following is recommended for consideration: [EPA-HQ-OAR-2010-0162-1948.1, p.4]

• The GEM model should be upgraded to incorporate functionality required to be able to manage hybrid electric drive trains such that both conventional and hybrid vehicle can enjoy the low cost, low burden process of using computer modeling to show compliance [EPA-HQ-OAR-2010-0162-1948.1, p.4]

• Some type of standardized procedures for test track certification should be implemented for both conventional and hybrid vehicles to demonstrate compliance. Reference Attachment-1 'Standardized On-Road Test (SORT) cycles' as a basis for such a procedure. While not as cost-effective as computer modeling it is vastly less burdensome than chassis dyno testing. [EPA-HQ-OAR-2010-0162-1948.1, p.4]

Response:

The agencies agree with the concern that chassis testing only as an option for assessing hybrid performance is overly burdensome at this time. The purpose of the chassis testing option is to provide for a direct comparison of the performance improvement. The additional options available for certification of advanced technologies include powerpack testing using pre-transmission or post-transmission options.

Organization: California Air Resources Board (ARB)

ARB encourages the U.S. EPA to continue to evaluate appropriate methods to evaluate heavy-duty hybrid vehicles. Specifically, as new studies and usage trends emerge, and manufacturers utilize U.S. EPA's heavy-duty hybrid test procedures, ARB urges U.S. EPA to continue its on-going evaluations to ensure those procedures accurately reflect real reductions from the many types of heavy-duty hybrid vehicles. ARB staff looks forward to continuing work with U.S. EPA to assess heavy-duty chassis dynamometer and power pack testing procedures. [EPA-HQ-OAR-2010-0162-2354.1, p. 3]

Response:

The agencies thank ARB for its assistance in assessing performance improvements, as well as protocol development and evaluation of hybrid vehicles.

Organization: CALSTART

We fully support the use of multiple voluntary testing approaches, including the optional engine dynamometer with “powerpack” and chassis dynamometer test protocols. These alternative testing approaches are vitally important for capturing the benefits provided by advanced technologies, such as hybridization and advanced transmissions, that are not captured in engine-only tests. Many of the manufacturers and suppliers that we work with in advanced technology feel the powerpack approach in particular may provide a very cost-effective way of capturing the value quantified in a chassis test but at lower cost. Indeed, the powerpack test has been used in practice to qualify vehicles for the Heavy Hybrid Tax Credit in the past with much success. We cannot encourage too strongly the retention and strengthening of this provision. [EPA-HQ-OAR-2010-0162-2121, p.4]

Response:

The agencies agree with the commenter that the use of options for advanced technology certification are essential to providing for a maximum amount of flexibility to facility the introduction of hybrids.

Organization: Daimler Trucks North America

Hybrid duty cycles (with and without PTO) do not match typical real-world hybrid applications, under representing the performance benefits of hybrid technologies. The main market for hybrid vehicles is in applications with very transient (stop and start) conditions like city driving, as those applications allow the highest benefit from recapturing energy. In turn, hybrids are generally optimized for transient operation, often with low speed application like city traffic with multiple stops per mile, low average speed, good acceleration and brake performance. By contrast, most hybrid vehicles are not generally optimized for frequent long-duration highway speed driving. [EPA-HQ-OAR-2010-0162-1818.1, p.78]

The test cycles suggested by the Agencies are not representative of this driving. They are much faster than hybrids normally drive, with less stops and less recoverable energy per unit distance. We refer the Agencies to Cummins' comments on the topic of hybrid drive cycles, in which are presented data comparing in-use hybrid drive cycles to the Agencies' proposed cycles. In particular, the 55 and 65 mph cruise tests are very unrepresentative of hybrid HDV operation. In turn, using the Agencies' proposed drive cycles will either under-credit hybrid vehicle fuel savings or drive manufacturers to optimize vehicles to these cycles. The former would be in accurate and unfair to manufacturers trying in good faith to encourage hybrid sales. The latter would cause vehicles to be less efficient in their actual use. Neither of these is in keeping with the Agencies' objectives. [EPA-HQ-OAR-2010-0162-1818.1, p.78]

Our analysis of transit bus cycles, comparing the Agencies' proposed cycles to more representative ones, shows similar disparity. Typical transit customer drive cycles show average speeds of 7 mph in New York City (as found following 383 buses during 1.24 x 106 hours of cumulative driving) and 12 mph for Toronto (41 buses during 79,000 hours for cumulative driving). As the table below shows, that these observed average speeds are well represented with the SAE 2711 drive cycles (Manhattan and Orange County), whereas the transient drive cycle or even the weighted drive cycle as proposed in the NPRM, show higher average speed and a significant higher average distance between stops. In turn, the Agencies' suggested drive cycle have significantly lower recoverable kinetic energy than real-world driving. So the proposed cycle will insufficiently reward hybrid fuel savings or incent hybrid vehicle use. [EPA-HQ-OAR-2010-0162-1818.1, p.78]

[See p.79 of this comment for a table showing drive cycles]

Consequently, we recommend a drive cycle like a vehicle FTP (v-FTP), by which we mean the engine FTP translated (through assumptions about vehicle and transmission characteristics) to a vehicle drive cycle. Alternatively, we recommend the CILCC or drive cycles used in SAE 2711 testing. For transit buses, if the Agencies wish to allow an application-specific cycle, we could recommend a Transit Coach Operating Cycle (ADB Cycle), which we have used in the past. [EPA-HQ-OAR-2010-0162-1818.1, p. 79]

For vehicles with PTO, we recommend a weighting of the regular hybrid transit cycle plus a PTO cycle, which we have used in the past when testing with Southwest Research Institute. [EPA-HQ-OAR-2010-0162-1818.1, p. 79]

The Agencies should remove the requirement for burdensome and inaccurate coast-down testing as the means to establish the vehicle's friction load. There are much easier means, and with easier means come less costs to apportion across hybrid vehicle sales, and in turn greater incentive for customers to buy hybrid vehicles. DTNA recommends that the Agencies allow us to use fixed friction load values from GEM for both vehicles (i.e., to use fixed values for the first and second order dynamometer parameters) but to use an estimated a Cd*A based upon a rough calculation of frontal area and an assumed Cd of the Agencies' picking. Because hybrid testing is test-to-control (comparative) testing, the actual Cd*A and friction factors only have a second order effect on measured fuel consumption. Hence they should not require a major, costly effort from vehicle manufacturers. If manufacturers wish to invest in demonstrating actual values for use in lieu of the pre-determined and calculated ones, then manufacturers should be able to do so, but it should not be required. [EPA-HQ-OAR-2010-0162-1818.1, p. 79]

Chassis Dynamometer Testing For Hybrid Vehicles Should Be The Primary Path. HILS And Power Pack Testing Should Also Be Allowed If A Manufacturer Can Establish Agency Approval Of The Test Method And Conditions. [EPA-HQ-OAR-2010-0162-1818.1, p. 79]

We recommend four options for hybrid vehicle testing: [EPA-HQ-OAR-2010-0162-1818.1, p. 80]

1. Chassis dynamometer testing using a vehicle cycle representative of real hybrid operation: We recommend either a vehicle version of the FTP test (i.e., translating the engine FTP to a vehicle cycle through calculation based upon a common transmission and a reasonable set of other vehicle parameters) or world-harmonized cycles. We recommend that testing be A:B comparison of a hybrid and a comparable conventional vehicle, both operated over the same vehicle cycle. We recommend that, until the Agencies have developed hybrid criteria pollutant procedures, testing be only for GHGs. We recommend that the test cycles and hardware be developed such that the hybrid can capture regenerative braking energy. [EPA-HQ-OAR-2010-0162-1818.1, p. 80]

2. Powerpack or post-transmission hybrid testing: we recommend procedures similar to those described for chassis dynamometer testing. [EPA-HQ-OAR-2010-0162-1818.1, p. 80]

3. Pre-transmission hybrid testing using existing engine cycles: We recommend that a manufacturer test an engine-hybrid setup as they would an engine alone, except that in the case of the hybrid, the engine dynamometer should motor the system to allow capture of regenerative braking energy. We recommend that testing be A:B testing, except that the "comparison engine" would be the relevant engine standards. (Because hybrid credits can transfer from engine to vehicle or vice versa, it is immaterial whether one certifies an engine below the emission standard and gains credits on the engine or whether one uses the standard engine in GEM but applies the hybrid A:B multiplier to the vehicle, as we discuss below.) [EPA-HQ-OAR-2010-0162-1818.1, p. 80]

4. An option to petition the Agencies for development of new procedures like HILS, once a manufacturer demonstrates a fair and representative method of modeling hybrid hardware or software. We recommend that a manufacturer have the option to test with more components than

are required. So, for example, a manufacturer who could use a pre-transmission hybrid test can also use a chassis dynamometer test. But we recommend that, until a manufacturer develops the HILS procedure, all testing must include all hardware from the hybrid powertrain. This includes battery packs, motors, controllers, the engine, and any waste heat recovery systems. [EPA-HQ-OAR-2010-0162-1818.1, p. 80]

We recommend that all four options allow for motoring of the hybrid system in order to regenerate braking energy, which means that manufacturers will have to work with the Agencies to develop a procedure for dynamometer configurations that fairly and representatively allow regeneration. [EPA-HQ-OAR-2010-0162-1818.1, p. 80]

Whichever procedure a manufacturer uses, we recommend a common set of test procedures, including apparatus warm-up, etc. Perhaps the best method for developing these procedures would be to adopt what Southwest Research Institute currently uses, as they have done much testing for the industry. [EPA-HQ-OAR-2010-0162-1818.1, p. 80]

We recommend that the Agencies work with manufacturers and with Agency counterparts in other countries to develop a harmonized HILS program. There is a lot of opportunity for improved testing with HILS, but what is needed are clear and detailed procedures so that no manufacturer has an opportunity to game the system. [EPA-HQ-OAR-2010-0162-1818.1, p. 80]

Battery State Of Charge Changes Need To Be Limited To 1 Or 2% From Start Of Test To End. [EPA-HQ-OAR-2010-0162-1818.1, p. 81]

We are not yet sure what is the right number for an allowable delta-SOC, but we do know that the industry is not yet ready for the complexity of calculating the fuel equivalence of battery charge, fairly and reasonably taking into account the inefficiency of batter charge outflow. And unless there is a fair and realistic accounting of inefficiencies, an unscrupulous manufacturer might try to game the system by loading up or excessively depleting a battery with energy during a test cycle, whichever achieves the best fuel equivalent calculation. [EPA-HQ-OAR-2010-0162-1818.1, p. 81]

Response:

The agencies agree with the commenter that the options available for hybrid vehicle testing help to facilitate introduction of heavy-duty hybrid technology. The cap on the change in the state of charge over the test is consistent with existing SAE protocols for charge sustaining testing. The agencies will continue to work with international groups and other governments to address the issue to continue development of HILS test procedure.

Organization: Eaton Corporation

We applaud the Agencies decision to include PowerPack testing as an option for accurately measuring the contribution of hybrids and other advanced technologies to the overall efficiency of the vehicle. The PowerPack methodology should be the preferred approach because it enables applications to multiple chasses. [EPA-HQ-OAR-2010-0162-1649.1, p.3]

Eaton supports the NPRM as it refers to tractors used in the line haul applications and it believes there is sufficient flexibility in achieving the proposed standards. However, in the Vocational category there are very few technology choices in achieving the standards. Our comments below refer to the means to increase the Rule’s flexibility in complying or over-complying with the standards in the Vocational category. [EPA-HQ-OAR-2010-0162-1649.1, p.4]

The contribution to fuel efficiency improvements and GHG reduction of transmission and other drivetrain technologies are not captured with the proposed testing procedures and not recognized in the technology credit programs. The Agencies can capture drivetrain efficiency by allowing PowerPack testing for Hybrids to be extended to driveline technologies. [EPA-HQ-OAR-2010-0162-1649.1, p.4]

Eaton advocates that the Agencies make the proposed PowerPack test available as an option for the certification of incremental GHG and fuel efficiency contributions of advanced driveline technologies such as Dual Clutch Transmissions, Vocationally-oriented Automated Mechanical Transmissions, and other novel approaches being introduced into the market in the near future. If this procedure is offered as an option in the Vocational categories, it adds compliance flexibility in those categories. [EPA-HQ-OAR-2010-0162-1649.1, p.4]

PowerPack test is a technology-neutral test procedure that can accurately measure the fuel efficiency and GHG benefits of a broad spectrum of technologies, including Hybrid, t recovery. Furthermore, PowerPack testing captures the benefits of system level optimization that are not visible at the component level certification in the proposed rule consistent testing methodology that captures incremental contributions of a wide array of solutions available in the Vocational market that are not quantifiable under the current proposal. [EPA-HQ-OAR-2010-0162-1649.1, p.5]

Until recently, the fuel efficient transmissions were less well accepted in many markets because of driver preference and the perceived performance compromises associated with prior generation technologies. However, due to recent advances in Automated Mechanical Transmissions, and especially with the advent of Dual Clutch Transmissions in commercial vehicles, there are new technologies entering the market that provide the fuel efficiency of manual transmissions wi~h performance equivalent or better than Torque Converter Automatic transmissions. [EPA-HQ-OAR-2010-0162-1649.1, p.5]

The extension of testing and certification to cover advanced drivelines does not increase the vehicle cost but does improve fuel efficiency and GHG emissions. This improves the Agencies' economic impact assessment by driving further improvement (or adding increased compliance flexibility) without changing the cost. Independent laboratory testing of three typical Medium Duty vocational vehicles with concept Dual Clutch Transmissions versus state of the art torque converter-based transmissions gives the following fuel efficiency improvement (with no performance degradation): Configuration A =4.06%; Configuration B = 6.70%; Configuration C = 10.91%. [EPA-HQ-OAR-2010-0162-1649.1, p.5]

Eaton agrees with the inclusion of the Power Pack testing and certification process for Hybrid technologies in the Advanced Technology Credit Program as proposed in the NPRM. The Power Pack framework provides a “hardware in the loop” test for post engine vehicle components that make significant contributions to vehicle fuel efficiency and GHG reductions. The proposed test is a cost effective way to accurately measure the off-cycle fuel efficiency and emissions reductions contributions of post engine hybrid technologies, and hybrid electric, hybrid hydraulic and other novel configurations. It also provides the capability to test hybrid power systems in varying vocational duty cycles, providing further flexibility to accurately measure the performance of hybrid systems in real world applications. [EPA-HQ-OAR-2010-0162-1649.1, p.12]

The Power Pack concept has been used by the commercial market to certify hybrid powers systems for the Heavy Duty Hybrid Tax Credit and to provide system performance data to government, fleets, OEM’s and other stakeholders for nearly a decade. Inclusion of the option to use Power Pack, among other A and B comparisons test such as the SAE J2711 tests 3 and 4 with appropriate drive cycles that are representative of the vocational segment, will promote further deployment of these technologies into the market and maintain the fleet’s ability to specify hybrid systems at the time of purchase. Note that the actual cycles in SAE J2711 are not appropriate for the Vocational segment; we recommend using CILCC instead. [EPA-HQ-OAR-2010-0162-1649.1, p.12]

As stated in the previous sections, we believe that the agencies should further refine the vehicle test cycles for Hybrid certification test to more accurately reflect actual drive cycles. Eaton maintains that one cycle will distort the market towards one solution. As stated and shown in Figures 1 thru 3 above, providing “urban/city bus” and “mixed urban/freeway” cycles will provide a more realistic comparison of in service fuel consumption rates in these vocational applications. The agency already recognized the need for PTO cycles as opposed to non-PTO cycles. However, “utility- PTO” versus “refuse-PTO” is a significant difference. The “refuse-PTO” cycle will drive solutions that deal with high transients and simultaneous drive and PTO, while a “utility-PTO” will drive solutions based on good mixed urban/freeway that optimize fuel efficiency and GHG at extended power idle. One PTO cycle will skew the market in one direction or the other. [EPA-HQ-OAR-2010-0162-1649.1, p.13]

Therefore, we reiterate our recommendation that the following specific cycles can accurately capture in service fuel savings of hybrid technologies while avoiding duty cycle proliferation:

• Mixed urban/freeway: CILCC with potentially 10-20% constant freeway (60 mph) weighing

• Urban (City Bus): a combination(concatenation or weighted) of standard bus cycles in the industry, specifically WVU, Orange County and Manhattan

• Refuse PTO: HTUF refuse cycle with 1 or 2 PTO hydraulic circuits

• Utility PTO: CILCC with a long power idle (single PTO) [EPA-HQ-OAR-2010-0162-1649.1, p.13]

A practical testing option is to concatenate the two non-PTO cycles thus testing both cycles for all vehicles, but then weigh 100% the cycle of intended use. Should the PowerPack or Chassis be used in another vocation, no new testing would be needed. [EPA-HQ-OAR-2010-0162-1649.1, p.13]

The choice of the four cycles is technology neutral and reflects the major in service vocational categories hybrid power systems currently operate in today. For consistency, we recommend the same duty cycles across the entire vocational segment, regardless of the driveline technology. [EPA-HQ-OAR-2010-0162-1649.1, p.13]

As stated previously, the classification of vehicles as combination tractor trailer versus vocational vehicle in the Class 7 and 8 categories may limit the introduction of hybrid technologies. In the case of City Delivery and Beverage Tractors, we believe that the duty cycle – not the vehicle size/weight, axels, tires, etc. – should define the targets and classification of these vehicles. Beverage and city delivery trucks (which fall into these class categories) are leading the way in adoption of hybrid technologies. If classified as a tractor trailer, by weight, instead of vocation, by duty cycle, there would be no way to test 15 the hybrid system for certification. The potential unintended consequence of this approach could prevent viable technologies from being utilized and/or overlooked for a category where significant improvements can be realized for those Class 7 and 8 vehicles are not used in the typical “line-haul” duty cycle. Eaton recommends that the Agencies find methods to categorize city delivery (short haul) and beverage tractors as vocational vehicles. [EPA-HQ-OAR-2010-0162-1649.1, pp.14-15]

Response:

The agencies agree with the commenter’s concerns about the duty cycle’s applicability to certain vocational applications. The agencies have reweighted the duty cycles for hybrid to more accurately reflect hybrid vehicle performance in-use. Given the fact that the agencies’ PTO cycle includes both refuse hauler and utility vehicle operation, the agencies are not changing the PTO command cycles with this action.

Organization: Engine Manufacturers and Truck Manufacturers Associations

A hybrid powertrain is one that combines two or more sources of propulsion energy -one uses a consumable fuel (the internal combustion engine), and the other is rechargeable (the rechargeable energy storage system, or 'RESS'). A significant component of the improved efficiency of a hybrid powertrain is improved vehicle power management, which includes the capture of braking energy, optimization of engine power requirements, and optimization of accessory power requirements. Optimizing engine power is achieved by downsizing the engine and modifying the operating cycle so that the engine is operating a majority of the time at its most efficient speed and torque. Power also is supplied to the RESS from the engine when it is not needed for propulsion (i.e., when the vehicle is slowing or stopped), and through regenerative braking by generating and capturing power to assist slowing the vehicle. The effectiveness of the hybrid powertrain at reducing GHG emissions and improving fuel efficiency depends on the design and respective interactions of the engine and RESS. [EPA-HQ-OAR-2010-0162-1940.1, p.32]

Hybrid powertrain effectiveness also is very sensitive to the duty cycle of the particular vehicle in which it is applied. In order to maximize the ability of a hybrid system to capture unused engine power and energy generated during braking, a vehicle's operations must include frequent short-term idling as part of significant stop-and-go operation. Accordingly, experience has shown that the best MD and HD vehicles for the application of hybrid technologies currently are: transit buses, urban delivery trucks, step vans, refuse collection trucks, school buses, and beverage tractors [EPA-HQ-OAR-2010-0162-1940.1, p.32]

The hybrid drive cycles in the Proposed GHG/FE Standards do not match typical real-world hybrid applications, and thus under-represent the performance of hybrid technologies. The proposed vocational hybrid cycle weightings should include a greater percentage of lower speed transient operation, consistent with the expected urban operations of MD and HD hybrid vehicles. The cycles proposed (including the CARB transient cycle and two steady state highspeed cycles) were chosen because they were reflective of the EPA's MOVES model, which was developed based on the operation of a wide range of MD and HD vehicles. However, the CARB Heavy Heavy-duty Truck Transient Mode Cycle that is part of the proposed test cycles does not reflect the high acceleration and deceleration rates (i.e., 'kinetic intensity') typically experienced by vehicles in urban applications. Additionally, the two steady state high-speed cycles (i.e., 55 mph cruise and 65 mph cruise) reflect operation where current hybrid technologies provide very limited benefit, and where hybrid vehicles seldom operate. [EPA-HQ-OAR-2010-0162-1940.1, pp.32-33]

Instead of analyzing the broad-based data from the MOVES model, the Agencies should tailor the hybrid duty cycles to the narrow category of urban stop-and-go operation where hybrid technologies can significantly improve fuel efficiency and reduce GHG emissions. To do so, the Associations recommend that the Agencies develop one combined hybrid drive cycle that consists mostly of a transient cycle with greater 'kinetic intensity' and increased idle time, and a very limited application of a steady-state cycle. [EPA-HQ-OAR-2010-0162-1940.1, p.33]

The primary proposed method for measuring the effectiveness of a complete HD vehicle with a hybrid system in §1037.610 involves utilizing a chassis dynamometer. In order for chassis dynamometer testing to simulate the forces acting on the vehicle during normal driving, the manufacturer must program the dynamometer with values representing the vehicle's frictional load, drag and rolling resistance, and aerodynamic effects. To obtain those values, the proposed rule directs manufacturers to perform a coast-down test for each vehicle. However, coast-down tests are extremely burdensome for heavy-duty vehicles, and highly inaccurate due to the significant influence of irregularities in the roadway and variable wind conditions. [EPA-HQ-OAR-2010-0162-1940.1, p.33]

The chassis dynamometer method of assessing the effectiveness of a hybrid vehicle involves comparing it to a conventional vehicle that is equivalent in all respects except for those factors directly related to the hybrid powertrain. As such, the improvement factor that is calculated from the measured emissions rates of the two vehicles renders irrelevant the road load values of the two vehicles. Accordingly, EMA and TMA recommend using fixed values (e.g., the values used in GEM for vocational vehicles) for the frictional load, drag and rolling resistance, and aerodynamic effect values for both the hybrid and baseline vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.33]

The Proposed GHG/FE Standards provide an option for evaluating hybrid powertrain performance using an engine dynamometer procedure. However, there are very few details in § 1036.525, which simply states that EPA 'may allow' modifications to Part 1065 -- the test procedures for conventional engines. (See 75 FR at 74371.) That section needs to provide more clarity and certainty to manufacturers. Specifically, the Agencies should make the changes outlined below. [EPA-HQ-OAR-2010-0162-1940.1, p.33]

As proposed, § 1036.525 is restricted to engines that capture energy during motoring, which is not a defining characteristic that distinguishes a hybrid powertrain as being more suited to engine dynamometer evaluation. Instead, the section should apply when the output of the hybrid powertrain is consistent in speed and positive torque with the output of a conventional engine (i.e., the dynamometer is connected to the powertrain upstream of the transmission). [EPA-HQ-OAR-2010-0162-1940.1, pp.33-34]

To ensure that test performance is consistent with real-world hybrid operation, all engine and all hybrid components capable of recovering or providing traction power should be included in the control volume. That would include motors, energy storage devices, and power conversion devices like power electronics. The test procedures in Part 1065 should be amended to allow accurate hybrid evaluation through the following additions: [EPA-HQ-OAR-2010-0162-1940.1, p.34]

• Use of system (hybrid + engine) torque curves to define speed and torque requirements, instead of engine torque curves; [EPA-HQ-OAR-2010-0162-1940.1, p.34]

• Reference to SAE J2711 for management of energy storage devices; and [EPA-HQ-OAR-2010-0162-1940.1, p.34]

• Calculation of emissions in a manner consistent with conventional calculation with only positive work counted. The Part 1065 engine dynamometer test cycles do not contain complete information about vehicle braking requirements. In order to ensure that energy capture is consistent with the real-world performance of a hybrid powertrain, Part 1065 must include a determination of maximum available kinetic energy. A reasonable upper limit for brake energy can be calculated by creating an equivalent vehicle cycle based on the engine cycle speed and torque requirements. [EPA-HQ-OAR-2010-0162-1940.1, p.34]

The Proposed GHG/FE Standards provide an option for the evaluation of hybrid powertrain performance by simulating the chassis test procedure (i.e., by testing a 'powerpack' that includes the engine, transmission, and hybrid system). However, the simulated chassis test procedure proposed in §1036.615 contains insufficient detail. While the additional flexibility provided by that option is helpful, some additional definition is needed to clarify the procedure. Specifically, the control volume that is tested should include all hybrid components that contribute to providing tractive force. For a typical MD or HD hybrid electric vehicle, the control volume would include the engine, electric motor, power electronics, battery, and controllers. [EPA-HQ-OAR-2010-0162-1940.1, p.34]

The Agencies should include alternative, more flexible hybrid certification procedures in the final rule covering a wider range of hybridization techniques, including but not limited to hydraulic, kinetic, electro-mechanical, and genset systems, and covering technology development, including charge-sustaining and charge-depleting hybrids. In those instances where certification procedures are too costly or impractical to implement, a different approach may be appropriate. Such a flexible alternative method may be similar to the approach for advanced technologies, but could be tailored so manufacturers may generate advance technology credits with novel applications of hybrid technologies. Accordingly, the Agencies should allow manufacturers to evaluate hybrid performance using an alternate method upon a showing that the improved performance from the hybrid system in question is measurable, demonstrable, and verifiable. [EPA-HQ-OAR-2010-0162-1940.1, pp.34-35]

Response:

The agencies have modified the duty cycle weighting to more accurately reflect hybrid technology performance in vocational vehicle applications . The agencies are also finalizing a brake energy cap to accommodate the benefit associated with hybrid vehicle operation. The agencies are providing additional clarity for how to test using these advanced technology protocol options. To address the brake work capture limit, 40 CFR 1036.525 provides a procedure for determination of the maximum brake fraction. To avoid the need to delete extra brake work from positive work you may set an instantaneous brake limit target.

Organization: Heavy-Duty Fuel Efficiency Leadership Group

Significantly, EPA/NHTSA has proposed a new "PowerPack" test certification procedure which can measure the contribution of both pre-transmission and post-transmission hybrid power systems to the overall fuel efficiency of the vehicle. The Leadership Group supports the PowerPack test certification options. [EPA-HQ-OAR-2010-0162-1620.1, p.4]

Response:

The agencies agree that certification options help to facilitate advanced technology introduction.

Organization: Hino Motors, Ltd.

Hino believes hybrid vehicles will contribute to reduce the GHG in the segment of medium and heavy-duty trucks, however, the design of the hybrid systems vary widely among manufacturers. Thus we sincerely request NHTSA and EPA to include a hybrid test procedure in the new GHG/fuel efficiency regulation which will cover these various hybrid system technologies and the vehicle designs which are currently in the market and also in the future, it will not be design restrictive to any HEV systems. Also, it should be efficient as a certification test procedure. [EPA-HQ-OAR-2010-0162-1609.1, p.1]

From the preamble of the proposal, we understand EPA/NHTSA need the test procedure which is based on the test data from actual hybrid vehicle or components. With understanding of this, we would like to request to add HILS (Hardware-in-the-loop) test method for the hybrid vehicles, The reasons to support HILS method are as follows:

1) HILS is applicable to any designs of hybrid system currently in the market or potential design in the future, only by developing software, which is derived from actual hybrid component tests, but not just a simple simulation. The equivalency of the simulation model can be verified with the actual vehicle test results.

2) Battery energy balance is obtained by calculation which will streamline the certification workload.

3) Engine manufactures do not have to invest a huge amount of money for new powerpack test cells. [EPA-HQ-OAR-2010-0162-1609.1, p.1]

Hino would like to request to revise the proposed hybrid vehicle certification cycle to be more adequately reflecting the energy regeneration during the deceleration of hybrid vehicle in real world by following reasons.

1) Hybrid vehicle are usually used for vehicles running with a lot of stop-and-go operation in urban areas and the fuel efficiency improvement is highly expected when it is operated in such operating pattern.

2) Hybrid test cycle in the proposed regulation does not include sufficient times of stop-and-go pattern. Therefore it does not represent the low speed operating mode which is typical operating pattern for hybrid vehicles use in urban areas. [EPA-HQ-OAR-2010-0162-1609.1, p.2]

Response:

The agencies agree that Hardware-in-the-Loop simulation (HILS) has the potential to serve as a viable option for future certification testing. The agencies plan to continue to work with international workgroups as HILS continues to be developed. The agencies have also revised the duty cycle weightings to accommodate concerns related to the performance impacts of the real world benefits of hybrid vehicles.

Organization: Hybrid Truck Action Group (HTAG)

We as a group fully support and ask that you maintain the flexibility shown on the proposed rule to allow multiple voluntary testing approaches, including the optional engine dynamometer with "powerpack" and chassis dynamometer test protocols. Manufacturers and suppliers we work with in advanced technology feel the powerpack approach in particular may provide a very cost-effective way of capturing the value quantified in a chassis test but at lower cost. We cannot encourage too strongly the retention and strengthening of this provision. [EPA-HQ-OAR-2010-0162-1817.1, p.3]

The Powerpack Test for Hybrid vehicles is cost effective, provides the opportunity for real world performance to be measured and has been used in practice to qualify vehicles for the Heavy Hybrid Tax Credit in the past with much success. [EPA-HQ-OAR-2010-0162-1817.1, p.4]

On duty cycles, we strongly encourage flexibility and allowing the use of a limited number of duty cycles, in addition to FTP, to better quantify the value of Hybrid technology while utilizing the proposed PowerPack or chassis test. We do not support an unlimited number of duty cycles. CALSTART and HTUF have been integral in identifying and quantifying, and/or forging industry support for, a limited number of discrete application-specific duty cycles that better reflect how trucks – in particular vocational trucks – are used. [EPA-HQ-OAR-2010-0162-1817.1, p.4]

While we accept the value of and need for continued use of FTP, we recommend strongly allowing the flexibility to use accepted real-world duty cycles for Hybrid certification using PowerPack or chassis testing procedures, such as those already listed in the SmartWay Fuel Efficiency Test Protocol for Medium and Heavy Duty Vehicles. CALSTART via HTUF has helped develop or validate several of these, including for parcel delivery, refuse and utility truck with PTO function, and some use the CILCC duty cycle for the driving component. [EPA-HQ-OAR-2010-0162-1817.1, pp.4-5]

Response:

With today's action the agencies are allowing for multiple options to fairly assess the performance of certain advanced technologies. Hybrid vehicle and engine systems may be certified using one of three methods discussed in the original notice of proposed rulemaking. The three options include pre-transmission powerpack certification, post-transmission powerpack certification, and complete vehicle chassis certification. To demonstrate the benefit of the hybrid system, the agencies have refined all of the test protocols to address the comparability of results between methods, as well as to more accurately reflect the benefit associated with use of the hybrid. To address the brake work capture limit, 40 CFR 1036.525 provides a procedure for determination of the maximum brake fraction. To avoid the need to delete extra brake work from positive work you may set an instantaneous brake limit target. For post-transmission and chassis based testing, a comparison with a baseline defined based on the market for the specific vehicle under consideration allows for an improvement factor to be developed to assess the actual improvement versus the traditionally produced vehicle. We have provided additional details regarding control system performance during the test to address test to test repeatability and general reproducibility of the test results. Test data from EPA's protocol development program indicates similar performance improvements for hybrid versus conventional systems when tested as a complete vehicle chassis configuration or post-transmission powerpack configuration.

Test	EPA Powerpack	EC Chassis
Comparison	Hybrid Active to Hybrid Inactive	Hybrid Active to Hybrid Inactive
55 mph	1.0%	3.0%
65 mph	3.0%	1.1%
Transient	17.3%	15.7%
CILCC	19.5%	-

The pre-transmission option for engines equipped with hybrid systems will allow those companies that have an engine with a directly coupled hybrid system to quantify performance benefits. Credits generated using any of these options will be fungible beyond the regulatory subcategory in which they were generated within constraints that prevent market disruptions. Additionally, these credits will have a value of 1.5 times the initial value of the credit. With these incentives, options, and appropriate constraints, the agencies feel this provision appropriately incentivizes the introduction of advanced technologies, such as hybrids, without the risk of market disruptions.

Organization: International Council on Clean Transportation (ICCT)

However, the proposed rule allows manufacturers to obtain credit for hybrids and certain other "advanced" technologies. As discussed in the following section on hybrid vehicle testing, the use of either chassis testing or "powerpack" testing should be permitted to demonstrate fuel savings and GHG reduction benefits from hybrids. [EPA-HQ-OAR-2010-0162-1945.1, p.7]

There are currently three options for quantifying the benefits of hybrid vehicles as compared to their conventional counterparts. The first option is to test entire vehicles using a chassis dynamometer and a designated test cycle. The second and third option are to use an engine or "powertrain" dynamometer to conduct "hardware-in-the-loop" testing of the complete hybrid powertrain, including the engine and all hybrid system components. The engine dynamometer with hybrid hardware-in-the-loop (Option 2) can be used to test only pre-transmission (i.e., the motor is located between the engine and the transmission) hybrid systems, while the powertrain test cell (Option 3) can be used to test any pre-transmission or post-transmission (i.e., the motor is located between the transmission and the final drive wheels) hybrid system. Option 3 could also be used to test other advanced powertrain technologies such as continuously variable transmissions (CVT) and automated manual transmissions (AMT). [EPA-HQ-OAR-2010-0162-1945.1, p.8]

The following sections present an overview of the three options and discuss the various issues related to the test cycles utilized, the equivalence of the three testing options, and consistency with other certification procedures. The final section outlines the ICCT's recommendations for the EPA and NHTSA's proposed test procedures. [EPA-HQ-OAR-2010-0162-1945.1, p.8]

For chassis testing of Class 2B – 8 hybrid vehicles other than pickup trucks and vans, the agencies are proposing to use four different test cycles and to calculate a weighted average value for measured fuel use/carbon dioxide (CO_2) emissions based on the weighting factors shown in Table 2. With the exception of the Power Take-off (PTO) cycle, the proposed test cycles are the same as those that will be used in EPA's GEM simulation model for certification of these types of conventional vehicles. The PTO cycle is intended to represent typical stationary operations of hydraulic equipment on utility and refuse trucks. For non-PTO hybrids the proposed cycle weighting factors are also the same as those proposed to certify conventional vehicles. [EPA-HQ-OAR-2010-0162-1945.1, p.8]

[Table 2 can be found on page 8 of this comment.]

Certification of the benefits of a hybrid vehicle would be based on an "A-B" test of both a hybrid vehicle or drivetrain (A) and an "equivalent" conventional vehicle or drivetrain (B), using the following formula:

Benefit [g CO_2/ton mile] = ((CO_{2A} – CO_{2B}) ÷ CO_{2A}) x Applicable Standard [g CO_2/ton mile]

where the "A" vehicle is the hybrid version and "B" is the conventional version.

This test method could also be used to certify the benefits of other advanced drivetrain technologies, including advanced transmissions. [EPA-HQ-OAR-2010-0162-1945.1, p.8]

The agencies are proposing to allow manufacturers to certify pre-transmission hybrids based on “hardware-in-the-loop” testing using a standard engine dynamometer and the FTP engine dynamometer test cycle. This is the same cycle that will be used for engine certification for criteria pollutants. Under this scenario the measured brake-specific fuel consumption and CO2 emissions (gal/bhp-hr and g/bhp-hr) of the tested hybrid system could be used directly to calculate the hybrid benefit (percent reduction compared to an engine in a conventional vehicle). [EPA-HQ-OAR-2010-0162-1945.1, p.9]

The current FTP test cycle only has positive torque values defined. For pre-transmission hybrid testing, negative torque values would need to be defined for the “motoring” sections of the cycle in order to define the maximum energy potentially available for capture and re-use by the hybrid system (i.e. regenerative braking). The agencies have not yet fully developed this aspect of the proposed test procedure. [EPA-HQ-OAR-2010-0162-1945.1, p.9]

Preliminary analysis of the FTP by MJ Bradley & Associates indicates that up to 40 percent of the total cycle energy might theoretically be available for capture as regenerative braking energy during the FTP, depending on how negative torque was defined on the motoring sections. However, approximately half of this energy is available during what amounts to a “downhill” section of the FTP. Depending on the size of the energy storage system some hybrids would not be able to capture all of this energy. [EPA-HQ-OAR-2010-0162-1945.1, p.9]

This test method could be used only for pre-transmission hybrid systems. It could not be used to test post-transmission parallel or series hybrid systems and could not be used to test other advanced drivetrain technologies, including advanced transmissions. [EPA-HQ-OAR-2010-0162-1945.1, p.9]

The agencies are also contemplating allowing manufacturers to certify hybrids based on hardware-in-the-loop testing using a “powertrain test cell”. A powertrain test cell would differ from a traditional engine test cell in that it would require an electric, alternating current dynamometer to accommodate the additional rotational inertia and speeds associated with the inclusion of the transmission. In practical terms, a powertrain test cell would need to have the power absorption capabilities of a traditional heavy-duty chassis dynamometer, but with the power aborbers connected directly to the transmission output shaft as opposed to being connected to rollers that support the drive wheels of the test vehicle. [EPA-HQ-OAR-2010-0162-1945.1, p.9]

This procedure could be used to test any type of hybrid system (pre- or post-transmission parallel or series hybrid) and could also be used to test alternative/advanced transmissions. [EPA-HQ-OAR-2010-0162-1945.1, p.9]

For this type of test the FTP engine test cycle could not be used. The agencies have yet to define an alternate vehicle-type test cycle(s) (i.e., vehicle speed versus time, or power and drive shaft speed versus time) for this purpose. There are two possibilities for the test cycle(s) to be used for this option:

1) Use the chassis test cycles and cycle weightings proposed for Option 1 (see above). This would make testing under Option 3 equivalent to testing under Option 1, or

2) "Translate" the FTP engine cycle into an appropriate vehicle cycle based on various standard assumptions (i.e. vehicle test weight relative to engine horsepower, transmission and final drive ratio, shift points, etc.). This would make testing under Option 3 equivalent to testing under Option 2. While theoretically possible, translating the FTP into an equivalent chassis test cycle is complicated by the fact that the FTP embodies "terrain effects" which are very difficult to mimic in a chassis cycle. This issue is discussed further below. [EPA-HQ-OAR-2010-0162-1945.1, pp.9-10]

In theory, any of the options proposed by EPA and NHTSA could be used almost equally successfully to "certify" the benefits of at least some hybrid systems. Options 1 and 3 can be used to certify any type of hybrid or advanced drivetrain technology, while Option 2 has more limited utility and could only be used to test pre-transmission hybrid systems. [EPA-HQ-OAR-2010-0162-1945.1, p.10]

There are three primary areas to evaluate when comparing the three proposed options. These areas are discussed below – after the discussion of each there is a list of open issues that the agencies should consider.

1) Representative Test Cycle(s): [EPA-HQ-OAR-2010-0162-1945.1, p.10]

[For further discussion of Test Cycles, see page 10 of this comment.]

2) Equivalence of Different Test Options: [EPA-HQ-OAR-2010-0162-1945.1, p.10]

[For further discussion of Equivalence of Different Test Options, see pages 10-11 of this comment.]

3) Consistency with other Certification Procedures: [EPA-HQ-OAR-2010-0162-1945.1, p.11]

[For further discussion of Consistency with other Certification Procedures, see pages 11-12 of this comment.]

All three of the methods proposed to "test" hybrids to generate credits are theoretically valid. The biggest concern is that the agencies are proposing to use "non-equivalent" test cycles – the FTP for the engine dynamometer test of pre-transmission hybrids and the GEM test cycles (transient, 55 mph, 65 mph, PTO) for chassis testing of a full vehicle and for the powertrain test cell. This means that the “benefit” of a hybrid system could vary (perhaps significantly) depending on the test method chosen. [EPA-HQ-OAR-2010-0162-1945.1, p.14]

The EPA and NHTSA need to be careful to ensure that, at a minimum: 1) each test method/test cycle combination requires the same amount of total energy to run the cycle (for a specific vehicle weight), 2) each test method/test cycle combination has the same amount of total energy available for capture as regeneration by a hybrid system, and 3) that this available regeneration energy appears in similar increments in each test method/test cycle combination (i.e. not as a series of stops and starts in one test cycle but as a long down hill portion in another). The best way to do this would be to create a post-transmission and a chassis cycle from the FTP – which can be done with a few assumptions – and to use this cycle for hybrid testing. Based on the analysis of the FTP and UDDS cycles, this new cycle would be significantly more transient than the UDDS, with a lot more stops. It would likely turn out that up to 40% of total power required to run the cycle would be available for capture as regeneration by a hybrid system. Assuming that the translation of the FTP was done correctly, under this scenario all of the test methods would use an “equivalent” test cycle that meets the above conditions. [EPA-HQ-OAR-2010-0162-1945.1, p.14]

Recommendations

Based on the above discussion, the ICCT makes the following recommendations relative to the proposed heavy-duty hybrid test procedures. [EPA-HQ-OAR-2010-0162-1945.1, p.14]

1) Regulatory Structure – Hybrid Sub-groups

The proposal for chassis testing of hybrids (Option 1) seems to strike a reasonable balance between accuracy and practicality by dividing all hybrids into two sub-categories, those with PTO operation and those without. The proposed test cycles and cycle weightings (as shown in Table 2) also appear to represent a conservative approach which will allow for meaningful certified benefits from well-designed hybrid systems without over-stating the benefits as compared to typical in-use experience.

The ICCT supports this part of the proposal. [EPA-HQ-OAR-2010-0162-1945.1, p.15]

2) Test Procedures

The ICCT supports chassis testing (Option 1) of hybrid vehicles as proposed and hardware-in-the- loop powertrain testing (Option 3) using the same test cycles and cycle weightings proposed for Option 1. These test procedures would be functionally equivalent, consistent with the proposed vehicle certification procedures for conventional vehicles, and as discussed above would be a reasonable approximation of in-use hybrid operation. [EPA-HQ-OAR-2010-0162-1945.1, p.15]

The ICCT does not recommend support of hybrid test Option 2 (engine test cell with hardware-in- the-loop using the FTP cycle) unless the agencies develop a translation of the FTP cycle to an "equivalent" vehicle cycle for use on the chassis dynamometer or in the GEM simulation model. If the FTP is used, this test option will not be functionally equivalent to the other allowable test options and will not be consistent with the proposed vehicle certification procedures for conventional vehicles. Unlike the other allowable test methods, Option 2, as proposed, treats all pre-transmission hybrid systems as the same and does not distinguish between PTO and non- PTO hybrids, and it has limited utility because it can not be used to test post-transmission hybrids and other advanced drivetrain technologies. [EPA-HQ-OAR-2010-0162-1945.1, p.15]

If the agencies elect to allow engine dynamometer testing (Option 2) of pre-transmission hybrid systems using the FTP, the ICCT recommends simultaneous measurement of GHGs and criteria pollutants. As proposed, the engine in a hybrid system would be tested both by itself for criteria pollutant compliance and then with the other hybrid components for generating fuel use/CO2 credits. Presumably, the testing with the engine and hybrid components gives a more realistic representation of real-world fuel use and emissions performance. Different test configurations for the criteria and fuel use/GHG programs limits the ability of manufacturers to optimize engines for hybrid operation. Modification of the criteria pollutant testing program may not be possible in this rulemaking, but the agencies should consider taking the necessary steps so that engines and hybrid components can be tested for GHGs and criteria pollutants during the same test procedure. [EPA-HQ-OAR-2010-0162-1945.1, p.15]

If the agencies decide to allow manufacturers to certify pre-transmission hybrids using an engine dynamometer and the FTP, they must define negative torques in the motoring sections of the FTP. When doing so, they should be careful to define these torques relative to the actual terrain effects embodied in the FTP (i.e. available negative "braking" torque is not always 100% of actual negative torque, because the hill was helping to slow the vehicle – this negative torque supplied by the hill cannot necessarily be recaptured by a hybrid system in practice.). Actual braking events in the FTP often do not show ups as motoring, but rather as idle events, because the transmission was placed in neutral during actual vehicle braking. [EPA-HQ-OAR-2010-0162-1945.1, p.15]

For the next phase of regulations, the ICCT believes that the possibility of replacing the current FTP engine cycle and GEM chassis cycles with a new suite of specifically equivalent and world-harmonized engine and chassis cycles to better integrate engine and vehicle testing deserves serious consideration by the EPA and NHTSA. [EPA-HQ-OAR-2010-0162-1945.1, p.16]

Response:

Consistent with these comments, with today's action the agencies are allowing for multiple options to fairly assess the performance of certain advanced technologies. Hybrid vehicle and engine systems may be certified using one of three methods discussed in the original notice of proposed rulemaking. The three options include pre-transmission powerpack certification, post-transmission powerpack certification, and complete vehicle chassis certification. To demonstrate the benefit of the hybrid system, the test protocol has been refined to address the comparability of results between methods, as well as to more accurately reflect the benefit associated with use of the hybrid. For post-transmission and chassis based testing, a comparison with a baseline defined based on the market for the specific vehicle under consideration allows for an improvement factor to be developed to assess the actual improvement versus the traditionally produced vehicle. We have provided additional details regarding control system performance during the test to address test to test repeatability and general reproducibility of the test results. The pre-transmission option for engines equipped with hybrid systems will allow those companies that have an engine with a directly coupled hybrid system to quantify performance benefits. Credits generated using any of these options will be fungible beyond the regulatory subcategory in which they were generated within constraints that prevent market disruptions. Additionally, these credits will have a value of 1.5 times the initial value of the credit. With these incentives, options, and appropriate constraints, the agencies feel this provision provides the appropriate incentives for the introduction of advanced technologies, such as hybrids, without the risk of market disruptions. The agencies have also proposed to cap the available braking torque for hybrid testing.

Organization: Odyne Systems, LLC

Allow hybrid manufacturers to optimize system to the equipment on the vehicle, match energy storage to the size of vehicle and the type of equipment mounted to vehicle. [EPA-HQ-OAR-2010-0162-1853.1, p.10]

Permit hybrid manufacturers to demonstrate performance improvements through comparative testing and modeling of a conventional vehicle to a hybrid vehicle (A to B testing). The comparative test should be a detailed analysis of the improvements to CO2 and fuel reduction. These results should be able to be modeled to other vehicles to obtain a fuel and CO2 benefit. If comparative tests have provided sufficient data for an accurate model, use the model to update results as the hybrid system and powertrain evolve. Odyne agrees with the EPA that the limited dyno capacity and diversity of powertrain combinations makes it much more desirable to develop a model and use the model for regulatory approval. [EPA-HQ-OAR-2010-0162-1853.1, pp.12-13]

Permit hybrid manufacturers to demonstrate performance through comparison testing and modeling of conventional vehicle to hybrid vehicle

o Gather test data for baseline configuration

o Model variations if required, or use telematics [EPA-HQ-OAR-2010-0162-1853.1, p.13]

Response:

The final rule provides three options for hybrid vehicle / system certification including: pre-transmission, post-transmission, and chassis dynamometer. Both the post-transmission and the chassis dynamometer approach require A to B testing to establish performance improvement as requested by the commenter. Additionally, should additional methods for quantifying advanced technology benefit be developed which are not currently reflected in the test cycles, an A to B innovative technology approach remains available as an option.

Organization: Sierra Club

Additionally, the agencies should develop specific test protocols to capture emissions and fuel consumption reductions from advanced transmissions and other non-engine efficiency standards. [EPA-HQ-OAR-2010-0162-1889.1, p. 3]

Response:

The agencies did not set the standards based on specific advanced transmission performance. The agencies have allowed for the incentive provision for manufacturers to certify innovative technology that is not currently contemplated within the construct of the existing test procedures.

Organization: Union of Concerned Scientists (UCS)

Test procedures for evaluating advanced and innovative technologies must be well defined. In the absence of a full vehicle compliance program, the benefits of many technologies will not be captured as part of the regular compliance pathway. The agencies have proposed alternative test procedures to capture the benefits of hybrid technology for example, but the procedures themselves have not been well defined. The agencies should further develop these test procedures to ensure they are well-defined and that they capture as much of the vehicle performance as possible. For example, the development of powerpack testing could capture the benefits of post-transmission hybrids as well as other improvements, such as dual clutch automated manual transmissions. [EPA-HQ-OAR-2010-0162-1764.1, p.6]

Response:

The agencies agree with the commenter that hybrid test protocols may provide a compliance pathway for quantifying these advanced technology benefits and that the protocols would benefit from the provision of additional clarity. The agencies have augmented the regulatory provisions describing the test protocols for hybrid vehicles and systems in response to this comment including more detailed test cell requirements, additional detail regarding test system control and driver model design, and performance requirements for the successful conduct of the tests. The agencies did not set the standards based on specific advanced transmission performance. The agencies have allowed for the incentive provision for manufacturers to certify innovative technology that is not currently contemplated within the construct of the existing test procedures.

8.10. Rolling resistance test procedure

Organizations Included in this Section:

Allison Transmission
Bridgestone
Navistar, Inc
Oshkosh Corporation
Rubber Manufacturers Association
American Automotive Policy Council

Organization: Allison Transmission

EPA and NHTSA have proposed that vehicle compliance for Class 7 and 8 combination tractors measure the performance of specified tractor systems, including aerodynamics and tire rolling resistance. For vocational vehicles, EPA and NHTSA are proposing vehicle standards focused solely on improvements to vehicle tires. Thus, relatively large emphasis is placed in the proposed rules on tire rolling resistance and the ability of a vehicle to improve GHG and FE performance through the use of newer technology tires. [EPA-HQ-OAR-2010-0162-2735.1, p.19]

Given this emphasis, EPA and NHTSA should attempt to incorporate real world data and experience with respect to the matter of tire selection for individual vehicles. As each agency recognizes, there are a multiplicity of different vehicle uses in the MD/HD category. Certain vehicles may perform emergency services, other vehicles may be required to regularly transport heavy loads or incorporate some off-road travel into their pattern of ordinary use. In such situations, tire selection can be a critical component of vehicle function and safety. One possible point of reference for modeling tire rolling resistance for various vehicles is therefore the normal original equipment manufacturer ('OEM') tire offerings for various vehicles. While EPA and NHTSA certainly may seek to improve GHG and FE through incorporation of improved tire technology, both agencies should also recognize that there are limitations with respect to at least some vehicles in the degree to which such technology may reasonably and rationally be incorporated into the end vehicle. [EPA-HQ-OAR-2010-0162-2735.1, pp.19-20]

Organization: American Automotive Policy Council

AAPC strongly prefers the SAE J2452 test method for calculating tire rolling resistance. This is the standard test that is used in the USA by OEMs because it is a tire-on vehicle simulation test, not an isolated tire test. At face value, the single point ISO 28580 method is simpler and less expensive to run than the multi-point SAE J2452 procedure. However, manufacturers needing to completely understand the interaction between tires and resistive losses in order to deliver real world CO2 and fuel consumption benefits to their customers are already performing the more comprehensive SAE J2452 procedure, and requirements based on the ISO 28580 method amount to incremental non-value-added workload and testing burden. Additionally, the ISO 28580 method uses a capped inflation method, resulting in increased test variability due to differences in pressure build up. The SAE J2452 does a fit across a span of the three variables (load, pressure, and speed), which is inherently less prone to error than repeats of a single condition. AAPC recommends that EPA and NHTSA allow for the use of the more robust SAE J2452 procedure. AAPC member companies are also willing to work with EPA and NHTSA to develop a procedure to correlate SAE J2452 results between laboratories and test equipment. [EPA-HQ-OAR-2010-0162-1762.1, pp.19-20]

EPA and NHTSA's proposal effectively requires that low-rolling resistance tires be used by the manufacturers of Vocational Vehicle chassis, but there is no corresponding requirement for aftermarket tires. This prevents assurance that the CO2 benefits associated with the tire requirements will be achieved for the useful life of the vehicles. [EPA-HQ-OAR-2010-0162-1762.1, p.20]

AAPC recommends that EPA and NHTSA consider regulation of aftermarket tires to insure that CO2 benefits are achieved beyond the wear period of a vehicle's first set of tires. This will have the additional benefit of increasing the economies of scale for the low-rolling resistance tires, better justifying the supplier investment necessary to produce them. [EPA-HQ-OAR-2010-0162-1762.1, p.20]

Organization: Bridgestone

To assure that un-intended consequences have been addressed, Bridgestone Americas would like to recommend that further study be conducted on the tire aspects of the technology used to establish the vehicle standards as follows: [EPA-HQ-OAR-2010-0162-2120.1, p.2]

The total environmental impact for trending to low rolling resistance and wide base tires needs to be studied from a total life cycle analysis viewpoint, using the data obtained from recommendation #1. [EPA-HQ-OAR-2010-0162-2120.1, p.3]

Bridgestone Americas recommends that a total life cycle analysis be conducted (using ISO14040:2006 and ISO 14044:2006) to fully understand the environmental impacts of tires with various levels of performance, and any trends discovered in the data obtained from Recommendation #1. Some tire life cycle analyses that have been performed in the past are biased as a result of significant subjective weighting of one environmental impact versus another. [EPA-HQ-OAR-2010-0162-2120.1, p.3]

Organization: Navistar, Inc.

Navistar offers over 300 types of tires across our product portfolio. Tire rolling resistance data is not currently available for the vast majority of the tires Navistar uses because tire suppliers consider such data to be proprietary and confidential. Due to the nature of the market, vehicle manufacturers do not identify target rolling resistance. Instead, tire suppliers are responsible for the rolling resistance that they provide. Accordingly, Navistar simply does not have the information the test requires. And, in those limited instances where some data does exist – which largely amounts to educated guesses from tire suppliers as most of them do not broadly test their tires using the ISO test method called out in the NPRM – the data is not sufficient for Navistar to adequately assess our ability to comply using GEM. As a result, tire rolling resistance test methods and data presentation must be standardized and available for all tires in use in commercial vehicles that this proposed regulation affects. [EPA-HQ-OAR-2010-0162-1871.1, p.43]

Organization: Oshkosh Corporation

Unlike the engine portion of the rule, the vehicle portion of the rule as it applies to vocational vehicles is not sound in its current form. [EPA-HQ-OAR-2010-0162-1588.1, p.2]

The proposed rule uses the GEM computer model to determine compliance with the new regulations. For vocational trucks, the tire rolling resistance value (CRR) is the only factor in the GEM model that may be entered by the chassis manufacturer. Every other factor is provided by the EPA and NHTSA. [EPA-HQ-OAR-2010-0162-1588.1, p.3]

Since the CRR is the only factor available to be modified, and the regulation establishes what the final result must be, the chassis manufacturer has no choice but to install tires that meet the prescribed CRR. [EPA-HQ-OAR-2010-0162-1588.1, p.3]

Only tires with a CRR value of 8.0 kg/metric ton or less will provide a passing score for vocational vehicles in the GEM model. [EPA-HQ-OAR-2010-0162-1588.1, p.3]

The feedback available from the major manufacturers of truck tires is that they have tested very few vocational tires. Up to this point the vocational industry has had little interest in low rolling resistance tires, so there has been no impetus for the tire manufacturers to perform this testing. Few of the tire manufacturers have been able to provide CRR values for tires with the more aggressive mixed-service tread patterns (tires capable of both on-road and off-road performance). Some manufacturers who plan this testing are predicting that published values will not be available until the summer of 2011. [EPA-HQ-OAR-2010-0162-1588.1, p.3]

After discussions with the tire manufacturers, it is our understanding that the CRR values are not comparable between tire models or between similar tires from different makes unless a “reference lab” is established. Even after tests on vocational tires have been completed, the CRR values will not be valid without this reference lab criteria. Without first establishing the reference lab we do not understand how the CRR criteria were established and have no way of commenting on whether the 8.0 kg/metric ton is reasonable. [EPA-HQ-OAR-2010-0162-1588.1, p.3]

Although test data is unavailable at the time of this comment, there is some evidence to suggest that many of the current tread patterns may be close to meeting the 8.0 kg/metric ton criteria already. If this turns out to be true, then the regulation will have no effect on emissions or fuel consumption. The regulation will be adding administrative burden without any social or environmental gain. [EPA-HQ-OAR-2010-0162-1588.1, p.3]

For all these reasons, Oshkosh Corporation strongly urges EPA and NHTSA to

1. Retain the engine efficiency rule as it is written with respect to vocational vehicles

2. Eliminate the tire rolling resistance requirement for vocational vehicles [EPA-HQ-OAR-2010-0162-1588.1, p.4]

The vast amount of variability in both design and function make any tire regulation fraught with the risk of unintended consequences. Market forces will continue to push those improvements in efficiency appropriate for each vocational niche in a manner that maintains the functionality of the vehicle for its intended purpose. Tire criteria can be proposed in future rule-making when more test data is available and it has been proven that we can have both aggressive tread construction and lower rolling resistance values on the same tire. [EPA-HQ-OAR-2010-0162-1588.1, p.4]

Organization: Rubber Manufacturers Association (RMA)

SmartWayTM Tire RRC Targets are Based on Vehicle Conditions, not ISO 28580 Test Conditions The standards proposed in the NPRM for Class 7 and 8 tractors are based on inputs in the GEM for several components, including low rolling resistance tires for the steer and drive wheel positions. These were originally derived from SmartWayTM 2007 baseline values. The EPA SmartWayTM program is a voluntary program. Furthermore, the RRC targets for SmartWayTM compliance are continually under review and discussion. The SmartWayTM RRC baseline values were based on tire testing conducted pursuant to SAE J1269 and regress to vehicle operating conditions (vehicle load and tire inflation pressure). The SAE J1269 multi-point test can be used to accurately predict truck/bus tire RRC at various loads and inflations including the ISO28580 load and inflation conditions. However, at this time, there is no established data conversion method from the SAE J1269 vehicle condition to the ISO28580 single point condition. While this conversion is possible and industry experts continue to explore this issue, no established conversion method has been adopted. [EPA-HQ-OAR-2010-0162-1963.1, p.7]

RMA supports the designation of ISO 285807 as the test procedure to assess tire rolling resistance for purposes of this regulation. The ISO 28580 test procedure contains one component that is absent in all of the earlier test procedures (e.g., SAE J1269): a machine alignment method, which makes it the strongest candidate for use in this regulation. This interlaboratory alignment procedure requires the identification of a reference lab and use of alignment tires. This regulation, to be complete, would have to fully identify the reference laboratory and alignment tire information needed to use the ISO28580 method or the reported data for tires would be meaningless. [EPA-HQ-OAR-2010-0162-1963.1, p.7]

Rolling resistance test variation among different test machines and different laboratories can be significant, even with well calibrated machines that achieve scientifically valid and repeatable test results. In a presentation during a workshop held by the International Energy Administration (IEA), the European Tyre and Rim Technical Organization (ETRTRO) estimated that this variability can be as high as 20 percent in RR result absent an inter-laboratory alignment procedure. [EPA-HQ-OAR-2010-0162-1963.1, p.7]

In order for the ISO 28580 test procedure to yield meaningful test data for use in the GEM model and assist vehicle manufacturers with compliance with the regulation, test data gathered on different test machines in different laboratories must be correlated to a reference laboratory. EPA and NHTSA should specify a reference laboratory in its regulation. This kind of designation should be proposed in a supplemental notice for public comment. [EPA-HQ-OAR-2010-0162-1963.1, pp.7-8]

Similarly, NHTSA has recognized the need for a reference laboratory as well. In its final rule on its Tire Fuel Efficiency Consumer Information Program, NHTSA states, ”NHTSA must specify [a reference laboratory] for the purposes of implementing this rule so that tire manufacturers know the identity of the machine against which they may correlate their test results.” NHTSA further indicates intent to establish a “regional” reference machine for use in its rulemaking that is independent of the entities it regulates. [EPA-HQ-OAR-2010-0162-1963.1, p.8]

Since tire rolling resistance is a key component of the aforementioned NHTSA final rule on tire fuel efficiency consumer information, as well as this NPRM and the EPA SmartWayTM program, a reference laboratory is necessary. This would make all data submitted to EPA or NHTSA and/or used by vehicle and tire manufacturers in compliance with these regulations and programs to be comparable. Without a universal reference machine, data developed for use in the various programs would be meaningless for compliance or other comparison purposes. [EPA-HQ-OAR-2010-0162-1963.1, p.8]

EPA and NHTSA Should Revise the Requirements for Tire Testing The NPRM would require that for each tire model and size, three samples would be required to each be tested three times. This requirement is at odds with the requirements in the ISO 28580 test method. The ISO 28580 test method requires only one tire to be tested one time in order to assess rolling resistance of that tire model. The only exception in the ISO 28580 standards is if the test machine does not meet the repeatability requirements established in the method. In that case, multiple tests may be required to verify the machine’s performance. So, in the case of a test machine that is fully compliant with the requirements of the standard, one tire is required to be tested one time in order to assess that tire's rolling resistance. [EPA-HQ-OAR-2010-0162-1963.1, p.8]

The proposed requirement to test three samples each three times would inflate the testing burden placed on tire manufacturers by nine times. The proposed requirement also conflicts with the tire testing requirements of the NHTSA Tire Fuel Efficiency Consumer Information Program and the EPA SmartWayTM program. The NPRM and the NHTSA Tire Fuel Efficiency Consumer Information Final Rule both specify use of ISO 28580 for assessing tire rolling resistance. The arithmetic average of the three tests becomes the reported result of the test. As compared with the testing requirements in the Tire Fuel Efficiency Information Program and the EPA SmartWayTM program, the proposed testing requirement in this NPRM would triple the tire testing burden, unnecessarily increase tire testing costs and require significant expansion of tire testing capacity. These additional costs should be considered. [EPA-HQ-OAR-2010-0162-1963.1, p.8]

This rulemaking places a significant testing burden on tire manufacturers to assess rolling resistance of tire market segments that have heretofore not been studied. Yet, even if tire manufacturers were to complete this significant amount of testing, this NPRM does not provide any guidance as to how or in what format this information would need to be provided in order to be in compliance with the proposed requirement at §1037.125(i).15 Furthermore, unless EPA and NHTSA specify a reference laboratory in this regulation for tire rolling resistance testing, any rolling resistance information provided pursuant to this regulation would not be comparable. [EPA-HQ-OAR-2010-0162-1963.1, p.10]

Other countries are also addressing these issues. In the European Union, a rating system for medium- and heavy-duty truck tires has been established. Japan and Korea are also developing rating programs. [EPA-HQ-OAR-2010-0162-1963.1, p.10]

RMA Members are Working to Provide Recommendations for a SmartWayTM program for Retreaded Tires [EPA-HQ-OAR-2010-0162-1963.1, p.11]

In the area of low rolling resistance retreads, the tire industry is working cooperatively with EPA SmartWayTM program to provide recommendations for establishing SmartWayTM targets for retreaded tires. RMA members have conducted initial testing to assess the RRC of popular retreads and their fuel efficient counterparts. The SmartWayTM Retread Subgroup expects to provide recommendations to the SmartWayTM program for test requirements and verification targets for retreads by the end of 2011. RMA has also been in a dialogue with the California Air Resources Board (CARB) about this issue, since recently adopted CARB regulations will require trucks to be equipped with SmartWayTM verified tires in the future. Since retreaded tires represent a significant portion of tires installed on medium and heavy trucks, it is important that the SmartWayTM program have a retread verification component. [EPA-HQ-OAR-2010-0162-1963.1, p.11]

Response:

The agencies have continued to conduct testing to assess real world tire performance subsequent to the proposal. Additionally, the agencies have sought and received additional feedback from tire manufacturers in the development of the GHG and fuel consumption standards.

The SAE J2452 test method is only applicable for passenger car and light truck tires, and is not suitable for medium and heavy duty truck tires. The use of a single point test method such as the ISO 28580 was selected in order to reduce the burden of testing on the tire manufacturers while providing an accurate estimate of rolling resistance. Data collected by EPA suggest that the precision of measurements of the coefficient of rolling resistance obtained by the capped ISO28580 test is comparable to that obtained by other methods.

In the period since RMA made this comment, EPA has developed a method to provide equivalent values of rolling resistance coefficient determined by the ISO 28580 method and various test conditions of the SAE J1269 method. These have been agreed on by the tire industry and form the basis of determining equivalent target values for SmartWay verification of long-haul tractor trailer tires.

EPA has conducted extensive testing for rolling resistance on a representative sample of tires used in a wide variety of vocational vehicle applications. In addition, EPA has obtained information about the rolling resistance of Class 8 long-haul tires as part of the SmartWay Program, and has discussed the matter with representatives of the tire industry. Our results suggest that tires are available that will allow vehicle assemblers to design vehicles that can comply with the rule.

EPA agrees that a life cycle analysis of tires could provide useful information. However, this is beyond the current scope of the rule as proposed.

EPA did not propose that every tire installed on a vocational vehicle have a rolling resistance coefficient of 8.0 kg/ton or less. The requirement for vocational vehicles is that they meet a vehicle GHG emissions standard which is premised on target rolling resistance coefficients of the steer and drive tires. Thus it is entirely possible that a vehicle equipped with drive tires having a rolling resistance coefficient of greater than the target rolling resistance coefficient would meet standard if the steer tire had a lower rolling resistance coefficient. EPA has conducted extensive testing for rolling resistance on a representative sample of tires used in a wide variety of vocational vehicle applications. We have found that the vast majority of combinations of drive and steer tires we tested for each application would meet the proposed standard.

The agencies received comments which identified the need to develop a reference lab and alignment tires. Because the ISO has not yet specified a reference lab and machine for the ISO 28580 test procedure, NHTSA announced in its March 2010 final rule concerning the light duty tire fuel efficiency consumer information program that NHTSA would specify this laboratory for the purposes of implementing that rule so that tire manufacturers would know the identity of the machine against which they may correlate their test results. NHTSA has not yet announced the reference test machine(s) for the tire fuel efficiency consumer information program. Therefore, for the light duty tire fuel efficiency rule, the agencies are postponing the specification of a procedure for machine-to-machine alignment until a tire reference lab is established. The agencies anticipate establishing this lab in the future with intentions for the lab to accommodate the light-duty tire fuel efficiency program. The agencies note the lab-to-lab comparison conducted in the most recent EPA tire test program. The agencies reviewed the RR_C data from the tires that were tested at both the STL and Smithers laboratories to assess inter-laboratory and test machine variability. The agencies conducted statistical analysis of the data to gain better understanding of lab-to-lab correlation and developed an adjustment factor for data measured at each of the test labs. Based on these results, the agencies believe the lab-to-lab variation for the STL and Smithers laboratories would have very small effect on measured RR_C values. Based on the test data, the agencies judge that it is reasonable to implement the HD program with current levels of variability, and allow the use of either Smithers or STL laboratories for determining the RRc value in the HD program.

8.11. Aerodynamic Assessments

Organizations Included in this Section:

American Trucking Associations, Inc
American Council for an Energy-Efficient Economy
Aeroserve Technologies Ltd.
Exa Corporation
Daimler Trucks North America
Sinhatech
Anonymous Public Comment
ArvinMeritor, Inc
Auto Research Center, LLC
Engine Manufacturers and Truck Manufacturers Associations
National Automobile Dealers Association
Navistar, Inc
Nose Cone Manufacturing Company
Union of Concerned Scientists
Volvo Group
International Council on Clean Transportation
Eaton Corporation
CALSTART
Natural Resources Defense Council

Organization: Aeroserve Technologies Ltd.

The proposed regulations have been extracted from a program whose last initiatives were described in the 21st Century Truck Program. We recall that industry stakeholders and government wanted to collaborate to reduce the performance verification costs of a myriad of after market aerodynamic and other fuel consumption reduction devices. Industry realized the high costs attached to such verification programs especially if shouldered individually. They therefore welcomed government participation to assist “add-on” technologies and to verify their performance claims. A logical extension of these tests was a safety assessment when operating in high winds and and/or wet or snowy conditions. [EPA-HQ-OAR-2010-0162-2118.1, p.2]

There are several fundamental flaws inherent in the Agencies’ goal to simplify the results gathered from the testing referenced in the proposed regulations. One major flaw is the Agencies’ assumptions that CFD and wind tunnels are sufficient technologies to determine categories and baseline results that will be used in the GEM to establish bin numbers or efficiency categories for future vehicles. Neither of these technologies are able to duplicate real world conditions. CFD is limited by computing power and the inadequate ability to model free stream vortices or turbulence with sufficient confidence levels to set far reaching industry standards.. The wind tunnel is limited by physical dimensions, the excessive use of scaled models that eliminate some otherwise viable products and an inability to test full sized whole vehicles at any appreciable yaw angles. This begs the serious question: Why are the Agencies bent on using a computer model to determine what’s “in” and what’s “out” and using input data for said model that ignores high winds, gusts and yaw…forces that are routine on any highway in the Nation? The industry economic consequences of error are huge. Another omission that jumps out is that while safety is identified as important and even imperative, all testing is to be done with winds that are compliant with existing testing standards. That is to say, less than 12 MPH with no more than 15 mph gusts. These limits were set based on wind averages. Safety assessments and vehicle performance limitations involve exposing the vehicles to extreme conditions, not by the facile elimination of the very force that can cause the safety hazard in the first place. Wind induced turbulence is not a linear function. That is to say the difference between a 10 to 15 mph wind is not the same as the difference between a 15 to 20 mph wind. As wind speed increases gusts also become stronger Such existing test wind limits only serve to [EPA-HQ-OAR-2010-0162-2118.1, pp.2-3]

a. unrealistically reduce or eliminate a major vehicle road force.

b. reduce data complexity

c. reduce time and therefore costs to the client

d. artificially enhance the performance of “head on” type aerodynamic products while ignoring the safety or performance consequences of operation in extreme conditions. Both “stock” vehicles and especially vehicles using aerodynamic add-ons must be checked/tested/trialed in real life conditions including high winds and gusts. [EPA-HQ-OAR-2010-0162-2118.1, p.3]

The data used to establish the proposed regulations have been based on the approved tests such as J1321 and J1263. These tests have been designed specifically to reduce error so that data can be compared within the acceptable error of 2% between data samples (runs). These approved tests each require several hours and sometimes days to complete the required series, and winds can definitely change during that time. Therefore by lowering the wind limits in the standards, there is a higher probability that the testing data will continue to fall within the acceptable error range over a longer period of time. (Note: For Coast down tests like J1263 wind limits are set at less than 10 mph with peaks less than 12.3 mph and the average wind component cannot exceed 5 mph.) As we mention above wind plays a significant role in performance and safety. We propose to include tools that are used in the aviation industry to gather more dynamic data. Please see attached proposed draft Abstracts for modified J1263 and modified J1321 test procedures Attachments A and B. [EPA-HQ-OAR-2010-0162-2118.1, p.4]

The EPA and NHSTA considered using wind averaged drag coefficients in this regulatory program, but ultimately decided to use coefficient of drag values with zero yaw (i.e., representing wind from directly in front of the vehicle, not from the side) instead. We are taking this approach, recognizing that wind tunnels are currently the only tool to assess the influence of wind speed and direction on a truck's aerodynamic performance. See Attachment C on the effects of testing without isolating the direction of the test runs and the direction of the wind. [EPA-HQ-OAR-2010-0162-2118.1, p.4]

Response:

The agencies pursued a program that had different initiatives than the program described the commenter and sought to continue and further, scientific study of heavy-duty, on-highway truck aerodynamics. Specifically, our focus was on original-configuration, manufacturer vehicles, not add-on technologies and performance verification in this rulemaking. This type of activity is part of our highly successful SmartWay Program and is not the subject of this rulemaking although some of the techniques and methods used in this rulemaking may support SmartWay verification activities. Therefore, although the collaborative nature and area of aerodynamic study overlaps with the program described by the commenter, the goal of the test program to support this rulemaking is very different.

Regarding the use of wind tunnel and CFD, the agencies' goal was to allow continued use of existing methods and limiting the variability in the measurement techniques, specifically for the preferred method, coastdown testing. As a result, the agencies: (1) conducted research on coastdown, wind tunnel, and computational fluid dynamics (CFD) methods; and, (2) included refined requirements for the use of these three techniques in today's action. The research, detailed in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary, not only improved understanding of the uncertainties of each method but was specifically designed to identify key test elements that should be constrained to ensure precision, accuracy, and cross-method comparability. As a result, today's action includes refined requirements for conducting coastdown, wind tunnel, and CFD aerodynamic evaluations for purposes of generating aerodynamic inputs for the GEM.

Today's action relies upon the coastdown test as a reference method for determining the aerodynamic performance of a tractor and its subsequent GEM aerodynamic input. This rulemaking also includes as compliance flexibility the allowance that a manufacturer may demonstrate that their preferred (non-coastdown) approach can meet the agencies' need for precision and accuracy. Based upon that demonstration, the manufacturer's preferred method could be allowed to demonstrate compliance through correlation factors. The preferred method and correlation factor development and approval is specific to that manufacturer's demonstration of that aerodynamic tool (i.e. a particular wind tunnel) using agreed upon testing procedures and parameters. The agencies expect that some manufacturers will choose to use wind tunnels and voluntarily submit demonstrations for review. The agencies believe that the use of a correlation factor to relate data produced by an alternate, manufacturer-preferred aerodynamic evaluation tool mitigates concerns over the accuracy of wind tunnel data. The use of a correlation factor (relative to the coastdown test results) in place of simply using the raw Cd or Cd*A data for aerodynamic bin determination also provides the potential for different test methods to be used by different manufacturers with less concern that the bin determination will be overwhelmingly dependent upon the test method selection. Regarding safety in high wind conditions, we agree with the commenter that safety is imperative and should not be minimized. However, today's action does not deal with the safety of heavy-duty trucks and in no way changes or hampers current or future safety regulations or standards related to safety. Rather, this rulemaking strictl deals with setting standards for green house gas emissions and the subject of safety standards for heavy-duty trucks is handled under a different authority and/or set of regulations. While we are restricting wind conditions as part of test methods in today's actions, this does not minimize the need for safety standards on heavy-duty trucks nor reduce the pursuit of heavy-duty truck safety in high wind conditions in other appropriate test programs. We believe the industry will continue to address safety externally to this rulemaking.

The agencies adopted changes to the test protocol inherent to improvement of the coastdown test data meant to provide a more robust data set with the intent to address consistency, repeatability, and reproducibility from a compliance test result perspective. Based on survey data and wind data collected during the agencies test program, the wind restriction allow for testing consistency with the above state goal, while not creating burdensome test requirements which excessively restrict the number of available test days. The coastdown test procedure discussed in this rulemaking was designed to address aerodynamic assessment and safety specific testing protocols are not germane to this action.

Regarding test facilities, although we did use coefficient of drag values at zero yaw, we are allowing manufacturers use wind tunnels for compliance purposes as discussed above. Further, we are also including provisions that allow manufacturers to benefit from the use of wind tunnels for full yaw angle sweeps and wind average coefficient of drag determination. Therefore, we believe that manufacturers will continue to assess the influence and impact of cross winds on aerodynamic tractor performance.

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The agencies have estimated the baseline aerodynamic drag coefficient value for high roof tractors as 0.69 (p. 74219), which appears high, considering data from published studies. The NAS study suggested that aerodynamically designed tractors have drag coefficient values in the range of 0.60 to 0.65. Researchers from Lawrence Livermore National Laboratory, Sandia National Laboratories, California Institute of Technology, and University of Southern California in an SAE paper in 2000 observed a C_D value of 0.60 for a 80,000 lb Class 8 tractor truck. A 2003 Society of Automotive Engineers (SAE) paper examined full-scale wind tunnel tests that showed a baseline tractor and a 28-foot box trailer having a C_D value of 0.55. Another article by the same author showed that a tractor truck fitted with skirts, rear-end treatment, and gap seal could have a C_D value as low as 0.48. Together, these sources suggest that both the agencies baseline C_D value and the proposed 017 target C_D value of 0.55 C_D (Advanced SmartWay) for tractor trucks are too high. [EPA-HQ-OAR-2010-0162-1894.1, p.6]

Recommendation (aerodynamics): Ensure comparability of aerodynamics measurements across manufacturers and products, if necessary by requiring coastdown testing. Consider replacement of Cd and CRR inputs to GEM with coastdown test results. [EPA-HQ-OAR-2010-0162-1894.1, p.7]

Manufacturers should specify a baseline vehicle test against which to benchmark their coefficient of drag calculations. Unless the agencies can devise a reliable means ensuring comparable results from the various approaches to determining the Cd, manufacturers should be required to perform coastdown testing, at least on a subset of their vehicles large enough to allow reliable extrapolation to all of their vehicles. [EPA-HQ-OAR-2010-0162-1894.1, p.7]

An added advantage of requiring coastdown tests is that the results of those tests would be used directly as inputs to a revised GEM model, which would be the most accurate way to account for both Cd and tire rolling resistance. [EPA-HQ-OAR-2010-0162-1894.1, p.7]

Response:

The agencies based the proposed aerodynamic bins on data from published literature as well as on in-house research programs. Several studies reviewed by the agencies were more current (e.g., TIAX, NAS) and based upon a broader spectrum of stakeholders and data sources. Some of the sources cited by the commenter were considered by expert panels during the development of the more recent reports reviewed by the agencies in the development of the NPRM and today's rule.

The agencies conducted research, with the cooperation of stakeholders, to further evaluate the aerodynamic performance (Cd and CdA) of class-7 and class-8 tractors affected by today's rule. This test program, as detailed in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary, conducted coastdown testing of vehicles from multiple OEMs in each category. As a result, the agencies changed the values and nomenclature in the bins but retained the basic progression and ranges (i.e., the widths) of the proposed bin structure. The agencies believe the widths are reasonable and provide some mitigation of potential variability (test-to-test, facility-to-facility, method-to-method) associated with the allowed aerodynamic compliance methods. This is supported by the agencies' comprehensive test program which conducted multiple tests, at multiple facilities, using multiple methods. Additionally, the use of an adjustment factor will address method to method variation as compared to the reference method. More details on the test program and the coastdown results are included in the Regulatory Impact Analysis (RIA) Chapter 3 "Test Procedures" and the docket for this final rule EPA-HQ-OAR-2010-0162.

Organization: American Trucking Associations, Inc. (ATA)

The proposed rule fails to consider the fundamental differences between the characteristics and benefits of aerodynamics for high-roof and lower-roof tractors. The proposed certification requirements mean that manufacturers must measure all tractors, which will shift limited aerodynamics experts and facilities from the high-roof tractors where there is a good return on the investment, to low- and mid-roof tractors, an inefficient use of limited resources. [EPA-HQ-OAR-2010-0162-2263.1, p.12]

The aerodynamic performance of low-roof and mid-roof tractors receives much less attention from manufacturers for several reasons. Low- and mid-roof tractors are coupled with trailers of different shapes and sizes that carry bulk commodities (e.g., grain, milk, gasoline) or flatbed trailers where the cargo (e.g., steel coils, pipes, off-road equipment) largely defines its aerodynamic shape. The flow air around a low- or mid-roof tractor is unpredictable because of the unpredictable trailer aerodynamics. Moreover, low- and mid-roof tractors are typically not used in high-speed long-haul operations where aerodynamic improvements generate the greatest fuel efficiency benefits. Instead, they typically are used for regional or urban/suburban delivery. Additionally, those tractors frequently transport bulk and haul heavy cargo that reaches maximum allowable weights, and therefore truck operators are incentivized to reduce the tare weight of the tractor to allow carrying more cargo. Customers of low- and mid-roof tractors place a low priority on aerodynamic and, in some cases, specifically request omitting aerodynamic devices in order to reduce the weight of the tractor. [EPA-HQ-OAR-2010-0162-2263.1, p.12]

ATA recommends that the agencies develop a simplified process for certifying the coefficient of aerodynamic drag of low-roof and mid-roof tractors to ensure OEM's can focus their resources where the biggest gains from aerodynamic improvements may be achieved. [EPA-HQ-OAR-2010-0162-2263.1, p.13]

Response:

We agree that high-roof tractors used in line-haul applications may offer the greatest potential opportunity for realizing benefits from aerodynamic improvements due to their operational cycles (i.e., significant portions of drive time at steady, highway speeds). As a result, today's action maintains the mechanisms to incorporate aerodynamic assessment into the compliance tools (i.e., GEM) for Class 7 and 8 tractors. Furthermore, based upon comments received and additional information provided, the agencies are including in today's action additional flexibility for Class 7 and 8, low-roof cab and mid-roof compliance. This flexibility allows manufacturers to establish a GEM input aerodynamic bin for their high-roof model and assume the same aerodynamic bin would also apply to the low-roof and mid-roof versions of that model. This acknowledges that significant aspects of the aerodynamic efficiency (i.e., the general streamlining of the bumper, hood, windshield, and overall shape) will be consistent across the low-, mid-, and high-roof models. In addition, similar aerodynamic components (e.g., chassis fairings, side extending fairings, streamlined mirrors) are commonly offered for all the low-, mid-, and high-roof versions, should they be appropriate for the customer's needs. While there are some continuity in aerodynamic features across low-, mid-, and high-roof versions of a model, the aerodynamic performance is expected to differ due to the differences in projected frontal area. This is further influenced by the differences in standard trailer assumed for the low-, mid-, and high-roof versions. These expected differences are reflected in the differences in the default Cd*A assigned to the low-, mid-, and high-roof categories of the same aerodynamic bin level. In other words, allowing a manufacturer to use the same aerodynamic bin level will acknowledge similarity across versions (i.e., different roof heights) of the tractor model while assigning different default Cd*A values for different roof configurations within a bin level recognizes expected differences in aerodynamic performance.

Organization: Exa Corporation

The wind tunnel testing at NRC used a 28 foot and 14 foot trailer for the full scale and half-scale VNL testing respectively, as a longer trailer could not be accommodated by the length of the NRC test section. In order to study the influence of using a standard 53 foot box trailer, simulations were performed at yaw angles of 0, 2.5, and 5 degrees. The simulation results showed that the 53 foot trailer results in a drag increase of 10 percent over the 28 foot trailer at zero degrees yaw. The drag increase between 0 and 5 degrees yaw is also notably different than the 28 foot trailer results. The blockage corrected wind tunnel testing on the 28 foot trailer showed an increase of 16 percent, while the open road, 53 foot trailer simulation, resulted in an increase of 22 percent. These results confirm that a reduced trailer length produces significantly different drag coefficients and yaw performance. [EPA-HQ-OAR-2010-0162-1759.1, p.6]

Our experience is that tractors and trailers must be considered as an integrated system when assessing aerodynamics. For example, a predicted change in drag between 2 tractors using a standard 28 foot trailer, will be different if a 53 foot trailer is instead used. We have also seen that drag improvements on the tractor due to improved streamlining, can be negated by drag increases at the rear of the trailer. For the final fuel efficiency and GHG regulations, it is therefore important that the standard trailer types (Box, flatbed, and tanker) be defined in such a way that they include sufficient detail to be representative of the most common realistic configurations. Detailed, 3-dimensional CAD files would be the preferred format for defining the standard trailer types. [EPA-HQ-OAR-2010-0162-1759.1, p.6]

Response:

The agencies recognized this in the NPRM and proposed some basic characteristics of standard trailers (53 foot box van, tanker, and flatbed). In response to comments, the agencies conducted further research into the impacts of trailer characteristics on the system's (i.e., tractor trailer combination) aerodynamic performance. This includes additional coastdown testing as well as scale windtunnel research. Tractor-trailer gap, trailer corner radius, and trailer size (48 foot and 53 foot long box trailers) were among factors evaluated during Agency test programs. Additional investigation into key aspects of flatbed performance (e.g., load weight, load shape, and geometry) and tankers was also conducted. As a result of commenter input and research, the agencies have included additional specificity in the definitions of the standard trailers to be used for compliance and test method validity as described in the RIA Chapter 3 " Test Procedures".

Organization: Daimler Trucks North America

To demonstrate the significant impact that trailer shape can have on estimated Cd, we use some rather extreme versions of loads that will satisfy the Agencies' constraint that the trailer "includes a payload of dense material (such as steel plate) covered completely with one or more tarps. For aerodynamic modeling, use an amount equivalent to a standard payload of 25,000 pounds for Class 7 and 38,000 pounds for Class 8." (§1037.501 at 75 Fed. Reg. 74391.) Based upon the density of steel, we can meet those criteria with a shape such as (a) a flat dense rectangle extending the 102 inch width and 48 feet with a height of approximately 2 feet, modeled (in the extreme as essentially a bare trailer); (b) a tarp-covered wedge with height 4 feet, width 102 inches, and length 10 feet; or (c) a rectangle of 4 feet 8 inches by 102 inches extending the length of a standard trailer. (In cases (b) and (c), steel is so dense that we have to imagine the shapes are steel plates or blocks spaced apart from each other with, say, wood blocks, covered by a tarp. The exact arrangement of contents under the tarps are immaterial to the present analysis.) The resulting Cd vary from each other by nearly three hundredths (meaning the difference between 0.74 and 0.71)11. For comparison, the widths of the Conventional, SmartWay, and Advanced SmartWay bins are only four hundredths, such that a change in the shape a manufacturer chooses for its modeled load will almost always move the vehicle from one bin to another. Stated another way, the shape of the load determines the vehicle's bin. Moreover, the arrangement of the load on the trailer will affect the drag. If we arrange a wedge or a dense cube in the middle of the flatbed trailer, we find larger gap effects between the cab and the wedge or cube than if we arranged the wedges close to the tractor. In turn, Cd will be higher and will depend on the load's exact placement. In turn, how one places their shape, like the shape they choose, can strongly affect resulting Cds and aerodynamics bins. Of course, loads must be spread among axles, so a dense wedge placed close behind the cab will not satisfy axle weight distribution requirements. However, this exercise is illustrative. With the Agencies specifying a dense yet divisible material like steel and a weight, manufacturers can concoct a variety of shapes and placements, in turn affecting observed tractor-trailer Cd. In conclusion, the Agencies need to specifically define the trailers' shapes and geometry, as opposed to specifying aerodynamic features through limited statements about material and total weight. [EPA-HQ-OAR-2010-0162-1818.1, pp.107-108]

Similarly, trailer size can have a large impact on Cd. The Agencies' proposed +/- 2' tolerance on trailer dimensions can greatly affect the Cd value, and it will lead all manufacturers to test with a 113" high x 100" wide van trailer, which will provide significantly better Cd results than the standard 115' high 102' wide trailer. EPA should specify exact model and dimensions of trailer to be utilized for audits. [EPA-HQ-OAR-2010-0162-1818.1, p.108]

Response:

As stated in the previous response, the agencies recognized this by proposing some basic characteristics of standard trailers (53 foot box van, tanker, and flatbed). In response to comment that "more specificity is needed in the trailer definition, the agencies conducted further research into the impacts of trailer characteristics on the system's (i.e., tractor trailer combination) aerodynamic performance. This includes additional coastdown testing as well as scale wind tunnel research. Tractor-trailer gap, trailer corner radius, and trailer size (48 foot and 53 foot long box trailers) were among factors evaluated during Agency test programs. Additional investigation into key aspects of flatbed performance (e.g., load weight, load shape, and geometry) and tankers was also conducted. As a result of commenter input and research, the agencies have included additional specificity in the definitions of the standard trailers to be used for compliance and test method validity as described in the RIA Chapter 3 " Test Procedures".

Organization: Anonymous Public Comment

While there is a lot of changes to be made to make the maximum effect desired in the regulation, take the following NASA (2008) research into consideration: [EPA-HQ-OAR-2010-0162-0376-cp, p.1]

"Rounding the vertical corners on the front and rear of the cab reduced drag by 40 percent while decreasing internal volume by only 1.3 percent. Likewise, rounding the vertical and horizontal corners cut drag by 54 percent, with a 3-percent loss of internal volume. Closing the gap between the cab and the trailer realized a significant reduction in drag and 20 to 25 percent less fuel consumption. A second group of tests added a faired underbody and a boat tail, the latter feature resulting in drag reduction of about 15 percent. Assuming annual mileage of 100,000 driven by an independent trucker, these drag reductions would translate to fuel savings of as much as 6,829 gallons per year." [EPA-HQ-OAR-2010-0162-0376-cp, p.1]

These changes in aerodynamics alone would make a world of difference. Without even dipping into the engine design or even getting into what could be considered a drastic change, a 6.829% decrease could be seen in fuel consumption. As your proposal suggests, add onto that tire design, advances in engine efficiency and even some work with the diesel fuel itself and a 25% reduction cannot be too difficult to achieve. [EPA-HQ-OAR-2010-0162-0376-cp, p.1]

NASA, 2008, Aerodynamics Research Revolutionizes Truck Design, Retrieved from: http://www.sti.nasa.gov/tto/Spinoff2008/t_3.html [EPA-HQ-OAR-2010-0162-0376-cp, p.1]

Response:

The commenter indicated that the agencies should consider the information presented in a summary of National Aeronautics and Space Agency (NASA)-sponsored research titled "Aerodynamics Research Revolutionizes Truck Industry" (http://www.sti.nasa.gov/tto/Spinoff2008/t_3.html). The research included trailer and tractor strategies. While the trailer aerodynamic devices are outside of the scope of this regulation, the agencies acknowledge that a variety of techniques can be employed in combination to dramatically reduce aerodynamic drag on combination tractor-trailers. Today's action recognizes the importance contribution improved aerodynamics can have on truck applications which spend a significant portion of their time operating at highway speed. This is done by including aerodynamic drag as an input into the GEM compliance model for Class 7 and Class 8 tractors. In addition, the agencies have finalized a mechanism for including aerodynamic drag without prescribing specific aerodynamic devices or strategies. This allows manufacturers to employ those devices and strategies that best suit their base truck model and customers. We have also included provisions that will recognize innovative technologies and provide an incentive for manufacturers to pursue such technologies if they opt to do so.

Therefore, the agencies agree with the commenter that changes to aerodynamics have an impact on the fuel consumption of the vehicle and, thus, have promulgated this rulemaking with the overall goal of reducing GHG emissions. In addition, as mentioned elsewhere, our highly successful SmartWay Program currently provides incentives for innovative tractor and trailer technologies and will continue to do so in conjunction with this rulemaking.

Organization: ArvinMeritor, Inc.

Aerodynamic Management Systems (Suspension Height Control and Tractor-Trailer Gap Reduction) – Several systems are currently under development to (1) lower the ride height of the tractor and trailer to reduce aerodynamic drag; and (2) systems that adjust fifth-wheel position to reduce tractor to trailer gap at high speeds, thus reducing a source of significant turbulence and drag. Test results showing the benefits of these systems could be used to create an aerodynamic improvement factor that could be coded into the GEM simulation program. [EPA-HQ-OAR-2010-0162-1605.1, p.6]

Response:

The commenter noted that "Several systems are currently under development to [automatically] (1) lower the ride height of the tractor and trailer to reduce aerodynamic drag; and (2) systems that adjust fifth-wheel position to reduce tractor to trailer gap at high speeds." They further suggest that existing developmental testing could be used to create "aerodynamic improvement factors" that could be coded into the GEM. The agencies are aware of the development and testing of such systems but did not explicitly include these in development of today's rule because these are currently considered experimental. Further, the commenter did not provide test data to support Agency development of the suggested GEM default factors. In addition, while there may be benefit to using some of these experimental systems (e.g., speed-specific, automatic gap-reduction systems) the integrated tractor-trailer devices may include improvements to equipment outside of the scope of this rule. Once these technologies have fully matured and are implemented in use, they may be considered under our existing SmartWay Program and for future regulatory inclusion.

However, the agencies believe that today's action will provide incentives for the development and deployment of innovative technologies, such as those listed by the commenter, without a technology-specific mechanism or credit in the GEM. The OEM has an inherent incentive to improve the tractors aerodynamics using any strategy available to them. Technologies, such as those listed by the commenter, could be incorporated into a tractor design, tested with the standard trailer appropriate for that tractor's category, and benefit from any improvement in aerodynamic drag via a lower GEM input.

For these reasons, today's action does not include specific mechanisms to provide credit for technologies listed by the commenter in the GEM model.

Organization: Auto Research Center LLC (ARC)

The ARC staff has over 30 years of experience collectively using CFD. The staff uses CFD daily as a design tool to assist our clients in designing their products. The tool is not a validation tool and all final conclusions are validated in a scale model rolling road or full scale rolling road wind tunnel if available. Due to the complexity of CFD results can vary greatly and erroneous results can be generates with just a slight change in meshing, assumptions and preset conditions to mention a few. CFD can get you in the ball park for a target Cd but you should not base the bin placement or ranking of a product solely on CFD. The error bar is far too high. [EPA-HQ-OAR-2010-0162-1766.1, p.1]

If the EPA wants to consider using CFD even remotely then they must require all CFD tests results include a full yaw angle sweep of -9, -6,-3,-1,0,+1,+3,+6,+9 with wind average calculation as per the standard SAE procedure for wind averaging. Trucks and trailer are not symmetrical and testing in just a zero degree yaw will mislead the industry and the EPA. The vast majority of heavy duty trucks on the road today experience high yaw angle forces. That is why the higher yaw angles results are weighted more then the lower yaw angle. It is more then possible that two trucks will have the similar result at zero degree yaw and have dramatically different results at the higher yaw angles. [EPA-HQ-OAR-2010-0162-1766.1, p.1]

In the regulation the EPA stated all mid roof heavy duty trucks shall be tested pulling a flat bed trailer with a dense cargo spread out over the whole length and width of the trailer. If this is done the cargo would be about 12" high and would not represent anything the industry actually does haul short of flat plates. [EPA-HQ-OAR-2010-0162-1766.1, p.2]

It is true the loads the flat bed industry does haul are many, but after 2 months of investigation ARC has determined that a good compromise would be a Conestoga trailer configuration. The configuration has short removable side walls and an arched removable canvas roof. Attached are a few pictures and over 200 pictures can be made available to the EPA on ARC FTP site if requested by the EPA. [EPA-HQ-OAR-2010-0162-1766.1, p.2]

Response:

The agencies have an understanding of the complexities of CFD and share the commenter's concern regarding the potential impact that base assumptions, environmental condition setting, and model fidelity (e.g., coarseness or fineness of the meshing for the tractor-trailer and the surrounding environment). As a result, we have included two requirements in this regulation that should address the concerns expressed.

First, we are requiring the use of any alternative aerodynamic method, other than the modified SAE J1263 coastdown reference method, to be approved prior to use. In addition, the alternative aerodynamic method must be correlated to the modified SAE J1263 coastdown reference method. Thus, any use of CFD must be accompanied by empirical measurements to corroborate its ability to provide a reasonable estimate of a given tractor's or tractor-trailer combination's Cd.

Second, we have imposed a minimum set of standardized criteria that must be used for demonstrating compliance with this regulation using CFD. This criteria was developed using established research, industry feedback, and experimental data as discussed in the RIA to this rulemaking. This will provide for a level playing field and a consistent measuring stick for comparison between software codes and eliminate some of the base assumptions that can add variation.

Finally, the commenter suggested that the standard flatbed load would be best represented by a "Conestoga trailer configuration" for testing of mid-roof tractors. We proposed using a flatbed trailer for low-roof and a tanker trailer for mid-roof tractor applications. However, the issue of flatbed trailer load configuration and tanker trailer fill level was addressed in the test program described in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary, and RIA Chapter 3 "Test Procedures". Also, various stakeholders indicated that high-roof day and sleeper cab tractors are more prolific in the fleet and, coupled with their typical operating regime in line-haul applications are the focus of aerodynamic improvement. As a result, the low- and mid-roof tractor applications tend to be derivatives of high roof day and sleeper cab tractors.

Therefore, we are finalizing the provisions that low- and mid-roof tractors will be assigned an aerodynamic bin based on the aerodynamic bin for the high-roof day or sleeper cab tractor that they are derived from. If a low- or mid-roof tractor is not derived from a high-roof day or sleeper cab tractor, the manufacturer must perform testing of a low- or mid-roof tractor in a "bobtail" configuration (i.e., testing of the tractor only without the presence of a trailer) as described in 40 CFR 1037.501. This eliminates the confusion regarding trailer configuration for testing low and mid roof tractors. We are including a basic specification for flatbed and tanker trailers but this only applies for manufacturers seeking to comply with special compliance provisions in 40 CFR 1037 Subpart G.

Organization: Daimler Trucks North America

On page 75 Fed. Reg. 74181, the Agencies request comment on methods that should form the primary aerodynamic testing tool, methods that may be appropriate as alternatives, and the mechanism (including standards, practices, and unique criteria) for the Agencies to consider allowing alternative aerodynamic test methods. The following are DTNA's comments. [EPA-HQ-OAR-2010-0162-1818.1, p.63]

On 75 Fed. Reg. 74182 and later in §1037.141 at 75 Fed. Reg. 74385 et seq., the Agencies propose qualitatively based bins for aerodynamics. While there are advantages to having a loosely specified regulation, DTNA thinks that such a regulation would work poorly in practice. It would leave too much room for confusion and misinterpretation, and be a real headache for manufacturers to meet and would lead to a lot of instances of manufacturers trying to game the system. Moreover, as written, the qualitative bin standards are (1) vague to the point that they are unusable and (2) unnecessary in that manufacturers must submit quantitative data, which overrides the qualitative bin definitions anyway. First on 75 Fed. Reg. 74182, the Agencies specify how for example classic vehicles are "tractor bodies which prioritize appearance or special duty capabilities over aerodynamics." Even presuming that the Agencies meant tractors whose owners or manufacturers prioritize in various ways (not tractor bodies themselves prioritizing), the proposal is still too vague for regulation in that we cannot certify vehicles based on people's priorities. More importantly, the Agencies' bin descriptions are too vague for regulation. After all, all vehicles have "features that detract from aerodynamics" like mirrors, steps, axles, grab handles, etc, such that all vehicles might be called "classic." Similarly, all vehicles might be said to have some sort of "underbody airflow treatment" and "lowered ride height" (which are not defined and thus open to a vast range of interpretations, such as any curved bumpers qualifying for "underbody airflow treatment" and all but the highest ride height qualifying for "lowered ride height"). So in turn all vehicles might be said to be "advanced SmartWay." (And the same holds for other bins.) In short, the qualitative descriptions of aerodynamic bins in the preamble are unworkably vague.

Second, the qualitative descriptions in the regulatory text at 75 Fed. Reg. 74385-6 are similarly unworkably vague. For example, classifying mirrors based upon whether they are "streamlined" or are "aerodynamically efficient" without clearly defining those terms is unworkable. And even if the terms were defined, vehicles with all of those features could be more aerodynamic than, for example, vehicles with fully enclosed roof fairings, gap extenders, fuel tank fairings, and other streamlined features (the Advanced SmartWay components) because aerodynamics come from the full vehicle shape not the shapes of certain limited components. Stated another way, aerodynamic features are often not intuitive or are invisible to the eye. In summary, the terms used in the qualitative bin standards need definition but, better, should just be dropped as unworkable. [EPA-HQ-OAR-2010-0162-1818.1, p.63]

Third, and most importantly, the Agencies require testing or good engineering judgment in calculation or estimation of Cd's for all vehicles. And if manufacturers have Cd's for vehicles, they need no qualitative bin definitions. In short, with quantitative testing or modeling required, qualitative bin definitions are unnecessary. Since they are also unworkably vague, we recommend that the Agencies remove them from the regulations. [EPA-HQ-OAR-2010-0162-1818.1, p.64]

Response:

In the proposal, the agencies asked for comment on the use of qualitative aerodynamic bins as part of two pronged approach to aerodynamic compliance. The commenter advised against the use of qualitative bins on the grounds that they "lack proper definition and would be inappropriate." The agencies agree with the recommendation of this commenter and are excluding the qualitative aerodynamic assessment mechanism from the aerodynamic bin system in today's rule.

Organization: Daimler Trucks North America

The Aerodynamic Bin Method Of Assigning Bins Is Unclear And, Given That The Agencies Are Using A Quantitative Measure For Assigning Bins, Unnecessary. [EPA-HQ-OAR-2010-0162-1818.1, p.64]

The proposed regulation contains a qualitative standard for determining the aerodynamic bins at 1037.141. The qualitative assessment is based on things like, for example, fully enclosed roof fairings, fuel tank fairings, aerodynamic fuel tanks, streamline grills, hoods, mirrors, and bumpers. There are no definitions for any of these design characteristics. At 1037.520, the proposed regulation also requires that manufacturers use a defined testing method to determine the aerodynamic bin. If the testing shows that the coefficient of aerodynamic drag puts the vehicle in a better bin than based on the qualitative determination, the agencies may approve the use of the aerodynamic drag determined by the testing. The rule says nothing about what to do if the testing shows that the aerodynamic drag is worse than that determined from the qualitative assessment. If the Agencies do not approve the better test result, the manufacturer must use the input from the qualitative assessment. This method for determine the aerodynamic input into GEM seems curious and is arbitrary. The input should be based on test results, not a qualitative assessment of undefined design characteristics left to the caprices of the Agencies. The Agencies should eliminate the qualitative assessment ("apparent bin categories") and use a properly defined testing method to determine the drag coefficient for input into GEM. This is the only sound basis to regulate a tractor's aerodynamics. [EPA-HQ-OAR-2010-0162-1818.1, p.64]

Response:

The agencies based the proposed bins on data from published literature as well as in-house research programs. Several recent studies were reviewed by the agencies (e.g. TIAX, NAS). Based upon stakeholder feedback and data generated by the agency as described in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary and RIA Chapter 3 “Test Procedures”, the agencies redefined the aerodynamic bins. Following the proposal, the agencies conducted additional research, with the cooperation of stakeholders, to further evaluate the aerodynamic performance (Cd and CdA) of Class 7 and Class 8 tractors affected by today’s rule. This test program conducted coastdown testing of vehicles from multiple OEMs in each category and the results can be found in the report to the docket and the RIA for this rule. As a result, the agencies have retained the bin structure and basic progression and ranges (i.e., the widths) of the bins, absent the related to the comment above, but have dropped the qualititative nomenclature in favor of a numeration sequence, and revised the bin values based on our additional research. The agencies believe the bin structure and range in the bins provides some mitigation of potential variability (test-to-test, facility-to-facility, method-to-method) associated with the allowed aerodynamic compliance methods. Therefore, we are retaining and finalizing, with some revisions, the bin structure.

Organization: Daimler Trucks North America

Coast-Down Tests Are Burdensome Yet Inaccurate And Not Accepted By The HDV Industry Even For Internal Purposes Requiring Little Accuracy. In Turn, They Are Inappropriate For Regulations. The Agencies Should Adopt More Accurate And Simpler Procedures Like Constant-Speed Tests. [EPA-HQ-OAR-2010-0162-1818.1, p.64]

Coast-down tests are inappropriate for HDV regulations. The agencies list 4 types of aerodynamics tests used by manufacturers. (NPRM P. 63.) To our knowledge, no manufacturer uses coast-down testing. As we have discussed with the Agencies on numerous occasions, we rarely use coast-down tests, because of the difficulty and the relatively inaccurate results. [EPA-HQ-OAR-2010-0162-1818.1, p.64]

Below is an example of the variance that we had during our last coast-down test. This error was on the high side, while normal variance is around 10%. We present these data as single test runs, showing repeated tests on various days to show the variability in testing both within a day and across different days. The point of this is twofold: (1) an average of extremely variable tests is still variable, so coast-down tests inherently lack accuracy, and (2) measurements of the same truck over different days might lead to different results. We think that many tests (perhaps more than ten in each direction) would be necessary to achieve precision necessary for the present regulation program. [EPA-HQ-OAR-2010-0162-1818.1, p.64]

But even with such precision, we question whether the test will be accurate enough. (So there is no confusion, we wish to clarify. By “precision” we mean having results close to each other, when tested repeatedly under the same conditions. By “accurate” we mean having results close to the real result.) [EPA-HQ-OAR-2010-0162-1818.1, p.65]

[See p.65 of this comment for a scatter plot entitled, Class 8 Tractor/Trailer Coastdown Test Variance Two Days- Single Vehicle Results]

We are not terribly familiar with the Agencies' suggested SAE 2263 procedure, because we rarely use coast-down tests and still more rarely use this procedure. However, we have recently done some testing with it and have the following observations. SAE J2263 procedures attempt to factor out influences such as wind and gravity forces, but these forces can still have dominant effects on the results at heavy truck testing due to the high Cd *A value and the total weight of the combination vehicle. Each of these forces may account for a significant fraction of the total running resistance force at lower speeds (e.g., 0.1% lane inclination with a 65,000 lb vehicle gives a force of nearly 300 N) and therefore cannot be neglected. If coast-down is subjected to unsteady wind and uneven test track conditions, the data regression technique in SAE J2263 may deliver false values, as there are 8 parameters to be determined only from the speed and time signal. [EPA-HQ-OAR-2010-0162-1818.1, p.65]

But, if the Agencies insist upon coast-down testing, we would recommend the following, which we have learned from our experience with coast-down tests: [EPA-HQ-OAR-2010-0162-1818.1, p.65]

•We recommend against split runs, based upon our experiences doing such testing. Because some tracks are not long enough to do a complete run, we normally run this with an empty trailer which allows for a shorter track. Still, one needs a 2-3 mile long track. Part of the problem, of course, is that the empty trailer adds to the variability in the data. [EPA-HQ-OAR-2010-0162-1818.1, p.65]

• We recommend against the possibility of consecutive runs in one direction. The wind can change too fast. Someone could game the system, especially if they do not have a total test time requirement (test in one direction one day and the other direction some other day). If the Agencies insist upon coast-down testing, we would recommend runs in alternating directions. [EPA-HQ-OAR-2010-0162-1818.1, p.65]

• We have not done coast-down tests with full trailer aerodynamics treatments, but this would help reduce the variability in the data. However, this makes the Cd result unrepresentative of Cd using the regulatory trailer. [EPA-HQ-OAR-2010-0162-1818.1, p.66]

• We recommend an adequate warm up period to stabilize temperatures of axle oil, tires, engine, etc). The temperature in key components must be held constant during testing to prevent gradual warm up from masking actual trends. [EPA-HQ-OAR-2010-0162-1818.1, p.66]

Response:

The agencies adopted changes to the test protocol inherent to improvement of the coastdown test data meant to provide a more robust data set with the intent to address consistency, repeatability, and reproducibility from a compliance test result perspective. Based on survey data and wind data collected during the agencies test program, the wind restriction allow for testing consistency with the above state goal, while not creating burdensome test requirements which excessively restrict the number of available test days.   The coastdown test procedure discussed in this rulemaking was designed to address aerodynamic assessment and safety specific testing protocols are not germane to this action.

Organization: Daimler Trucks North America

Clarification Of Agency Coast-Down Test And Chassis Dynamometer Test Procedures Would Be Useful If The Agencies Want To Convince Interested Parties That The Procedures Are Accurate. [EPA-HQ-OAR-2010-0162-1818.1, p.66]

On page 75 Fed. Reg. 74180, the Agencies indicate that they performed comparison of GEM results to chassis dynamometer tests and found accurate results. Both GEM and chassis dynamometer tests require aerodynamics input, which the Agencies propose to require through coast-down testing. If the Agencies are running repeated tests, either with GEM or with a chassis dynamometer, in order to demonstrate comparability and/or repeatability, then the Agencies should be testing the entire procedure, start to finish. In turn, the Agencies should be running a new coast-down test for each repetition of their GEM analysis or dynamometer test. Otherwise, the Agencies will have tested a procedure with one major source of variability held unnaturally fixed and constant. Doing so will mask variances. It is not clear from the NPRM how the Agencies ran their testing, so we request that clarification in order that we can properly judge whether the Agencies' purported 4% correlation is accurate. [EPA-HQ-OAR-2010-0162-1818.1, p.66]

Response:

The agencies adopted changes to the test protocol inherent to improvement of the coastdown test data meant to provide a more robust data set with the intent to address consistency, repeatability, and reproducibility from a compliance test result perspective. Based on survey data and wind data collected during the agencies test program, the wind restriction allow for testing consistency with the above state goal, while not creating burdensome test requirements which excessively restrict the number of available test days.   The coastdown test procedure discussed in this rulemaking was designed to address aerodynamic assessment and safety specific testing protocols are not germane to this action. The updated procedure with clarification is available in 40 CFR 1066 and the Regulatory Impact Analysis Chapter 3.

Organization: Daimler Trucks North America

Even though we own a wind tunnel, we oppose a requirement to use wind tunnels for the following reasons: [EPA-HQ-OAR-2010-0162-1818.1, p.66]

Most wind tunnels, though able to measure wind average drag, lack fidelity with respect to in-use drag that would be measured over the road for various reasons, including large floor boundary layers, lack of rolling road simulation, or insufficient size. So for example, a “static road” wind tunnel versus “rolling road” wind tunnel with spinning wheels could differ in Cd by five hundredths (such as 0.60 to 0.65). Moreover, it is impossible to correlate from one to the other because ground effects can be an important part of Cd. Moreover, our concern with the NASA Ames wind tunnel is that the boundary layer at the tunnel floor is so tall that it will mask improvements made to the vehicle below 5.5 feet. Our concern with the NRC wind tunnel is that its blockage ratio of 12% for a full size tractor and trailer at zero degrees yaw exceeds SAE J1252 standards of 5%, and in testing at nonzero yaw the blockage will be worse. (The Agencies may know that DTNA's wind tunnel does not meet the SAE J1252 blockage standards. Our tunnel is an “adapted wall” wind tunnel, allowing us a much higher blockage ratio without sacrificing fidelity of testing. We acknowledge, however, that this tunnel is not yet accepted for the purposes of regulation.) Wind tunnel time is very expensive (several thousand dollars per hour, which is difficult for an industry already struggling with low sales and low profits), especially compared to the constant-speed testing that DTNA proposes. [EPA-HQ-OAR-2010-0162-1818.1, pp.66-67]

• Installation time at a wind tunnel is long, while that for constant-speed testing is relatively short. [EPA-HQ-OAR-2010-0162-1818.1, p.67]

• Developing robust industry-wide procedures for measurement of wind-averaged drag values with a full trailer (i.e., developing procedures that prove comparable to in-use measurements) will not be a trivial undertaking. Wind tunnels would be more expensive and burdensome yet not yield data with much more fidelity than would the on-road constant speed tests that DTNA proposes. [EPA-HQ-OAR-2010-0162-1818.1, p.67]

• A wind tunnel test with scale-models (e.g., 1:2.5) is not accurate enough and may miss some key vehicular components. [EPA-HQ-OAR-2010-0162-1818.1, p.67]

Response:

The agencies received comments that both advocated for and recommend against using wind tunnels for determining aerodynamic performance inputs for GEM. The agencies acknowledge that each aerodynamic test method will have strengths and weaknesses that will address or introduce uncertainty, respectively, and stated us such in the proposal. Subsequent to the proposal the agencies: (1) conducting research on coastdown, wind tunnel, and computational fluid dynamics (CFD) methods; and, (2) included refined requirements for the use of these three techniques in today’s action. The research, detailed in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary, not only improved understanding of the uncertainties of each method but was specifically designed to identify key test elements that should be constrained to ensure precision, accuracy, and cross-method comparability. As a result, today’s action includes refined requirements for conducting coastdown, wind tunnel, and CFD aerodynamic evaluations for purposes of generating aerodynamic inputs for the GEM.

Today's action relies upon the coastdown test as a reference method for determining the aerodynamic performance of a tractor and its subsequent GEM aerodynamic input. This rulemaking also includes as compliance flexibility the allowance that a manufacturer may demonstrate that their preferred (non-coastdown) approach can meet the agencies' need for precision and accuracy. Based upon that demonstration, the manufacturer's preferred method could be allowed to demonstrate compliance through correlation factors relative to the coastdown test results. The preferred method and correlation factor development and approval is specific to that manufacturer's demonstration of that aerodynamic tool (i.e. a particular wind tunnel) using agreed upon testing procedures and parameters. The agencies expect that some manufacturers will choose to use wind tunnels and voluntarily submit demonstrations for review. The agencies believe that the use of a correlation factor to relate data produced by an alternate, manufacturer-preferred aerodynamic evaluation tool mitigates concerns over the accuracy of wind tunnel data. The use of a correlation factor (relative to the coastdown test results) in place of simply using the raw Cd or Cd*A data for aerodynamic bin determination also provides the potential for different test methods to be used by different manufacturers with less concern that the bin determination will be overwhelmingly dependent upon the test method selection.

Organization: Daimler Trucks North America

CFD Procedures Are Not Yet Sufficiently Established For A Regulatory Program. [EPA-HQ-OAR-2010-0162-1818.1, p.67]

In response to urging from manufacturers like DTNA, in the NPRM the Agencies discuss CFD as one possible procedure and perhaps in the future it may be. However, we have come to realize that CFD procedures are not yet sufficiently developed for the rigors of a regulatory program. There are a number of issues that the Agencies raise in the NPRM (e.g., what turbulence model to use?). But there are other measures of quality and method that the NPRM does not mention like number of iterations and steady or transient solutions. The Agencies correctly realize that they do not have enough information or a good enough solution to suggest a solution and ask for manufacturers input. But unfortunately, we are in the same boat. With our own experience of constantly changing CFD processes, with differences and occasionally problems with code developers, we are not very close to stabilizing on a 'correct' procedure for CFD. So, at least for Phase 1 of this regulatory program, CFD is best used for qualitative flow understanding and some comparative work but not to determine an absolute drag coefficient. [EPA-HQ-OAR-2010-0162-1818.1, p.67]

Response:

The agencies received comments that both advocated for and recommend against using computational fluid dynamics (CFD) models for determining aerodynamic performance inputs for GEM. The agencies acknowledge that, as pointed out by commenters, each aerodynamic test method will have strengths and weaknesses that will address or introduce uncertainty, respectively. Subsequent to the proposal the agencies: (1) conducting research on coastdown, wind tunnel, and computational fluid dynamics (CFD) methods; and, (2) included refined requirements for the use of these three techniques in today's action. The research, detailed in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary, not only improved understanding of the uncertainties of each method but was specifically designed to identify key test elements that should be constrained to ensure precision, accuracy, and cross-method comparability. As a result, today's action includes refined requirements for conducting coastdown, wind tunnel, and CFD aerodynamic evaluations for purposes of generating aerodynamic inputs for the GEM. The CFD requirements of this rulemaking acknowledge some of the key differences in the two most common approaches to CFD modeling (i.e. Lattice-Boltzmann and Navier-Stokes approaches) by including testing and demonstration requirements that are specific to each type of model. In addition, the agencies have added some criteria and specifications for the use of CFD analysis to comply with this rulemaking.

Today's action relies upon the coastdown test as a reference method for determining the aerodynamic performance of a tractor and its subsequent GEM aerodynamic input. This rulemaking also includes as compliance flexibility that allows a manufacturer to demonstrate that their preferred (non-coastdown) approach can meet the agencies' need for precision and accuracy to the extent that it should be allowed for rule compliance through correlation factors. The preferred method and correlation factor development and approval is specific to that manufacturer's demonstration of that aerodynamic tool (e.g., a particular wind tunnel) using agreed upon testing procedures and parameters. The agencies expect that some manufacturers will choose to use CFD and voluntarily submit demonstrations for review. The agencies believe that the use of a correlation factor to relate data produced by an alternate, manufacturer-preferred aerodynamic evaluation tool mitigates concerns over the accuracy of CFD data. The use of a correlation factor (relative to the coastdown test results) in place of simply using the raw Cd or Cd*A data for aerodynamic bin determination also provides the potential for different test methods to be used by different manufacturers with less concern that the bin determination will be overwhelmingly dependent upon the test method selection. In addition, the agencies have added some criteria and specifications for the use of CFD analysis to comply with this rulemaking. This, coupled with the requirement for correlation to the modified SAE J1263 coastdown reference method, should minimize the uncertainty surrounding CFD analysis as an aerodynamic assessment tool.

Organization: Daimler Trucks North America

The Agencies' Aerodynamic Program, Based Upon Zero Degree Yaw Drag Values, Will Not Correlate As Well To In-Use Drag As Other Measures. However, The Advantages Of Our Suggested Constant-Speed Test Procedure Outweigh The Disadvantages Of Zero Degree Yaw. [EPA-HQ-OAR-2010-0162-1818.1, p.67]

On page 75 Fed. Reg. 74183, the Agencies note that the wind average drag coefficient differs from the zero degree coefficient of drag. The Agencies considered use of a wind averaged drag coefficient in this regulatory program but decided to us zero yaw values because wind tunnels are the only tool that allow repeatable measurement of wind average drag values. (Nonzero yaw values are not repeatable in coast-down or constantspeed tests because they require unusually constant wind speeds.) The Agencies request comment on aerodynamic testing procedures. We recognize that zero degree yaw values, like those calculated from coast-down or constant-speed tests, do not perfectly correlate to wind-averaged drag numbers or, in turn, to in-use drag. (For example, most fuel tank side fairings are much less effective at 0 degree yaw, so a 0 degree yaw procedure does not favor vehicles with side fairings.) But we agree with the Agencies that a zero degree yaw test is the most appropriate for the proposed regulation. [EPA-HQ-OAR-2010-0162-1818.1, pp.67-68]

We think that the complexity of getting wind-averaged drag numbers is too high for a program such as the present one. And we think the added complexity buys little. While we do design our vehicles for optimum performance in nonzero yaw angles, we do so through our in-house wind tunnel and other in-house tools that do not lend themselves to a proper regulation. By contrast, if manufacturers were stuck with costly and complex testing procedures, there is nothing that manufacturers can do to avoid this cost. Because wind-averaged wind tunnel tests cannot robustly correlate with on-road tests (meaning constant-speed or coast-down) due to there being only one angle measurable in the onroad tests, we do not recommend attempts to correlate the test results. Rather, if the Agencies must make a choice between a minimal infidelity to real-world drag (which manufacturers will likely correct for anyway) and costly, complex procedures, we recommend the former. In turn, we recommend constant-speed tests. [EPA-HQ-OAR-2010-0162-1818.1, p.68]

In summary, having weighed the advantages and disadvantages of the different test / modeling procedures, we consider constant-speed tests to be the best alternative. The reason is that manufacturers have an incentive to optimize their vehicles for true wind conditions, because customers demand such optimization. In turn, manufacturers will not likely design to a zero degree yaw test. But, the test used for regulatory purposes must be robust and easily repeatable. So, the wind tunnel, which includes wind-averaged drag, adds no additional value that manufacturers would not give anyway – and it does so at great cost in terms of money spent on wind tunnel time. Similarly, CFD is not adequately developed. [EPA-HQ-OAR-2010-0162-1818.1, p.68]

On 75 Fed. Reg. 74181 et seq., the Agencies propose various types of aerodynamics testing. We recommend the constant speed test of "Measurement of running resistance by torquemeter method" in ISO 10521-1. (In the past, we recommended to the EPA an old DIN standard, but as we have worked on the present rulemaking with the Agencies, our knowledge and expertise about how to structure a regulatory aerodynamics program has grown, and our thinking has evolved. Consequently, we wish to revise our recommendation.) Although ISO 10521-1 was written for LDVs, we think it can be extended for HDVs with certain additional specifications. We prefer to use a torque metering hub between gearbox and prop-shaft as a simple alternative to have torque meter devices on each driven wheel, because it gives only one signal representing the entire torque. In future the engine torque signal on the CAN-bus may be exact enough to skip the installation of this measuring device, but we are not yet confident about that CAN-bus torque signals are sufficiently accurate. [EPA-HQ-OAR-2010-0162-1818.1, p.68]

ISO 10521-1 describes the procedure with following major steps: [EPA-HQ-OAR-2010-0162-1818.1, p.68]

• Data collection may be started following preconditioning and stabilization of the vehicle [EPA-HQ-OAR-2010-0162-1818.1, p.69]

• Record at least 10 data sets of speed, torque and time over a period of at least 5 s. [EPA-HQ-OAR-2010-0162-1818.1, p.69]

• The speed deviation from the mean speed shall be within specified values (normally no problem with standard speed control devices in the truck) [EPA-HQ-OAR-2010-0162-1818.1, p.69]

• Carry out these measurements in both directions until a minimum of four consecutive figures have been obtained which satisfy accuracy [EPA-HQ-OAR-2010-0162-1818.1, p.69]

• ISO 10521-1 incorporates the determination of correction factor for rolling resistance and aerodynamic drag and specifies how to apply these corrections to the resulting fitting curve. [EPA-HQ-OAR-2010-0162-1818.1, p.69]

• Additionally, we have found: acceptable crosswinds should limited to a resulting yaw angle of maximum 4 degrees at top speed when operating without onboard anemometry (5% error limit on drag coefficient). In our tests with a single lane length of 2 km, we received torque values with a standard deviation σ to be normally less than 2% and a maximum standard deviation less than 4%. [EPA-HQ-OAR-2010-0162-1818.1, p.69]

In turn, we find very good repeatability. For the basic measurement on a truck, we normally investigate 7 speeds starting at 15 km/h to assure a reliable fitting curve. The symmetry of measuring points to the fitting curve is found to be reliable criteria to determine the necessity of additional test rows. [EPA-HQ-OAR-2010-0162-1818.1, p.69]

In order to check accuracy, we performed tests where we modified vehicles and compared the expected and measured results. In our experience, modifications in the range of down to Cd changes of 1 percentage point may be distinguished by a constant-speed test, which may be difficult to reach by coast down tests. There is nearly no influence coming from the lane grade profile and wind forces as testing will be done in both lane directions within a short time stage. Further, when testing the truck at stable thermal conditions, we find high repeatability. [EPA-HQ-OAR-2010-0162-1818.1, p.69]

In our view, it is important to measure the aerodynamic drag of a vehicle as a whole, i.e., as a complete tractor/trailer combination and not as a bobtail vehicle. A vehicle designed for bobtail testing and one designed for testing with a trailer will have vastly different shapes, and we do not wish to see regulations push designs that are not suitable for real use with trailers. [EPA-HQ-OAR-2010-0162-1818.1, p.69]

Below are some of our results using constant-speed tests. Not shown are error bars on the graph comparing test results from the three accepted procedures. But what can be seen is that constant-speed tests and wind tunnel tests correlate best with each other. We wish to work through these with the Agencies to explain why we think this procedure is the best one. Note that the testing, done on a particular configuration of a European Actros, is (1) analogous to what the Agencies would observe with an American-style vehicle but (2) not indicative of Cd's from all configurations of Actros vehicles. [EPA-HQ-OAR-2010-0162-1818.1, p.69]

[See pp.70-71 of this comment for three graphs. First graph entitled, The measured torque on the propshaft shows that the influence of track inhomogeneity and wind are well balanced to mean value. Second graph entitled, The comparison of the derived vehicle resistance curve show that the regression algorithm gives a plausible fit to the measuring points. Third graph entitled, Comparing the test results from wind tunnel/pulling, constant speed and coastdown test it can be seen, that the results of careful investigations are quite close together, but are different in sensitivity at measurement and data evaluation]

On page 75 Fed. Reg. 74183, the Agencies "seek comment on allowing multiple aerodynamic assessment methodologies." We believe that aerodynamic round-robin testing will be necessary if the Agencies move forward with a regulatory program allowing multiple aerodynamics test procedures. The Agencies' proposed method of truing up measurements from one method to another – using qualitative estimates of what Cd should be – will not suffice for such a non-intuitive parameter as Cd. We are unaware of any data correlating one aerodynamics test procedure to another. In turn, there is the possibility of bias, which could create an unlevel playing field. [EPA-HQ-OAR-2010-0162-1818.1, p.71]

Response:

The agencies have adopted an optional wind-averaged drag calculation which accounts for the full vehicle performance benefit associated with this method. Regarding constant speed testing, it will be necessary for additional test data and protocol refinement to be undertaken prior to adoption by the agencies. Given the lack of available test data and the potential for different constant speed protocols between manufacturers, the agencies are not able to finalize a single constant speed protocol at this time.

Organization: Daimler Trucks North America

The Agencies' Preselected Frontal Areas Are Inappropriate, Unnecessary, And Inaccurate. The Agencies Should Omit The Use Of Predetermined Frontal Areas And Should Instead Use Actual Measured Cd*A. Moreover, With The Preselected Frontal Areas, The

Agencies Make It Extremely Difficult For Even The Most Aerodynamic Vehicles In Certain Categories To Comply With The Regulations. [EPA-HQ-OAR-2010-0162-1818.1, p.71]

On page 75 Fed. Reg. 74183, the Agencies seek comments regarding the frontal area of trucks, specifically whether the specified frontal areas are appropriate and whether the use of standard frontal areas may have unanticipated consequences. The preselected frontal areas are problematic and are unnecessary. [EPA-HQ-OAR-2010-0162-1818.1, p.71]

(The following paragraph contains general numbers because of confidentiality concerns. The paragraph is repeated using specific data in separately submitted confidential document.) At various points in the NPRM, the Agencies use preselected frontal areas, which lead to incorrect calculations of Cd's. For example, the 9.8 m2 for high roof sleepers is too low a frontal area. More appropriate for that bin is 10.2 to 10.4 m2. Better frontal areas for the various vehicles are shown below. The problem is that the preselected and incorrect values of A artificially drive up Cd values on paper, to the point that some aerodynamic vehicles fall into the “Classic” bin. So, for example, a high roof sleeper falling in the Advanced SmartWay bin with a Cd of 0.56 and with a real A of 10.4 m2, will have a Cd *A of 5.8 m2. (Re. 75 Fed. Reg. 74182.) But when we use that Cd *A of 5.8 m2 with the preselected A of 9.8 m2, we find that the “Cd” is 0.59, which puts the vehicle well into the next worse bin. With low roof vehicles, the anomalous frontal area makes all of our vehicles, including some of the most aerodynamic vehicles in the industry, appear to be “Conventional” or “Classic.” For example, our Cascadia vehicle – widely recognized as one of the most aerodynamic in the industry – has a real frontal area of 6.9 m2. Its Cd should easily be within the SmartWay (perhaps even the Advanced SmartWay bin), so for the present calculations we will use a Cd of 0.74, such that the real Cd *A is 5.1 m2. But if we measured via coast-down or any of the other test procedures a Cd *A of 5.1 m2 and we used the Agencies' selected A of 6.0 m2, our calculated Cd is 0.85, which puts the vehicle into the “Classic” bin. Clearly, there is a problem with a system that puts the most aerodynamic vehicles into the Classic bin. [EPA-HQ-OAR-2010-0162-1818.1, p.72]

A more appropriate idea than preselected frontal areas is to eliminate the preselected frontal areas altogether. The physics are such that Cd and A are always used together. Separating them is unnecessary and leads to anomalies. GEM should use Cd *A only, and manufacturers should submit Cd *A only, rather than measuring it but backing out only one element of it in a way that leads to errors.

[See p. 72 of this comment summary for a diagram showing sleeper and day cabs' configuration and frontal area]

Response:

The agencies are finalizing Cd x A to establish the aerodynamic bins for GEM input. However, it uses a default (i.e., predetermined) frontal area in this calculation that is based upon the tractor's classification. The agencies maintained the use of default frontal areas as a reasonable approach to ensuring some uniformity in determining aerodynamic performance that avoided complex and relatively uncertain procedures for measuring the projected frontal area specific to each tractor. The agencies believe it is reasonable to finalize today's rule using Cd x A for aerodynamic bin determination based upon category-specific default frontal areas.

In addition, the agencies have revised the default number for the frontal area and they are in agreement with the recommendations from the commenter. The agencies used a number of 9.8 square meters (105.5 square feet) in the proposal but, for the final rule, we are using a default frontal area of 10.4 square meters (111.9 square feet). Some manufacturers assume a frontal area of 10.66 square meters (114.75 square feet) with the dimensions of the typical box trailer (4.1m H x 2.6m W or 13.5 feet H x 8.5 feet W) defining the frontal area. However, we know that the box of the box trailer and the tractor do not extend all the way to the ground and that there is a gap at the front of the trailer defined by the height of the bumper and the space between the axle tires, with the rear axle having a smaller width. If you assume an axle space of 1.2 meters (~4 feet) and a nominal ground clearance at the front bumper of 0.4572 meters (1.5 feet), which may be high for most tractors currently in the fleet, this is a square area of approximately 0.56 square meters (7.38 square feet) and, subtracted from the assumed frontal area of 10.66 square meters, is 10.1 square meters, depending on the bumper height and space between the axle tires. Therefore, the revised default value of 10.4 square meters seems appropriate given the variability in tractor configurations.

Organization: Daimler Trucks North America

Whether Or Not The Agencies Switch From Requiring Cd To Cd *A, The Agencies Should Realign The Aerodynamic Bins, Because The Current Bin Definitions Classify Some Of The Most Aerodynamic Vehicles As "Classic." [EPA-HQ-OAR-2010-0162-1818.1, p.73]

Regulatory limits, such as the bin limits in the Agencies' proposed rule, need to be based upon actual data or sound calculations of feasibly achievable levels. They cannot be based on conjecture or extrapolation from a small number of vehicles, or else their use creates the risk of unachievable regulatory limits. Unfortunately, the Agencies' bin definitions in many bin categories are based upon insufficient data, such as extrapolation from measurements of two similar vehicles to estimates of how the whole averaging subcategory should be. (Re.: EMA / EPA meeting, January 18, 2011, Ann Arbor, Michigan.) We fear that this limited data could lead to an unrealistic stringency of the regulations in certain regulatory subclasses. As we discussed above, the categories are arranged in such a way that some of the Agencies' calculations are far off, making the most aerodynamic vehicles fall into the worst categories. We recommend that the Agencies undertake a thorough study to demonstrate what the bin categories should actually be. [EPA-HQ-OAR-2010-0162-1818.1, p.73]

Response:

As previously stated, the agencies based the proposed bins on data from published literature as well as in-house research programs. Several recent studies were reviewed by the agencies (e.g. TIAX, NAS). Based upon stakeholder feedback and data generated by the Agency as described in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary and RIA Chapter 3 “Test Procedures”, the agencies redefined the aerodynamic bins. Some of the sources cited by the commenter were considered by expert panels during the development of the more recent reports reviewed by the agencies in the development of the NPRM and today’s rule.

The agencies conducted research, with the cooperation of stakeholders, to further evaluate the aerodynamic performance (Cd and CdA) of Class 7 and Class 8 tractors affected by today’s rule. This test program, detailed in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary, conducted coastdown testing of vehicles from multiple OEMs in each category. As a result, the agencies changed the values and nomenclature in the bins but retained the basic progression and ranges (i.e., the widths) of the proposed bin structure. The agencies believe the widths are reasonable and provide some mitigation of potential variability (test-to-test, facility-to-facility, and method-to-method) associated with the allowed aerodynamic compliance methods. This is supported by the agencies’ comprehensive test program which conducted multiple tests, at multiple facilities, using multiple methods. Detailed results can be found in the report to the docket. Additionally, the use of an adjustment factor will address method to method variation as compared to the reference method. More details on the test program and the coastdown results are included in the Regulatory Impact Analysis (RIA) and docket for this final rule.

Organization: Daimler Trucks North America

Extrapolation should be allowed from one vehicle to another, as long as the vehicles’ Cd differs by no more than 2%. [EPA-HQ-OAR-2010-0162-1818.1, p.73]

One of the items not covered by the NPRM is: by how much can any given vehicle vary from a certified configuration? In other words, if an Agency were to selectively audit a vehicle, measuring its drag against the value claimed by the manufacturer, would there be a margin built in to the testing? We recommend yes, and that the program should work exactly as with SEAs for engines, meaning 2% compliance margin, 40% AQL, etc. Aerodynamic testing will involve imperfect testing, so the Agencies should recognize that results will not be perfectly repeatable. Additionally, manufacturers will have to make certain assumptions regarding when one vehicle configuration is similar enough to another that the second one need not be tested. In turn, allowing a compliance margin recognizes these inherent program imperfections. [EPA-HQ-OAR-2010-0162-1818.1, p.73]

The agencies propose to treat tractors with adjustable roof fairings, which allow the operator to change the fairing height to better match the type of trailer that is being pulled which can reduce fuel consumption and GHG emissions during operation, as low roof tractors and test with the fairing down. The Agencies request comments on this approach and data to support whether to allow additional credits for their use. (75 Fed. Reg. 74175) We agree with the Agencies that the reason a customer would buy a low roof vehicle with a roof fairing is to be able to use the fairing for improving aerodynamics yet to allow height-limited operation or low trailer height operation when necessary (including when the vehicle is sold to a second owner). In turn, there is a benefit to the adjustable roof height flexibility, both for the customers and for the Agencies. So, potentially penalizing low roof vehicles by arbitrarily assigning them to a particular regulatory sub-category, as the Agencies propose to do on page 75 Fed. Reg. 74175, seems counter to the Agencies' stated objectives. This approach limits flexibility in the market by imposing arbitrary requirements that could dis-incentivize use of vehicles with these fairings, which is contrary to the Agencies' statement on page 75 Fed. Reg. 74170 and elsewhere that they do not wish to restrict the market's ability to respond to fleet's needs. Instead of an arbitrary decision as to which category should include vehicles with the adjustable roof heights, we recommend the following: as part of the mid- and low-roof vehicle aerodynamic testing that the Agencies must do to properly configure bins (discussed elsewhere in these comments), the Agencies should evaluate whether it makes a difference to include the adjustable roof height vehicles in one category or another. In other words, the Agencies should make a decision based upon data. So, for example, if a given vehicle would fall in the "SmartWay" aerodynamics bin in either raised or lowered roof configurations, then there is no difference and the Agencies should not force the vehicles one way or the other. By contrast, if a given vehicle performs much worse in one configuration than the other, the Agencies should regulate the vehicles based on their worse performance (to be fair). But that decision should be data driven. [EPA-HQ-OAR-2010-0162-1818.1, pp.73-74]

Some real-world fuel saving measures, like downsizing an engine, may show up as fuel consumption increases by GEM. For example, when a customer moves from a M2-112 to a M2-106, the aerodynamics is marginally worse but the benefit in weight reduction almost certainly more than makes up for this. (The more blunt hood has a slightly higher Cd. But the M2-106 has smaller and lighter-weight engines.) Because the M2-106 and M2-112 both happen to fall in the middle of their aerodynamics bin, GEM happens to treat them identically. However, if they fell at the edge of a bin, that might not be the case. Moreover, if a future phase of the Agencies' program involves dissolution of the bins, then the Agencies will have to address vehicle changes that improve fuel efficiency through changes not credited by GEM but do so with worsened aerodynamics. [EPA-HQ-OAR-2010-0162-1818.1, p.74]

Response:

The agencies adopted changes to the test protocol inherent to improvement of the coastdown test data meant to provide a more robust data set with the intent to address consistency, repeatability, and reproducibility from a compliance test result perspective. Based on survey data and wind data collected during the agencies test program, the wind restriction allow for testing consistency with the above state goal, while not creating burdensome test requirements which excessively restrict the number of available test days. The coastdown test procedure discussed in this rulemaking was designed to address aerodynamic assessment and safety specific testing protocols are not germane to this action.

The agencies are allowing additional compliance margin for in-use testing. Manufacturers would be allowed a one bin margin (i.e., the results from the in-use test would need to fall into the bin above the certified bin to be compliant), as suggested by the commenter. However, we are not adopting a 40% AQL in this final rule that was also suggested by the commenter.

Regarding repeatability, the commenter should see review the aerodynamic assessment section in 3.2.2 of the RIA for this rulemaking. Our testing demonstrated that, although there was disagreement between aerodynamic assessment methodologies, each of the aerodynamic assessment methodologies are very repeatable on their own merits such that there is high confidence in the results from a single test using any of the aerodynamic assessment methodologies.

Organization: Engine Manufacturers and Truck Manufacturers Associations

The commercial vehicle industry has long understood the importance of aerodynamics as applied to line-haul trucks. At highway speeds, 50% or more of the road load is attributable to aerodynamic drag forces. As such, fuel efficiency, and therefore operating cost, are strongly related to and affected by aerodynamics. Even in an unregulated environment, the commercial vehicle industry consistently has improved the aerodynamics of its products in response to competitive pressures to address customers' needs to reduce operating costs. [EPA-HQ-OAR-2010-0162-1940.1, p.25]

Truck manufacturers have developed similar yet individual design methods and tools in order to meet customers' demands for more aerodynamic products. Within those aerodynamic design methods and tools are computational fluid dynamics (CFD) modeling, full-scale testing in a wind tunnel, scaled model wind tunnel testing, and on-road testing methods, such as constant-speed testing and fuel economy testing using recommended practices from the Society of Automotive Engineers and the Technology and Maintenance Council. Noticeably absent from this collective set of design methods and tools for aerodynamic development, however, is coast-down testing -- the method that the Agencies have proposed for aerodynamic evaluation. While coast-down testing may be an accepted test method for passenger cars, it produces highly variable results when applied to line-haul and other HD vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.25]

The Agencies should eliminate the coast-down testing provision of the proposed rule. Instead, EPA and NHTSA should undertake a program to establish a 'reference method' to correlate manufacturers' individual aerodynamic assessment methods. Manufacturers would be able to test vehicles using the 'reference method' and compare the results obtained to their own methods in order to establish a correlation factor. Once those correlation factors are known, manufacturers could continue using whatever aerodynamic assessment method best fits their product development processes. [EPA-HQ-OAR-2010-0162-1940.1, p.25]

Whatever 'reference method' ultimately is established, the Agencies will need to ensure that there is consistency between the methods that manufacturers use to test and certify their products, and the methods that the Agencies use to test those products for compliance with the

GHG/FE standards. In that regard, the Agencies should not push to establish the 'reference method' as their own 'gold standard' method or testing laboratory, but instead should work with the industry to establish fair and objective procedures for correlating (perhaps through a weighting metric) the results that may flow from manufacturers' differing methodologies. More importantly, any confirmatory and compliance testing by the Agencies must utilize the same method as that used by the manufacturer for certification. Otherwise, manufacturers would be subject to unacceptable costs and risks from differing certification and compliance test methods. [EPA-HQ-OAR-2010-0162-1940.1, p.25]

Irrespective of the particular method for determining the coefficient of aerodynamic drag ('Cd'), the Proposed GHG/FE Standards require that manufacturers assess the aerodynamics of each unique vehicle. Even if manufacturers are provided flexibility to minimize their compliance burdens, the requirement to assess the aerodynamics of each unique vehicle is still unreasonable. Manufacturers spend a great deal of engineering resources refining the aerodynamic performance of their high-roof tractors, because it is a prudent use of those limited resources. High-roof tractors are designed to be coupled with box van semitrailers, which have a consistent overall shape that corresponds to the maximum overall vehicle height (13' 6') and the maximum overall vehicle width (102'). The flow of air around the combination of a high-roof tractor and a box van semitrailer can be significantly improved by the aerodynamic design of the tractor, and that aerodynamic performance is predictable in actual use because the box van trailers are of relatively consistent size and shape. [EPA-HQ-OAR-2010-0162-1940.1, pp.25-26]

Moreover, high-roof tractors and box van semitrailer combination vehicles often are used for the highest mileage trucking applications. They are the ubiquitous line-haul combination vehicles that often operate on coast-to-coast routes. That is so because high-roof tractors offer the greatest opportunity to optimize the aerodynamics of the tractor/semitrailer combination, and because those combinations are utilized in the applications that operate the most miles -- and the most high-speed miles - which maximize the CO2 emissions reductions and fuel efficiency improvements derived from aerodynamic improvements. [EPA-HQ-OAR-2010-0162-1940.1, p.26]

The aerodynamic performance of low-roof and mid-roof tractors receives much less attention from manufacturers for several reasons. Low- and mid-roof tractors are coupled with trailers of different shapes and sizes that carry bulk commodities (e.g., grain, milk, gasoline) or flatbed trailers where the cargo (e.g., steel coils, pipes, off-road equipment) largely defines its aerodynamic shape. The air flow around a low- or mid-roof tractor is unpredictable because of the unpredictable trailer aerodynamics. Moreover, low- and mid-roof tractors are typically not used in high-speed long-haul operations where aerodynamic improvements generate the greatest fuel efficiency benefits. Instead, they typically are used for regional or urban/suburban delivery. Additionally, those tractors frequently transport and haul heavy bulk cargos that require maximum allowable weights, and therefore truck operators are incentivized to reduce the tare weight of the tractor to allow carrying the maximum cargo. (Doing so is a very effective method of maximizing fuel efficiency, i.e., carrying more cargo with the same vehicle.) Given the foregoing, customers of low- and mid-roof tractors place a low priority on aerodynamics, and in some cases specifically request omitting aerodynamic devices in order to reduce the weight of the tractor. [EPA-HQ-OAR-2010-0162-1940.1, p.26]

The Proposed GHG/FE Standards do not take into consideration the fundamental differences between the characteristics and benefits of aerodynamics for high-roof and lower-roof tractors. Instead, the proposed certification requirements will dictate that manufacturers measure of all tractors, which will shift limited resources, manpower and facilities from the highroof tractors, where there is a good return on the investment, to low- and mid-roof tractors, where there is not, that will require a very inefficient use of very limited resources. Not coincidentally, the Agencies provide insufficient data regarding the effectiveness of aerodynamics for low- and mid-roof tractors. Similarly, the National Academy of Sciences report does not address low- and mid-roof tractors and questions the effectiveness of aerodynamic improvements on the flatbed and tank trailers that they typically pull. (See NAS Report, p. 105.) Accordingly, the Agencies should either eliminate the application of aerodynamic standards to low- and mid-roof tractors, or at a minimum develop a much more simplified process for certifying the coefficient of aerodynamic drag of those tractors. [EPA-HQ-OAR-2010-0162-1940.1, p.26]

Additionally, the definition of 'standard trailers' proposed in §1037.50l(g) lacks specificity. In addition to the elements included in the proposed definition, many additional trailer dimensions (e.g., ride height, comer radii, and suspension location) and trailer features (e.g., sidewall construction, underbody components and construction, suspension configuration and door construction) are crucial to determining the aerodynamic drag of a tractor trailer combination vehicle. To level the playing field, manufacturers must all use the same 'standard trailers' to determine the Cd of their tractors, and thus the material parameters of those trailers must be assigned with appropriate specificity. Accordingly, the Associations recommend that the Agencies include in the final rule appropriate additional details to the proposed definition of 'standards trailers.' Also, the Agencies should specify trailer makes and models that meet the definitions in the final rule so that manufacturers can purchase a 'standard trailer' and/or obtain additional details from the trailer manufacturer. [EPA-HQ-OAR-2010-0162-1940.1, pp.26-27]

Response:

Regarding the comments on the use of coastdown, the agencies acknowledge that manufacturers use a combination of aerodynamic assessment tools, including wind tunnels, CFD, and full-scale truck testing, with coastdowns being less common. However, through research conducted by the agencies in coordination with stakeholders, the agencies modified the coastdown procedure and evaluated this procedure in the test programs that the coastdown test can be a reasonable method and correlated to other methods. the agencies' test program: (1) conducted research on coastdown, wind tunnel, and computational fluid dynamics (CFD) methods; and, (2) included refined requirements for the use of these three techniques in today's action. Coastdown methodologies and key factors to improving the coastdown precision was a focus of the testing. The research, detailed in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary, not only improved understanding of the uncertainties of each method but was specifically designed to identify key test elements that should be constrained to ensure precision, accuracy, and cross-method comparability. Further, commenters did not provide data to demonstrate that the uncertainty inherent to the comparing coastdown procedures (as constrained by the agencies' additional requirements) is significantly worse than the uncertainty in comparing results within other methods (e.g., a wind tunnel to another wind tunnel, a wind tunnel test to another test on a different day). The agencies maintain that coastdowns (as constrained by the agencies' additional requirements) provide a reasonable reference method that can be compared from test-to-test and form a basis for cross-method correlation. As a result, today's action includes refined requirements for conducting coastdowns as the reference method for purposes of generating aerodynamic inputs for the GEM.

The agencies acknowledge that each aerodynamic test method will have strengths and weaknesses that will address or introduce uncertainty, respectively, and stated us such in the proposal. Subsequent to the proposal the agencies: (1) conducting research on coastdown, wind tunnel, and computational fluid dynamics (CFD) methods; and, (2) included refined requirements for the use of these three techniques in today's action. The research, detailed in the memorandum to the docket not only improved understanding of the uncertainties of each method but was specifically designed to identify key test elements that should be constrained to ensure precision, accuracy, and cross-method comparability. As a result, today's action includes refined requirements for conducting coastdown, wind tunnel, and CFD aerodynamic evaluations for purposes of generating aerodynamic inputs for the GEM.

Today's action relies upon the coastdown test as a reference method for determining the aerodynamic performance of a tractor and its subsequent GEM aerodynamic input. This rulemaking also includes as compliance flexibility the allowance that a manufacturer may demonstrate that their preferred (non-coastdown) approach can meet the agencies' need for precision and accuracy. Based upon that demonstration, the manufacturer's preferred method could be allowed to demonstrate compliance through correlation factors. The preferred method and correlation factor development and approval is specific to that manufacturer's demonstration of that aerodynamic tool (i.e. a particular wind tunnel) using agreed upon testing procedures and parameters. The agencies expect that some manufacturers will choose to use wind tunnels and voluntarily submit demonstrations for review. The agencies believe that the use of a correlation factor to relate data produced by an alternate, manufacturer-preferred aerodynamic evaluation tool mitigates concerns over the accuracy of wind tunnel data. The use of a correlation factor (relative to the coastdown test results) in place of simply using the raw Cd or Cd*A data for aerodynamic bin determination also provides the potential for different test methods to be used by different manufacturers with less concern that the bin determination will be overwhelmingly dependent upon the test method selection.

We agree that high-roof tractors used in line-haul applications offer the greatest potential opportunity for realizing benefits from aerodynamic improvements due to their operational cycles (i.e., significant portions of drive time at steady, highway speeds). As a result, today's action maintains the mechanisms to incorporate aerodynamic assessment into the compliance tools (i.e., GEM) for Class 7 and 8 tractors. Furthermore, based upon comments received and additional information provided, the agencies are including in today's action additional flexibility for Class 7 and 8, low-roof cab and mid-roof compliance. This flexibility allows manufacturers to establish a GEM input aerodynamic bin for their high-roof model and assume the same aerodynamic bin would also apply to the low-roof and mid-roof versions of that model. This acknowledges that significant aspects of the aerodynamic efficiency (i.e., the general streamlining of the bumper, hood, windshield, and overall shape) will be consistent across the low-, mid-, and high-roof models. In addition, similar aerodynamic components (e.g., chassis fairings, side extending fairings, streamlined mirrors) are commonly offered for all the low-, mid-, and high-roof versions, should they be appropriate for the customer's needs. While there are some continuity in aerodynamic features across low-, mid-, and high-roof versions of a model, the aerodynamic performance is expected to differ due to the differences in projected frontal area. This is further influenced by the differences in standard trailer assumed for the low-, mid-, and high-roof versions. These expected differences are reflected in the differences in the default Cd*A assigned to the low-, mid-, and high-roof categories of the same aerodynamic bin level. In other words, allowing a manufacturer to use the same aerodynamic bin level will acknowledge similarity across versions (i.e., different roof heights) of the model while assigning different default Cd*A values for different roof configurations within a bin level recognizes expected differences in aerodynamic performance.

Regarding the comments on definition of standard trailers, the agencies recognized this in the NPRM for this final rule and proposed some basic characteristics of standard trailers (53 foot box van, tanker, and flatbed). In response to comments, the agencies conducted further research into the impacts of trailer characteristics on the system's (i.e., tractor trailer combination) aerodynamic performance. This includes additional coastdown testing as well as scale wind tunnel research. Tractor-trailer gap, trailer corner radius, and trailer size (48 foot and 53 foot long box trailers) were among factors evaluated during Agency test programs. Additional investigation into key aspects of flatbed performance (e.g., load weight, load shape, and geometry) and tankers was also conducted. As a result of commenter input and research, the agencies have included additional specificity in the definitions of the standard trailers to be used for compliance and test method validity.

Organization: Exa Corporation

We are pleased to see in the proposed ruling that computational fluid dynamics (CFD) is one of the proposed allowed methods for heavy vehicle aerodynamic assessment. We will comment on the set of minimum CFD requirements and also on the approval process for certified methods. The proposed ruling does however introduce challenges from the variations that we expect in the predicted drag coefficients from the three allowed methods: coast-down, wind tunnel, and simulation. It is not clear that the proposed aerodynamic bin method will alleviate these challenges, as we expect that absolute drag values will differ substantially between different test methods. The subsequent sections will detail the challenges that we foresee with each of the proposed test methods and offer suggestions for the final ruling. [EPA-HQ-OAR-2010-0162-1759.1, p.3]

Exa's experience is that coastdown testing has historically not been used by the heavy vehicle industry as an aerodynamic assessment tool and there is very limited experience with correlating results to other methods. Upon review of the SAE J2263 specification (1), our concern is that the resulting drag coefficients will vary primarily due to the wide range of ambient conditions permitted during the testing and the indirect method of deriving a drag coefficient via fitting measured vehicle deceleration to a road load model that has components for mechanical and aerodynamic resistance. SAE J2263 has certain assumptions listed in the appendix of the standard that must be considered when comparing the derived drag coefficient with that obtained from wind tunnel testing or simulation. These assumptions are listed out and commented on in Appendix 6.1 of this document. [EPA-HQ-OAR-2010-0162-1759.1, p.4]

While wind tunnels offer controlled environments for experimental testing, they also have challenges with predicting "real-world" truck aerodynamics. The presence of the wind tunnel walls, condition of the floor boundary layer system, mounting of the truck to the balance, and numerous other factors can all have an artificial impact on the resulting aerodynamics. Corrections need to be introduced that are different for each facility and this naturally introduces variability in predicted drag values. Exa has published several studies that compare simulation results with wind tunnel testing in order to both validate simulation accuracy and also to understand aerodynamic differences in results between wind tunnel test environments and virtual "open road" simulation environments. [EPA-HQ-OAR-2010-0162-1759.1, p.4]

A recent study conducted by Volvo Trucks North America and Exa Corporation involved comparing results on a detailed production Class 8 VNL tractor-trailer combination between simulation and wind tunnel testing at the National Research Council in Canada (2). A simulation test matrix was designed to match conditions from both full scale and half-scale wind tunnel testing and study various effects such as the blockage influence of the solid walls, the impact of a moving belt system, the impact of scale model geometric approximations, and the influence of using a 28 foot trailer versus the standard 53 foot trailer. The main conclusions from the study will be restated below. [EPA-HQ-OAR-2010-0162-1759.1, p.4]

Additional experimental and numerical simulations will be cited to summarize other wind tunnel test considerations including the errors introduced by running at reduced Reynolds numbers (common in 1/8th scale automotive type wind tunnels). [EPA-HQ-OAR-2010-0162-1759.1, p.4]

The blockage influence of the wind tunnel walls was studied by comparing simulations of the full scale VNL tractor with 28 foot trailer and the representative geometry of NRC's test section with those using an "open road" setup with negligible blockage from the boundaries of the computational domain. Using the projected frontal area of the VNL truck, the blockage ratio of the wind tunnel was approximately 13%, while the open road simulation was 0.1%. The simulation of the wind tunnel environment produced drag coefficients at several yaw angles that varied by at most 1.1% relative to the experimentally measured values (note, the comparisons were made to "uncorrected" force measurements, before any blockage corrections are made). [EPA-HQ-OAR-2010-0162-1759.1, p.4]

Moving to an open road environment with negligible blockage, the simulation results showed that the drag decreases by 37% at zero degrees yaw, while the standard blockage correction used by NRC results in a drag coefficient decrease of only 25% (Figure 7 in the SAE paper (2)). Analysis of the simulation flow results revealed different pressure distributions on the tractor and trailer between the tunnel and open road environment (Figure 9). As the flow is constricted in the space between the truck and the wind tunnel walls, velocities increase and local flow angles are different in the tunnel than the open road environment. These artificial effects mean that predicted drag differences between two tractor-trailer configurations could be different depending on the specific wind tunnel wall design that is being used as well as the blockage correction method being employed. The blockage influence will depend not only on the shape and proximity of the wind tunnel walls, but also on the specific shape characteristics of the tractor-trailer configuration being tested. Thus, there are several inherent difficulties with trying to correct wind tunnel force measurements to be representative of an open road environment. [EPA-HQ-OAR-2010-0162-1759.1, pp.4-5]

The moving belt and rotating wheel influence was studied both experimentally and with simulation, using the half scale VNL model. The moving belt dimensions were not large enough to accommodate the half-scale tractor-trailer combination with 14 foot trailer, thus the moving belt only included the tractor steer and drive tires, and stopped at approximately 60% of the tractor-trailer length, leaving the trailer bogie positioned above the static wind tunnel floor. Experimental results showed that the total drag increases by approximately 5 percent when the wheels are rotated and moving belt system turned on, while simulation predicted an increase in drag of approximately 2 percent. Differences can likely be attributed to differences in the experimental and simulation tire geometry and the surface roughness of the moving belt system. Absolute drag values for all of the simulation points were within 2 percent of the experimental measurements. A larger moving belt system covering the full tractor-trailer would likely result in an even larger increase in drag for the moving belt and rotating tire setup, as the drag increase comes primarily from increasing the stagnation pressure at the contact point of the tire with the road surface. [EPA-HQ-OAR-2010-0162-1759.1, p.5]

Two configurations were tested at half-scale using simulation. The first was the half-scale VNL model geometry tested at NRC while the second was the production VNL model (a fully detailed CAD model) scaled by 50 percent. There were several notable differences between the half-scale model built for testing at NRC and the scaled down production model (tested with simulation only). The half-scale test model uses a simplified representation of the under-hood detail, including the cooling package heat exchangers, the engine, the seals to the hood, the cooling fan, piping, and other detailed parts. The side fairing, wheels, fuel tanks, and exhaust system also differed to varying degrees. The results of the study indicated that the test model showed increased drag by 2 to 3 % over the fully detailed model. The most significant differences in the drag increase were found in the under-hood and underbody region of the tractor. [EPA-HQ-OAR-2010-0162-1759.1, p.5]

Other studies conducted by Exa have shown similar or greater differences in drag coefficients when geometric details are omitted from scale test models due to prohibitive cost or manufacturing difficulty. In practice, it is very difficult to build a scale model that has the proportionally correct under-hood resistance as the full-scale, detailed truck. Additional simplifications in test models can also influence the predicted aerodynamic performance, such as the exclusion of the engine intake airflow, the impact of the exhaust tailpipe flow, or the absence of rotating fan geometry. These influences are typically accounted for with virtual simulation environments through the use of boundary conditions and advanced fan models. [EPA-HQ-OAR-2010-0162-1759.1, p.5]

The wind tunnel testing at NRC used a 28 foot and 14 foot trailer for the full scale and half-scale VNL testing respectively, as a longer trailer could not be accommodated by the length of the NRC test section. In order to study the influence of using a standard 53 foot box trailer, simulations were performed at yaw angles of 0, 2.5, and 5 degrees. The simulation results showed that the 53 foot trailer results in a drag increase of 10 percent over the 28 foot trailer at zero degrees yaw. The drag increase between 0 and 5 degrees yaw is also notably different than the 28 foot trailer results. The blockage corrected wind tunnel testing on the 28 foot trailer showed an increase of 16 percent, while the open road, 53 foot trailer simulation, resulted in an increase of 22 percent. These results confirm that a reduced trailer length produces significantly different drag coefficients and yaw performance. [EPA-HQ-OAR-2010-0162-1759.1, p.6]

Our experience is that tractors and trailers must be considered as an integrated system when assessing aerodynamics. For example, a predicted change in drag between 2 tractors using a standard 28 foot trailer, will be different if a 53 foot trailer is instead used. We have also seen that drag improvements on the tractor due to improved streamlining, can be negated by drag increases at the rear of the trailer. For the final fuel efficiency and GHG regulations, it is therefore important that the standard trailer types (Box, flatbed, and tanker) be defined in such a way that they include sufficient detail to be representative of the most common realistic configurations. Detailed, 3-dimensional CAD files would be the preferred format for defining the standard trailer types. [EPA-HQ-OAR-2010-0162-1759.1, p.6]

Wind tunnel testing using scale tractor-trailer models often requires running at reduced Reynolds number flow conditions due to either wind tunnel fan power limitations, or avoidance of compressibility effects at high velocities. While it is widely accepted among heavy vehicle aerodynamicists that drag coefficients can vary significantly with Reynolds numbers below 1 million (based on truck width), we believe that the variation is also worth consideration between 1 million and full-scale, open road Reynolds number (typically 4 million or greater at highway speeds). We believe that running at reduced Reynolds numbers introduces measurable errors in the prediction of both absolute drag values and the changes in drag between different style tractor-trailers. [EPA-HQ-OAR-2010-0162-1759.1, p.6]

Experimental testing by NASA on the GCM tractor-trailer model in the 12 foot pressurized NASA Ames wind tunnel highlighted a drag increase of up to 2% at a reduced Reynolds number of 1 million (3 p. 26). The test results also highlighted that the drag coefficient dependence on Reynolds number was also a function of the actual tractor-trailer design (side extender configuration) and the specific yaw angle being tested. [EPA-HQ-OAR-2010-0162-1759.1, p.6]

Other experimental studies are only possible in a select number of wind tunnels that can run at high Reynolds numbers. Very few wind tunnels exist that can accommodate a full-scale tractor-trailer with a 53 foot trailer and also adhere to the SAE J1252 maximum blockage ratio of 5%. It should be noted that is not possible to run at the proposed minimum scale model test ratio of 1/8 and test at a full-scale Reynold numbers by running at 8 times the air velocity, as this exceeds the maximum test velocity of 92 meters per second that “should not be exceeded in order to avoid compressibility effects” as specified in SAE J1252. Other types of specialized test facilities can test Reynolds numbers dependence at small scale by altering fluid density or viscosity, such as pressurized tunnels, cryogenic wind tunnels, or water towing tanks, however, these tend to increase testing costs and introduce additional complexities. [EPA-HQ-OAR-2010-0162-1759.1, p.6]

Computational simulations are not restricted by physical wind tunnel constraints such as size or maximum velocity, and can therefore run at a Reynolds number that directly matches full-scale, highway speed flow conditions. [EPA-HQ-OAR-2010-0162-1759.1, p.6]

Computational fluid dynamics (CFD) simulations offer many advantages over coastdown and wind tunnel testing that are particularly suitable for the regulatory aerodynamic testing proposed by the EPA and NHTSA. Exa’s specific CFD software, PowerFLOW, provides a very accurate prediction of the drag coefficient in a controlled, open road environment at a reduced cost and reduced time frame. The simulation process can also be automated and highly standardized. Exa’s customers regularly validate the accuracy of PowerFLOW drag predictions by comparing to wind tunnel measurements. By employing a standard set of best practices (provided by Exa’s Aerodynamic Application Management group), PowerFLOW is able to achieve excellent correlation to tunnel measurements across a range of wind tunnel facility types and vehicle shapes. References are provided for a cross section of published studies that highlight comparisons to wind tunnel measurements and the usefulness of PowerFLOW in the design process (4) (5) (6) (7) (8) (9) (10) (11) (12) (2) (13) (14) (15). [EPA-HQ-OAR-2010-0162-1759.1, p.7; See pp.7-8 of this comment summary for additional comments pertaining to Computational Fluid Dynamics]

[See pp.8-13 of this comment summary for comments pertaining to Section V.D(3)(d): Coastdown procedure requirements, Wind tunnel procedure requirements, CFD Requirements, General CFD Guidelines for Simulating Open Road Environment, and General CFD Guidelines for Simulating Wind Tunnel Environments]

Response:

We appreciate the comments and have reviewed the accompanying materials submitted by the commenter. Despite the excellent comments and materials, we are continuing to allow wind tunnels, full or reduced scale, to be used as an alternative aerodynamic method. The agencies are finalizing provisions that would require correlation of alternative aerodynamic methods to the modified SAE J1263 coastdown reference method. Using this correlation, manufacturers would develop and use a generic correction factor to relate any results from their alternative aerodynamic method to a modified SAE J1263 coastdown reference method result.

Therefore, an alternative aerodynamic method only needs to be precise, with an acceptable delta between the alternative and refence method results, to be acceptable. As demonstrated in our test program, the full scale wind tunnel had a standard deviation of 0.001 (n=9) at zero yaw with corrected values. Thus, a manufacturer would be able to conduct a full scale wind tunnel test, a coastdown test and develop a reliable correction factor. The opportunity to demonstrate this type of precision is available for any of the alternative aerodynamic and, thus, they are all available for use if this type of precision is demonstrated.

Organization: National Automobile Dealers Association (NADA)

There is some suggestion that by MY 2017, some OEMs will no longer be able to make available certain commonly sought after tractor configurations, either because they will be too unaerodynamic or because they will not compete well in their category. On a related note, concerns have been raised regarding whether the proposal's assumptions on the potential aerodynamic efficiency of future tractors are biased toward the towing of box trailers. If so, adjustments should be made to better reflect the degree to which prospective purchasers will be using combination tractors to primarily or significantly to tow tankers, flat beds, and other nonbox trailers. EPA and NHTSA must take these concerns seriously since, as mentioned above, any significant reduction in customer choice or increased cost associated with unnecessary vehicle changes will cause commercial customers to avoid the new tractor marketplace to the detriment of OEMs, suppliers, dealerships, their employees, and the rule's public policy goals. [EPA-HQ-OAR-2010-0162-2705, p.7]

Response:

The agencies agree with the commenter that the current heavy-duty tractor fleet contains a range of tractors for different uses. It is with that in mind that the agencies created a program structure that has standards for both vocational and tractor applications. Additionally, the range of bins available to the industry will allow manufacturers to transition their fleet to meet improved fuel consumption and greenhouse gas emissions targets. The bin structure identified for certification allows for the market to adapt to the new regulatory provisions without introducing a burden that would change current market dynamics. While the industry will have to make improvements and the product mix in the fleet is likely to change, the agencies have included flexibility provisions including both the bin structure itself, as well as averaging, banking, and trading to facilitate a transition to the cleaner standards.

Organization: Navistar, Inc.

EPA proposes using coast-down testing to establish aerodynamic drag coefficient. Navistar has established through internal testing that coast-down testing is not a reliable method for determining the aerodynamic coefficient of drag. Coast down testing, even conducted in accordance with reasonable procedures and care, does not provide repeatable results within the ranges of concern in the regulation and GEM. Coast down testing does not take into account actual in-use wind conditions that can dramatically change aerodynamic loads. [EPA-HQ-OAR-2010-0162-1871.1, p.42]

In order to accurately assess aerodynamic coefficient of drag, a composite methodology is required. In general, a wind tunnel test or simulation allows assessing wind-averaged drag while an on-road test allows assessing effects of a moving road and undercarriage aerodynamic treatments. EPA also must insert a provision allowing manufacturers to carry through subsequent model years as long as the vehicle profile remains the same. [EPA-HQ-OAR-2010-0162-1871.1, pp.42-43]

Moreover, EPA must require the use of standardized trailers for these tests. Trailer aerodynamics have a very substantial impact on overall vehicle aerodynamics and can result in significant swings in results even within standard applications. As a result, EPA must require:

- high roof = van – specific van manufacturer or model or equivalent

- mid roof = specific tanker – manufacturer and model or equivalent

- low roof = specific flatbed, cargo, and tiedown – manufacturer and model or equivalent, cargo by dimensions, tiedowns by manufacturer, model, and tiedown configuration. [EPA-HQ-OAR-2010-0162-1871.1, p.43]

Response:

Regarding the comments on the use of coastdown, the agencies acknowledge that manufacturers use a combination of aerodynamic assessment tools, including wind tunnels, CFD, and full-scale truck testing, with coastdowns being less common. However, through research conducted by the agencies, coastdowns have shown to be a reasonable method that can be correlated to other methods. Further, commenters did not provide data to demonstrate that the uncertainty inherent to the comparing coastdown procedures (as constrained by the agencies' additional requirements) is significantly worse than the uncertainty in comparing results within other methods (e.g., a wind tunnel to another wind tunnel, a wind tunnel test to another test on a different day). The agencies maintain that coastdowns (as constrained by the agencies' additional requirements) provide a reasonable reference method that can be compared from test-to-test and form a basis for cross-method correlation.

Regarding the comments on trailer specifications, the agencies recognized this in the NPRM and proposed some basic characteristics of standard trailers (53 foot box van, tanker, and flatbed). In response to comment that "more specificity is needed in the trailer definition, the agencies conducted further research into the impacts of trailer characteristics on the system's (i.e., tractor trailer combination) aerodynamic performance. This includes additional coastdown testing as well as scale windtunnel research. Tractor-trailer gap, trailer corner radius, and trailer size (48 foot and 53 foot long box trailers) were among factors evaluated during Agency test programs. Additional investigation into key aspects of flatbed performance (e.g., load weight, load shape, and geometry) and tankers was also conducted. As a result of commenter input and research, the agencies have included additional specificity in the definitions of the standard trailers to be used for compliance and test method validity.

Organization: Nose Cone Manufacturing Company

A comprehensive design based specification in accordance to the SmartWay certification process is the best approach although the farthest reaching in terms of cost to implement. The success of the SmartWay program is a result of over 9 years of coordination, evaluation and untold investments by the American taxpayers, free-market enterprises, and non-profit organizations and only one tractor-trailer combination was targeted. This exercise proved highly productive in stimulating fleets to voluntarily implement fuel saving solutions but it fell short in the scope of application to other tractor trailer combinations that did not meet the criteria of the certification process. The targeted equipment type for the SmartWay program was the line-haul tractor/trailer with fully aerodynamic tractor set as the baseline. This specification excluded other combinations and although the line haul combination is the most prevalent in terms of volume, other combinations have significant potential for increasing efficiency and in some cases to a higher degree than the line-haul combination. If a design-based approach were to be adopted it will require the indefinite continuation of the EPA/SmartWay Transport program. We believe this is the best approach for objective evaluation and certification of technologies. However, it does not solve the lack of a generally agreed upon testing method with regard to aerodynamic technologies. [EPA-HQ-OAR-2010-0162-1943.1, p.2]

The modeling approach also requires an agreed upon testing method to derive the drag coefficient data for input into modeling programs. The drag coefficient is the elusive piece of data that must only come from wind-tunnel analysis. Even with wind tunnel analysis the question of the reliability of "wind-averaged drag coefficient" looms and leaves consumers to establish whether the recommended technology is suited to their geographic operating range with regard to the prevalent wind condition within the operator's region. It is debatable whether the "wind-averaged drag coefficient" provides appropriate decision making data or whether a minimum of two drag coefficients, one under no wind and the other at 10 degree crosswind is a more comprehensive approach with a higher level of accuracy and so better comparisons between designs can be made. However, the onus of conducting wind tunnel analysis of all the conceivable tractor trailer combination types bears a tremendous cost potential and is likely the biggest obstacle to full implementation of a modeling approach. [EPA-HQ-OAR-2010-0162-1943.1, pp.2-3]

Testing of aerodynamic devices cannot be done using dynamometers. The aerodynamic device must first be evaluated to establish a drag coefficient then that data is entered into the dynamometer. The drag coefficient (cd) data entered into dynamometers is at present the wind-averaged cd. Again, we argue strongly against the accuracy of a wind-averaged cd and strongly encourage the EPA and NHTSA to take careful consideration to establish if it accurately reflects the performance that a consumer can expect from an aerodynamic device. Furthermore, on-road testing also does not provide drag coefficient data, but only limited performance data. The performance data is limited as a result of the specification of ambient conditions which are nearly impossible to duplicate between runs in the presence of wind. Testing under conditions without wind derives unrealistic data as such ideal operating conditions are rarely replicated in real-world operating conditions. [EPA-HQ-OAR-2010-0162-1943.1, p.3]

Our preference in establishing the effectiveness of an aerodynamic design is to first conduct wind-tunnel analysis. In our experience, the crosswind performance of an aerodynamic device is paramount to the overall performance with regard to efficiency and safety as experienced by the consumer. If one drag coefficient factor is necessary to utilize modeling and simulation technologies it should be the performance of the design under a minimum of a 10 degree yaw angle wind exclusively. [EPA-HQ-OAR-2010-0162-1943.1, p.3]

In conclusion, we commend the EPA and NHTSA for preparing a regulatory proposal that considers the diversity of the truck equipment industry. We hope that our comments above will be taken with full consideration of our vast knowledge and experience in the field of trailer and truck body aerodynamic technology design and development. Our main point we hope to convey is for EPA/NHTSA to establish a single drag coefficient factor that is of a single test condition of 10 degree crosswind that is derived by wind-tunnel analysis. This will be the fairest approach for consumers and aerodynamic device developers alike. [EPA-HQ-OAR-2010-0162-1943.1, p.4]

Response:

The agencies acknowledged in the proposal that each aerodynamic test method will have strengths and weaknesses that will address or introduce uncertainty, respectively. The agencies responded by: (1) conducting research on coastdown, wind tunnel, and computational fluid dynamics (CFD) methods; and, (2) including refined requirements for the use of the aerodynamic methods and techniques in this rulemaking. The research, detailed in the memorandum to the docket, not only improved understanding of the uncertainties of each method but was specifically designed to identify key test elements that should be constrained to ensure precision, accuracy, and cross-method comparability. As a result, today's action includes refined requirements for conducting coastdown, wind tunnel, and CFD aerodynamic evaluations for purposes of generating aerodynamic inputs for the GEM.

Today's action relies upon the coastdown test as a reference method for determining the aerodynamic performance of a tractor and its subsequent GEM aerodynamic input. This rulemaking also includes as compliance flexibility that allows a manufacturer to demonstrate that their preferred (non-coastdown) approach can meet the agencies' need for precision and accuracy to the extent that it should be allowed for rule compliance through correlation factors. The preferred method and correlation factor development and approval is specific to that manufacturer's demonstration of that aerodynamic tool (i.e. a particular wind tunnel) using agreed upon testing procedures and parameters. The agencies expect that some manufacturers will choose to use wind tunnels and voluntarily submit demonstrations for review. The agencies believe that the use of a correlation factor to relate data produced by an alternate, manufacturer-preferred aerodynamic evaluation tool mitigates concerns over the accuracy of wind tunnel data. The use of a correlation factor (relative to the coastdown test results) in place of simply using the raw Cd or Cd*A data for aerodynamic bin determination also provides the potential for different test methods to be used by different manufacturers with less concern that the bin determination will be overwhelmingly dependent upon the test method selection.

Regarding the wind-average yaw drag, the agencies acknowledge that there are some advantages to using wind-average yaw drag determinations in tractor design, today's action maintains reliance on the zero-yaw aerodynamic drag assessment when determining the aerodynamic input bins for GEM. The agencies believe that the zero-yaw drag is a reasonable representation of the general aerodynamic efficiency of the tractor. In addition, a wider range of assessment tools are available to determine the zero-yaw drag. Further, there was no alternative, wind-average method was clearly supported by commenters. Some manufacturers stated that they optimize design based upon an assumed design yaw angle. Others used a wind-average yaw method based upon an assumed profile for representative winds in the United States. In light of this lack of consensus, reliance upon the zero yaw assessments is a reasonable approach for the reference methods.

Even though today's action uses zero-yaw drag for compliance and as a reference method, the agencies recognize the value of considering aerodynamic evaluation at yaw by including a mechanism that provides incentive for good yaw performance. Consequently, we have included provisions that allow manufacturers to benefit from performing a yaw sweep by using this information to potentially improve their GHG emissions score as described in 40 CFR §1037.521(f).

Organization: Sinhatech

Finally, for reliably certifying reduction in the aerodynamic drag coefficient Cd, we have developed a system of pressure sensors which can be conveniently attached to a vehicle under commercial use. The sensors remotely transfer data. Therefore they can be used on a select number of vehicles in a fleet to obtain a real-life representative Cd. The system can be calibrated on vehicle configurations tested in full-scale wind tunnel. We would like to offer this capability to NHTSA and EPA. [EPA-HQ-OAR-2010-0162-1606.1, p.4]

<u>Response:</u>

We would like to thank the commenter for submitting this information. We did not evaluate this technology during our test programs so we cannot speak to the validity of the comments nor recommend its use during our official testing since we have not quantified its impacts on the coastdown results. This technology may better serve to assess the differences between aerodynamic methods and assist manufacturers seeking to correlate coastdown testing to their alternative aerodynamic method. Therefore, the commenter should consider contacting manufacturers and researchers in the industry to gauge their interest.

Organization: Union of Concerned Scientists (UCS)

If the agencies proceed with allowing different test methods to measure aerodynamic drag as proposed, results must be comparable across methods and between test facilities to ensure that test results are repeatable and verifiable, and vehicle performance is comparable across all vehicles. Doing so will ensure that manufacturers are operating on a level playing field and allow proper evaluation of the program's effectiveness. [EPA-HQ-OAR-2010-0162-1764.1, p.8]

Response:

The agencies agree with the commenter and, as detailed in Chapter 3, "Test Procedures", of the RIA for this rulemaking, pursued a program that gathered test data from a single model of a class 8 high-roof, aero, sleeper cab. The results showed that the variability is acceptable for each aerodynamic method and compares favorably across all the aerodynamic methods considered in this rulemaking. In a addition, we are requiring that the coastdown procedure based on modifications to SAE J1263 be used as the reference method and that all other methods be correlated to the reference method prior to use. Therefore, this will require the manufacturers to demonstrate that results are comparable across aerodynamic methods. We believe this will address the concern of level playing field regardless of the aerodynamic method a manufacturer uses.

Organization: Volvo Group

The commercial vehicle industry has long understood the importance of aerodynamics as applied to line-haul trucks. At highway speeds, 50% or more of the road load is attributable to aerodynamic drag forces. As such, fuel efficiency, and therefore operating cost, is strongly related to and affected by aerodynamics. Even in an unregulated environment, the commercial vehicle industry has consistently improved the aerodynamics of its products in response to competitive pressures to address customers' needs to reduce operating costs. [EPA-HQ-OAR-2010-0162-1812.2, p.31]

Truck manufacturers have developed similar yet individual suites of design methods and tools in order to meet customers' demands for more aerodynamic products. Within the suites of aerodynamic design methods and tools are computational fluid dynamics (CFD), scale model testing in a wind tunnel, and onroad testing methods, such as constant-speed testing and fuel economy testing using recommended practices from the Society of Automotive Engineers and the Technology and Maintenance Council. Noticeably absent from this collective suite of design methods and tools for aerodynamic development, however, is coast-down testing -- the method that the Agencies have proposed for aerodynamic evaluation. While coast-down testing is an accepted test method for passenger cars, it produces highly variable results when applied to line-haul and other HD vehicles. [EPA-HQ-OAR-2010-0162-1812.2, p.31]

Volvo Group has been highly engaged with EPA to help improve the aerodynamic assessment methods deployed in this regulation and expect to continue to do so. We recommend that EPA and NHTSA undertake a program to establish a “reference method” to correlate manufacturers’ individual aerodynamic assessment methods. Manufacturers would be able to test vehicles using the “reference method” and compare the results to results from their own methods to establish a correlation factor. Once those correlation factors are known, manufacturers could continue using whatever aerodynamic assessment method fits best with their product development processes, while always able to accurately compare their results with the standards in the GHG standards. [EPA-HQ-OAR-2010-0162-1812.2, p.31]

Whatever “reference method” ultimately is established, the Agencies must ensure that there is consistency between the methods that manufacturers use to test and certify their products, and the methods that the Agencies use to test those products for compliance with the GHG/FE standards. In that regard, the Agencies should not push to establish the “reference method” as their own “gold standard” method or testing laboratory, but instead should work with the industry to establish fair and objective procedures for correlating (perhaps through a weighting metric) the results that may flow from manufacturers’ differing methodologies, with the results obtained through compliance testing when and if conducted by the Agencies. Otherwise, manufacturers would be subject to the unacceptable risks posed by differing certification and compliance test methods. [EPA-HQ-OAR-2010-0162-1812.2, p.31]

Irrespective of the particular method of determining the coefficient of aerodynamic drag (“Cd”), the Proposed GHG/FE Standards require that the manufacturer assess the aerodynamics of each unique vehicle. Even if a “reference method” is established so that manufacturers have the greatest flexibility to minimize their compliance burden, this requirement may still represent an unreasonable burden. Manufacturers typically spend a great deal of engineering resources refining the aerodynamic performance of their high-roof tractors, because it is a wise use of those limited resources. High-roof tractors are designed to be coupled with box van semitrailers, which have a consistent overall shape that corresponds to the maximum overall vehicle height (13’ 6”) and the maximum overall vehicle width (102”). The flow of air around a combination of a high-roof tractor and a box van semitrailer can be significantly improved by the aerodynamic design of the tractor, and that aerodynamic performance is predictable in actual use because the box van trailers are of relatively consistent size and shape. [EPA-HQ-OAR-2010-0162-1812.2, pp.31-32]

Moreover, a high-roof tractor and box van semitrailer combination vehicle is often used for the highest mileage trucking applications. They are the ubiquitous line-haul combination vehicles that often operate on coast-to-coast routes. Because high-roof tractors are utilized in the applications that operate the most high-speed miles and they offer the greatest opportunity to truly optimize the aerodynamics of the tractor/semitrailer combinations, they maximize the CO2 emissions reductions and fuel efficiency improvements derived from aerodynamic improvements. [EPA-HQ-OAR-2010-0162-1812.2, p.32]

The aerodynamic performance of low-roof and mid-roof tractors receives much less attention from manufacturers for several reasons. Low- and mid-roof tractors are coupled with trailers of different shapes and sizes that carry bulk commodities (e.g., grain, milk, gasoline) or flatbed trailers where the cargo (e.g., steel coils, pipes, off-road equipment) largely defines its aerodynamic shape. The flow air around a low- or mid-roof tractor is unpredictable because of the unpredictable trailer aerodynamics. Moreover, low- and mid-roof tractors are typically not used in high-speed long-haul operations where aerodynamic improvements generate the greatest fuel efficiency benefits. Instead, they typically are used for regional or urban/suburban delivery. Additionally, those tractors frequently transport bulk and haul heavy cargo that reaches maximum allowable weights, and therefore truck operators are incentivized to reduce the tare weight of the tractor to allow carrying more cargo. (Doing so is a very effective method of maximizing freight efficiency, i.e., carrying more cargo with the same vehicle.) Considering the foregoing, customers of low- and mid-roof tractors place a low priority on aerodynamics, and in some cases specifically request omitting aerodynamic devices in order to reduce the weight of the tractor and because no benefit has been demonstrated in their operations. [EPA-HQ-OAR-2010-0162-1812.2, p.32]

The Proposed GHG/FE Standards do not take into consideration the fundamental differences between the characteristics and benefits of aerodynamics for high-roof and lower-roof tractors. The proposed certification requirements mean that manufacturers must measure all tractors, which will shift limited aerodynamics experts and facilities from the high-roof tractors where there is a good return on the investment, to low- and mid-roof tractors, an inefficient use of limited resources. Furthermore, since the existing aerodynamic devices have unknown and unproven impact in these applications, there is no way to know what aerodynamic targets are achievable using existing technologies. Accordingly, Volvo Group recommends that the Agencies develop a simplified process for certifying the coefficient of aerodynamic drag of low-roof and mid-roof tractors, with targets that are demonstrated to be achievable using available technologies. [EPA-HQ-OAR-2010-0162-1812.2, p.32]

Volvo Group does not agree with defined frontal area the Agencies propose to use to assess coefficient aerodynamic drag (Cd). Actual measured frontal areas should be used as this directly affects the calculated Cd value. Calculating the Cd using the measured frontal area results in an approximate 10% decrease in Cd value compared to using the defined frontal area. In addition, a low roof tractor with a standard trailer will have a much larger frontal area than the tractor alone. It does not follow that a defined frontal area normalizes results across manufacturers. The defined frontal area has no relevance to any measured value and serves no purpose here. [EPA-HQ-OAR-2010-0162-1812.2, p.32]

<u>Response:</u>

The agencies agree with the commenter regarding the establishment of a reference method, allowance for use of other aerodynamic methods and establishing a "weighting factor" for comparison between methods. Accordingly, we are finalizing provisions that designate the coastdown test procedure as the reference method. The coastdown procedure we are referencing is based on modifications to the J1263 procedure that should help to reduce the variability that is possible with any test but more specifically with the coastdown test were environmental conditions are not controllable. We are also allowing manufacturers to use alternative aerodynamic methods such as full-scale and reduced-scale wind tunnels, and CFD software to estimate the coefficient of drag for a tractor model. Consequently, we also have developed a correction factor, which would be equivalent to the commenter's "weighting factor." This factor is determined by comparing the Cd results from the coastdown and any alternative aerodynamic method the manufacturer chooses to use, with prior Agency approval, and can be applied by the manufacturer to all subsequent Cd results generated using the alternative aerodynamic method.

Regarding the emphasis on low- and mid-roof tractors and associated test burden, the agencies understand that these tractors are typically derived from high-roof tractors. In this case, we are finalizing a simplified approach that allows assignment of the GHG emissions score for low- and mid-roof tractors based on the bin for the high-roof tractor that it is derived from. However, if the low- or mid-roof tractor is not derived from a high-roof tractor, then the low- or mid-roof would have to be evaluated and, thus, the emphasis on aerodynamics is appropriately balanced. Also in response to the comment, the final rule refines the approach to aerodynamic bins used for the low-roof and mid-roof models to only use two bins. By moving to a two-bin structure for low-roof and mid-roof models, today's action acknowledges the difference in aerodynamic development and performance that exists between high-roof models and the low-roof / mid-roof models. Further, the agencies believe that this simplified approach to binning the aerodynamic performance for low-roof and mid-roof tractors acknowledges the greater variety of trailer configurations that are paired with the low-roof and mid-roof models relative to high-roof tractors.

Regarding the comments on frontal area, the agencies finalizing Cd x A to establish the aerodynamic bins for GEM input. However, it uses a default (i.e., predetermined) frontal area in this calculation that is based upon the tractor's classification. The agencies maintained the use of default frontal areas as a reasonable approach to ensuring some uniformity in determining aerodynamic performance that avoided complex and relatively uncertain procedures for measuring the projected frontal area specific to each tractor. The agencies believe it is reasonable to finalize today's rule using Cd x A for aerodynamic bin determination based upon category-specific default frontal areas.

In addition, the agencies have revised the default number for the frontal area. The agencies used a number of 9.8 square meters (105.5 square feet) in the proposal. For the final rule, we are using a default frontal area of 10.4 square meters (111.9 square feet). Some manufacturers assume a frontal area of 10.66 square meters (114.75 square feet) with the dimensions of the typical box trailer (4.1m H x 2.6m W or 13.5 feet H x 8.5 feet W) defining the frontal area. However, we know that the box of the box trailer and the tractor do not extend all the way to the ground and that there is a gap at the front of the trailer defined by the height of the bumper and the space between the axle tires, with the rear axle having a smaller width. If you assume an axle space of 1.2 meters (~4 feet) and a nominal ground clearance at the front bumper of 0.4572 meters (1.5 feet), which may be high for most tractors currently in the fleet, this is a square area of approximately 0.56 square meters (7.38 square feet) and, subtracted from the assumed frontal area of 10.66 square meters, is 10.1 square meters, depending on the bumper height and space between the axle tires. Therefore, the revised default value of 10.4 square meters seems appropriate given the variability in tractor configurations.

Organization: International Council on Clean Transportation (ICCT)

Model inputs for Cd and Crr are not easily measured as specified Model inputs of the coefficient of aerodynamic drag (Cd) and rolling resistance (Crr) are difficult to measure with any degree of accuracy or precision and can be costly as well. Using only these two inputs will decrease the accuracy of the GEM outputs and limit the agencies' ability to make reliable comparisons between drag-reducing technologies. [EPA-HQ-OAR-2010-0162-1945.1, pp.17-18]

The three measurement methods of aerodynamic drag – coastdown testing, computational fluid dynamics (CFD), and wind tunnel testing – will most likely produce different results for Cd. The variability can potentially be quite high between test methods. [EPA-HQ-OAR-2010-0162-1945.1, p.18]

Coastdown testing: The coefficient of aerodynamic drag cannot be determined accurately or consistently between vehicles from coastdown data alone. Coastdowns test the drag of all rotating driveline parts in addition to the aerodynamic drag. This is very good for representing real-world vehicle behavior, though separating drag into Cd and Crr is not straightforward. [EPA-HQ-OAR-2010-0162-1945.1, p.18]

CFD: This test method may not produce reliable Cd results due to variation between the different software systems. For proper consistency, the agencies would have to contract a neutral third party to do all CFD modeling in the same software package. [EPA-HQ-OAR-2010-0162-1945.1, p.18]

Wind tunnels: There are limited wind tunnel testing facilities, and they are costly. This alone makes them undesirable. However, they are the best way to get accurate and reproducible Cd results. Suitable Cd data can be expected, provided the wind tunnel is large enough to fit the vehicle or the vehicle scale-model. If indeed the agencies intend to have Cd as a modeling input, then this is the preferred measurement method. Wind tunnels are also the only way to perform yaw-angle testing in a consistent manner. [EPA-HQ-OAR-2010-0162-1945.1, p.18]

In addition to the complexities involved in measuring Cd for use as a modeling input, coefficient of rolling resistance data is not readily available either. Each manufacturer has different test methods that can lead to variations in Crr values for the same tire. There are currently no efforts amongst tire manufacturers to harmonize the test procedure or correlate results. Consequently, Crr values are not comparable when generated by different manufacturers. To ensure reliable results under the current regulatory program, Crr test data would need to be gathered by an unbiased third party from a tire-only test. However, this tire-only test would ignore other real world rolling loads within the driveline. [EPA-HQ-OAR-2010-0162-1945.1, pp.18-19]

The GEM simulation results are based primarily on two inputs, Cd and Crr. All other vehicle inputs (frontal area, axle drag, etc.) are fixed inputs, and this ignores many other low-cost efficiency technologies that are readily available (e.g., synthetic gear lubricants, reduced differential drag from using a single-drive-axle plus a tag axle, low-friction bearings, etc.) While it is prudent for the agencies not to attempt to model each of these complex terms for each vehicle model, our proposed solution below would avoid this issue entirely. [EPA-HQ-OAR-2010-0162-1945.1, p.19]

Rather than using Cd and Crr as the sole model inputs, the agencies can take advantage of the full set of data provided by vehicle coastdown tests. Coastdown tests result in a 3-term polynomial equation representing total vehicle road load. The form of the equation is:

Road load force = a + bx + cx2 where

a = non speed-related term that depends mostly on the rolling resistance of tires and friction in the vehicle components (e.g., brake pads, wheel bearings, etc.)

b = speed-related term for the rolling resistance of tires and friction in the vehicle components

c = speed-related term that comes mostly from things that affect aerodynamic drag such as the frontal area, drag coefficient, and density of the air

x = speed of the vehicle [EPA-HQ-OAR-2010-0162-1945.1, p.19]

These a, b, and c terms represent the road load that must be provided to the axle to make the vehicle move and are typically used as inputs to a chassis dynamometer. The GEM can be strengthened by replacing the model's estimation of road load from Cd, Crr, and other fixed assumptions with the complete "ABC" coastdown results. Coastdowns are a relatively low-cost test and incorporate the agencies' desire to measure aerodynamic and rolling resistance, while also including other rotating driveline drag as well as weight-related affects. [EPA-HQ-OAR-2010-0162-1945.1, p.19]

Coastdown tests typically take a day or two for each vehicle, and the task can be hired out to a variety of third party entities. Coastdown testing is a core element of the light-duty regulatory program, and it makes sense to continue to build on that knowledge base by using coastdowns for heavy-duty vehicles. Eventually, as industry capacity develops and more heavy-duty chassis dynamometers are brought online, the agencies would be able to incorporate additional test protocols that have been proven to work in the light-duty program. [EPA-HQ-OAR-2010-0162-1945.1, p.19]

We gleaned useful insights about coastdown testing from Eric Rask, Principle Research Engineer at Argonne National Labs. He contends that most light-duty vehicles are tested using coastdowns because it yields the most consistent data, and it is the EPA/NHTSA standard. He went on to say that even if coastdowns are not exactly “accurate,” they are the most consistent way to gather whole-vehicle data. He agreed that “complete” information from coastdown tests should be used for commercial vehicles and the agencies should leverage the body of work that has been done for the light-duty program to get the best results possible for the medium- and heavy-duty regulations. [EPA-HQ-OAR-2010-0162-1945.1, pp.19-20]

Additionally, staff at Goodyear Tires and the National Renewable Energy Laboratory use coastdown testing as part of their heavy-duty vehicle analysis. To accommodate the higher inertia of heavy trucks that can result in long distances being traveled during the test, coastdown testing can be done in segments. Ecotality tested vehicles for Argonne National Laboratory (ANL) on an old runway near Phoenix. As few test tracks are long enough for heavy vehicles to coast from 80 mph to a stop in a single straightaway, the first coastdown leg was 80 – 40 mph, the second from 40 – 5mph. In the same way, a loaded truck could coast from 80 – 60 mph, 60 – 40 mph, 40 – 20 mph, and 20 – 5 mph, and the results can be combined. [EPA-HQ-OAR-2010-0162-1945.1, p.20]

Given the relatively longer length/width ratio of a tractor-trailer as compared to a passenger car and the gap between the tractor and trailer that allows cross-flow of air during typical operating conditions, yaw angle (i.e., the angle at which a vehicle encounters wind, where zero degrees is wind in the exact direction of forward motion) is a very important factor in tractor-trailer aerodynamic drag. Even though the agencies are testing with a “standard trailer”, it is possible for tractor manufacturers to partially seal the gap between the tractor and the trailer through good body design or active aerodynamic controls. [EPA-HQ-OAR-2010-0162-1945.1, p.20]

The EPA and NHTSA acknowledge that yaw angle has a sizeable impact on the fuel consumption of tractor-trailers in real-world conditions, but because wind tunnels are currently the only method available for assessing the influence of wind speed and direction, the agencies are proposing to use coefficient of drag values that represent zero yaw. By not including yaw angle in the tractor test protocol, the agencies have made it difficult for manufacturers to receive the proper credit for aerodynamic features such as gap seals and cross-flow devices, which have virtually no effect on zero-yaw Cd values. [EPA-HQ-OAR-2010-0162-1945.1, p.20]

According to Dr. Henning Lohse-Busch, who is a Research Engineer at ANL’s Advanced Powertrain Research Facility, recent changes to the light-duty vehicle test protocol have made coastdown results more accurate by correcting ABC coastdown values to account for wind, yaw angle, road roughness, and other environmental variables. The agencies have the opportunity to draw on the knowledge and experiences from the light-duty program and develop procedures for the Heavy-Duty National Program. [EPA-HQ-OAR-2010-0162-1945.1, p.20]

Inserting provisions in the rule for optional wind tunnel testing under crosswind conditions would incentivize manufacturers to introduce various gap reduction technologies that are currently available and encourage further advances in this often overlooked area of tractor-trailer aerodynamics. [EPA-HQ-OAR-2010-0162-1945.1, pp.20-21]

Recommendations:1) Use “complete” coastdown information from the road load equation in the GEM methodology. This use of coastdown data will simultaneously remove the measurement inconsistencies associated with Cd and Crr values, and it will also open up opportunities for manufacturers to more accurately receive credit for weight reduction and friction-reduction technologies (e.g., lubricants, bearings, tag-axles). [EPA-HQ-OAR-2010-0162-1945.1, p.21]

2) Allow manufacturers the option of demonstrating improved aerodynamic performance during yaw conditions, which can be measured through optional wind tunnel testing. This will encourage innovation in a critical – but often ignored – area of aerodynamics without subjecting all manufacturers to the cost burden of wind tunnel testing. [EPA-HQ-OAR-2010-0162-1945.1, p.21]

Response:

We agree with commenter and we have included in this rulemaking provisions that mirror the commenter’s recommendations. First, we are using the coastdown test, based on modifications to SAE J1263, as the reference method for measuring the coefficient of drag. Second, we are allowing manufacturers to use alternative aerodynamic methods, including wind tunnels, for demonstrating aerodynamic performance. These alternative aerodynamic methods must be compared to the modified SAE J1263 coastdown reference method prior to use for demonstrating aerodynamic performance. Finally, if manufacturers choose to use wind tunnels, to comply with this rule or otherwise, they may gain additional benefit by using their yaw sweep data to potentially lower their GHG emissions score. This should provide some incentive for manufacturers to continue to optimize their vehicles for conditions outside of zero yaw as required in this rulemaking.

Regarding the concerns expressed by the commenter on aerodynamic method agreement, coastdown, CFD and rolling resistance, we have the following responses. First, since we are using the modified SAE J1263 coastdown procedure as a reference method, all other methods need to be compared to this procedure for the same model. Although the methods may give wildly divergent answers on their own merits, our test program, detailed in the memorandum to the docket EPA-HQ-OAR-2010-0162 Heavy-Duty Greenhouse Gas and Fuel Consumption Test Program 2 Summary, showed that tighter restrictions, consistent test articles, and matching conditions can produce comparable results. Therefore, we have added criteria, test conditions and specificity where necessary to ensure that results are comparable. Second, we specifically added some criteria, restrictions and greater specificity for coastdown and CFD. As a result, our test program demonstrated that you can get repeatable and comparable results when the conditions for conducting coastdown testing and/or CFD analysis are consistent and repeatable. Finally, we have referenced and required the use of International Standards Organization (ISO) 28580 for determining the rolling resistance test for tires to which should help to standardize the procedure for measuring rolling resistance across the manufacturers.

9. Estimates of Emissions Reductions and the Associated Impact

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

New York State requests access to any state-by-state analysis to help determine to what extent greenhouse gas reductions achieved through the measures proposed would align with New York State's greenhouse gas reduction goal of 80 percent below the 1990 levels by 2050, and with the midterm benchmark of 40 percent by 2030, particularly in the medium- and heavy-duty truck sector. [EPA-HQ-OAR-2010-0162-2047.1, pp.1-2]

Response:

EPA did not do a state-by-state breakdown of greenhouse gas emissions. This was due in part to the large run times associated with running our emissions inventory models for every state compared to a national run. Also, since greenhouse gases are a global issue, EPA decided that a state-by-state breakdown of greenhouse gas emissions reductions would not add value to our overall analysis,

Organization: Institute for Policy Integrity

The agencies typically discuss regulatory impacts according to vehicle class, but it will sometimes also be helpful to think about effects for different consumer groups, which may cut across weight classes. [EPA-HQ-OAR-2010-0162-1895.1, p.2]

Response:

EPA attempted to categorize vehicles for this rule by their use. These categories – HD pickups and vans, vocational vehicles, and combination tractors – are differentiated partially by their size but also by their operation, which the agencies believe correlate well with consumer groups. As such, a single weight class may exist in more than one vehicle category (e.g. Heavy-heavy duty engines exist in both the vocational vehicle and the combination tractor categories).

9.1. GHG emissions

Organization: Business for Innovative Climate & Energy Policy (BICEP)

Finally, companies in a variety of sectors are increasingly interested in tracking Scope 3 emissions, including GHG emissions associated with transportation and freight movement, as part of their publicly disclosed GHG assessment. Thus, a growing number of companies support policies such as strict truck standards that would help them achieve their own GHG emission reduction goals as well as save money. [EPA-HQ-OAR-2010-0162-2165.1, p.2]

Response:

EPA appreciates the comment noting that truck standards can help achieve GHG reduction goals as well as saving money.

Organization: Clean Air Task Force (CATF)

In order to address the critical problem of climate change, deep reductions of greenhouse gas emissions will be required from the transportation sector, as well as from other sectors of the nation's economy. [EPA-HQ-OAR-2010-0162-2734.1, p.2]

EPA estimates that its heavy-duty highway proposal will reduce US oil consumption by more than 500 million barrels over the life of the regulated vehicles, and reduce greenhouse gas emissions by nearly 250 million metric tons. Projected benefits exceed costs by about 3.5 to 1. In fact, fuel savings alone will more than cover the costs of compliance with the Rule. The projected greenhouse gas emission reductions resulting from EPA's proposal are substantial, and the proposal is a step in the right direction. [EPA-HQ-OAR-2010-0162-2734.1, p.2]

However, much more substantial GHG reductions will be required. In 2008 alone, US net greenhouse gas emissions were about 6 billion metric tons. In order to stabilize the planet's temperature, our nation will need to move toward a carbon-neutral transportation system by mid-century, only 40 years from now. This will not happen without steep emission reductions from the highway sector, and will not happen without the development of a transportation system over the next few decades that will move the nation's freight in the most efficient way possible. And, unfortunately, it will not happen without some real costs to manufacturers and owners of heavy-duty trucks. But the eventual cost of inaction, even to vehicle manufactures and owners, will far exceed the cost of action now. The Rule as presently proposed must be strengthened in order to provide over the next decade a greater portion of the needed reductions. Delaying these needed reductions until after 2018 (at the earliest) will only increase the level of reductions needed thereafter, and thus may well make it harder ultimately to obtain them. [EPA-HQ-OAR-2010-0162-2734.1, pp.2-3]

Response:

EPA appreciates the comment noting that the rule will result in reductions of hundreds of millions of barrels of US oil consumption, and that these substantial reductions are a step in the right direction. Regarding the suggestion that the Rule must be strengthened, EPA has broad discretion in determining the appropriate standards to adopt under section 202(a)(1), based on a reasonable consideration and balancing of various factors relevant under that provision. EPA considered standards that were less stringent and more stringent than those adopted, and balanced a number of factors in selecting the final adopted standards, including the GHG reductions achieved by various alternative standards, the technology to achieve such standards, lead time, cost of achieving the standards, as well as other factors such as safety impacts. The commenter does not provide evidence to support the contention that the US transportation system must become carbon-neutral by mid-century in order to stabilize the planet's temperature.

Organization: Center for Biological Diversity

Since the time of our January 3, 2011 Comment Letter, additional studies have been published that add to the overwhelming evidence that climate change is currently underway and that the failure to reduce greenhouse gases will cause catastrophic consequences. 37 We include here studies showing record melts from the Greenland ice sheet in 2010; the bigger-than estimated impact on climate from the melting Arctic; and the higher-than previously-estimated risk of lung damage due to ozone pollution, and ask the Agencies to include them in their analysis of climate change impacts. [EPA-HQ-OAR-2010-0162-2506.1, p.10]

37 We note that unfortunately, the Proposed Rule contains this misleading summary of these dangers: "Setting GHG emissions standards for the heavy-duty sector will help to address climate change, which is widely viewed as a significant long-term threat to the global environment." Id. at 74156. The Agencies here seem to overlook EPA's own endangerment finding concerning greenhouse gases and the vast scientific evidence that supports its devastating conclusions. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66496 (December 15, 2009). These threats posed by climate change are a matter of established fact rather than a matter of opinion. The misleading language cited above should be removed. [EPA-HQ-OAR-2010-0162-2506.1, p.10]

Response:

EPA agrees with the commenter's assertion that many recent studies add to the evidence of climate change impacts. EPA appreciates the submission of several new studies, but the major assessment reports such as the IPCC, NRC, and USGCRP will continue to be the primary scientific basis for EPA's determinations regarding climate change, rather than individual selected studies.

EPA also acknowledges that "widely viewed" is not the best way to phrase the evidence that climate change is a threat, and we have changed our preamble/RIA text to better reflect the Administrator's Findings regarding climate change.

Organization: Conservation Law Foundation

These vehicles from the largest pickups to 18-wheelers use more than 100 million gallons of oil per day and are responsible for about 20% of the climate pollution from America's transportation sector. [EPA-HQ-OAR-2010-0162-3128, p.1]

Response:

EPA appreciates the comments. The rule is designed to reduce emissions from heavy-duty vehicles such as the ones described by the commenter. The EPA agrees that climate change resulting from elevated concentrations of greenhouse gases presents a risk to human health, welfare, and the environment, though we note that the term "runaway" global warming, where runaway implies that a passing a forcing threshold can result in ever increasing temperatures, is not a good description for the likely impacts of elevated concentrations of greenhouse gases. The positive feedbacks which do exist do not necessarily imply runaway climate change.

Organization: Environmental Defense Fund (EDF)

These vehicles from the largest pickups to 18-wheelers use more than 100 million gallons of oil per day and are responsible for about 20% of the climate pollution from America's transportation sector. [EPA-HQ-OAR-2010-0162-1965_Mass, p.1]

The climate crisis is the most serious environmental threat facing the planet and puts the health of all Americans at serious risk. America must take the strongest possible action as soon as possible to dramatically cut our climate pollution and avoid the catastrophic threat of runaway global warming. [EPA-HQ-OAR-2010-0162-1965_Mass, p.1]

Response:

EPA appreciates the comments. The rule is designed to reduce emissions heavy-duty vehicles such as the ones described by the commenter. The EPA agrees that climate change resulting from elevated concentrations of greenhouse gases presents a risk to human health, welfare, and the environment, though we note that the term "runaway" global warming, where runaway implies that a passing a forcing threshold can result in ever increasing temperatures, is not a good description for the likely impacts of elevated concentrations of greenhouse gases. The positive feedbacks which do exist do not necessarily imply runaway climate change.

9.2. Non-GHG emissions

Organization: Investor Network on Climate Risk (INCR)

Finally, companies in a variety of sectors are increasingly interested in tracking Scope 3 emissions, including GHG emissions associated with transportation and freight movement, as part of their publicly disclosed GHG assessment. Thus, a growing number of companies support policies such as strict truck standards that would help them achieve their own GHG emission reduction goals as well as save money. [EPA-HQ-OAR-2010-0162-1946.1, p.3]

Response:

EPA appreciates the comment noting that truck standards can help achieve GHG reduction goals as well as saving money.

Organization: Chew, Yuli

I also wish that non-CO2 greenhouse gas (CH4, N2O, HFCs) and other non-greenhouse gas (PM2.5, SOx, VOC, NOx, benzene, formaldehyde etc) can be quantified and evaluated in the economic analysis. [EPA-HQ-OAR-2010-0162-0558.1, p.2]

Response:

EPA conducted an analysis of the non-GHG health and environmental impacts that can be expected to occur as a result of the HD National program, as discussed in preamble Section VIII.H.

EPA has assigned a dollar value to reductions in CO_2 emissions using recent estimates of the social cost of carbon (SCC). The SCC is an estimate of the monetized damages associated with an incremental increase in carbon emissions in a given year. It is intended to include (but is not limited to) changes in net agricultural productivity, human health, property damages from increased flood risk, and the value of ecosystem services due to climate change. The SCC estimates used in this analysis were developed through an interagency process that included EPA and other executive branch entities, and concluded in February 2010. We first used these SCC estimates in the benefits analysis for the final joint EPA/DOT rule to establish MY 2012-2016 light-duty vehicle GHG emission standards and CAFE standards. See preamble Section VIII.L for more information about the SCC.

As the commenter notes, these monetized GHG benefits exclude the value of net reductions in non-CO_2 GHG emissions (CH_4, N_2O, HFC) expected under this action. Although EPA has not monetized the benefits of reductions in non-CO_2 GHGs, the value of these reductions should not be interpreted as zero. Rather, the net reductions in non-CO_2 GHGs will contribute to this program's climate benefits, as explained in preamble Section VI.C.

The interagency group decided that the SCC estimates apply only to CO_2 emissions. Given that warming profiles and impacts other than temperature change (e.g. ocean acidification) vary across GHGs, the group concluded "transforming gases into CO_2-equivalents using GWP, and then multiplying the carbon-equivalents by the SCC, would not result in accurate estimates of the social costs of non-CO_2 gases" (see page 13 of the SCC Technical Support Document that accompanies this rulemaking).

The interagency group has committed to updating the current estimates as the science and economic understanding of climate change and its impacts on society improves over time. Specifically, the interagency group has set a preliminary goal of revisiting the SCC values in the next few years or at such time as substantially updated models become available, and to continue to support research in this area.

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

New York State recognizes that due to the widely varying duty cycles for medium- and heavy- duty vehicles, the National Academy of Sciences study recommended that the new fuel-efficiency and emissions standards for medium- and heavy-duty vehicles be based on a 'per ton-mile' unit. However, this 'freight payload-based' parameter is not a MOVES (EPA's new emission model) input in the MOVES input panels. Will metropolitan planning organizations and transportation sponsors be expected to develop such 'payload based' MOVES inputs to estimate medium- and heavy-duty vehicle emissions in future State Implementation Plan and conformity analyses? If so, the development of such data inputs could be a potentially complicated process, and NHTSA and EPA should provide training to stakeholders regarding the development of 'payload-based' MOVES inputs. [EPA-HQ-OAR-2010-0162-2047.1, p.5]

Response:

The effects of this rule will eventually be converted into default MOVES inputs by EPA itself. Just because the regulatory framework is based on freight payload does not mean the SIP process would change. In fact, heavy-duty engines emissions standards are work-specific (g/bhp-hr), and MOVES is not designed directly from that either. EPA does not foresee a change to the SIP and conformity analyses as a direct result of this rule.

10. Health Impacts

Organization: Chew, Yuli

For heavy-duty engines, most of the human health challenge is the emission of particulate matter. It is high time that PM is not excluded from data collection over the transient engine test cycle, cold-start testing and hot-start testing. They must be collected for each steady-state test mode over the SET cycle. [EPA-HQ-OAR-2010-0162-0558.1, p.1]

Response:

EPA is not reopening, reconsidering, or otherwise reevaluating any aspect of criteria pollutant measurements under various test cycles. However, for this commenter's benefit, EPA excluded PM emissions from the data collection because the level of PM emissions from HD engines at each individual mode in the SET cycle is very low; therefore, it is very difficult to measure accurately and repeatably. Ramped-modal testing (which replaced the SET in the 2010 model year) involves a single, continuous emission measurement as the engine operates over the test modes in a defined sequence, including short transition segments between modes. Ramped-modal testing offers several advantages, including increased accuracy for measuring very low levels of particulate matter emissions.

Organization: Manufacturers of Emission Controls Association (MECA)

[See pp.2-7 of this comment for descriptions of technologies available to reduce CO2 emissions from mobile sources: See pp.6-7 of this comment summary for descriptions of technologies available to reduce Black Carbon from mobile sources; See pp.8-9 of this comment summary for descriptions of technologies available to reduce Ground-Level Ozone from mobile sources.]

Diesel particulate filters are particularly effective at removing black carbon emissions from diesel engines and effective climate change policies should include programs aimed at reducing black carbon emissions from existing diesel engines through effective retrofit programs that implement filters on the full range of in-use diesel engines operating in the U.S. [EPA-HQ-OAR-2010-0162-1530.2, p.9]

Response:

EPA agrees that emissions of PM and PM precursors from heavy-duty vehicles contribute to ambient air pollution that poses significant health concerns. Section 8.1.1 of the RIA for this rule details the health effects associated with $PM_{2.5}$. EPA agrees that air pollution in high-traffic areas is a significant issue; Section 8.1.1.10 of the RIA discusses exposure and health effects associated with traffic specifically. In addition, Section 8.1.1.9.1 of the RIA discusses the composition of diesel exhaust. Some aerosols, such as black carbon, cause a positive forcing or warming effect by absorbing incoming solar radiation, but there are uncertainties about the magnitude of that warming effect and the interaction of black carbon (and other co-emitted aerosol species) with clouds. While black carbon is likely to be an important contributor to climate change, it would be premature to include quantification of black carbon climate impacts in an analysis of the final standards at this time.

The HD National Program addresses GHG emissions and fuel consumption from new heavy-duty vehicles and engines. Retrofits of the existing fleets are outside the scope of this program. However, EPA's National Clean Diesel Campaign (NCDC) promotes clean air strategies by working with manufacturers, fleet operators, air quality professionals, environmental and community organizations, and state and local officials to reduce diesel emissions. Because diesel engines can operate for 20 to 30 years, millions of older, dirtier diesel engines are still in use. EPA offers many strategies and programs to help make these engines operate more cleanly, and funding to help build diesel emission reduction programs that improve air quality and protect public health.

10.1. Climate Change

Organizations Included in this Section:

Conservation Law Foundation
Interfaith Care for Creation
Missourians for Safe Energy (MSE)
Manufacturers of Emission Controls Association (MECA)

Organization: Conservation Law Foundation

The climate crisis is the most serious environmental threat facing the planet and puts the health of all Americans at serious risk. America must take the strongest possible action as soon as possible to dramatically cut our climate pollution and avoid the catastrophic threat of runaway global warming. [EPA-HQ-OAR-2010-0162-3128, p.1]

Organization: Interfaith Care for Creation

The climate crisis is the most serious environmental threat facing the planet and puts the health of all Americans at serious risk. America must take the strongest possible action as soon as possible to dramatically cut our climate pollution and avoid the catastrophic threat of runaway global warming. [EPA-HQ-OAR-2010-0162-1587-cp, p.1]

Organization: Missourians for Safe Energy (MSE)

The climate crisis is the most serious environmental threat facing the planet and puts the health of all Americans at serious risk. America must take the strongest possible action as soon as possible to dramatically cut our climate pollution and avoid the catastrophic threat of runaway global warming. [EPA-HQ-OAR-2010-0162-1597-cp, p.1]

Reducing fuel consumption will also reduce the release of other pollutants, which will have additional health and environmental benefits. [EPA-HQ-OAR-2010-0162-1597-cp, p.1]

Organization: Manufacturers of Emission Controls Association (MECA)

Ground level ozone also has a strong linkage to climate change. EPA needs to continue its efforts to review and adjust criteria pollutant programs for all mobile sources going forward to not only provide needed health benefits from technology-forcing emission standards but also the co-benefits these emission standards have on climate change. [EPA-HQ-OAR-2010-0162-1530.2, p.9]

Response:

Setting GHG emissions standards for the heavy-duty sector will help to ameliorate climate change. The EPA Administrator found that human-induced climate change resulting from GHG emissions endangers the public health and welfare of current and future generations (74 FR 66496, December 15, 2009), based on the scientific assessment reports of the Intergovernmental Panel on Climate Change (IPCC), the U.S. Climate Change Science Program (CCSP), the U.S. Global Change Research Program (USGCRP), and the National Research Council (NRC). Mobile sources emitted 31 percent of all U.S. GHGs in 2007 (transportation sources, which do not include certain off-highway sources, account for 28 percent) and have been the fastest-growing source of U.S. GHGs since 1990.[58] Mobile sources addressed in EPA's endangerment and contribution findings under CAA section 202(a) -- light-duty vehicles, heavy-duty trucks, buses, and motorcycles -- accounted for 23 percent of all U.S. GHG emissions in 2007.[59] Heavy-duty vehicles emit CO_2, CH_4, N_2O, and HFCs and are responsible for nearly 19 percent of all mobile source GHGs (nearly 6% of all U.S. GHGs) and about 25 percent of section 202(a) mobile source GHGs.

Although the purpose of these rules is to address greenhouse gas emissions, this final action will also impact emissions of criteria and hazardous air pollutants. As discussed in Chapter 8 of the RIA, EPA's air quality modeling projects relatively little impact on ambient concentrations of criteria pollutants and toxics, but there are net benefits associated with

[58] U.S. Environmental Protection Agency. 2009. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2007. EPA 430-R-09-004. Available at http://epa.gov/climatechange/emissions/downloads09/GHG2007entire_report-508.pdf

[59] *See* Endangerment TSD, Note **Error! Bookmark not defined.**, above, at pp. 180-194.

reductions in ozone and $PM_{2.5}$. Any ozone reductions from this action are beneficial from both a criteria pollutant perspective and a greenhouse gas perspective.[60]

[60] EPA (2011). Integrated Science Assessment for Ozone and Related Photochemical Oxidants. EPA/600/R-10/076A. EPA (2006). Air Quality Criteria for Ozone and Related Photochemical Oxidants. EPA/600/R-05/004aF.

11. Costs and Monetized Benefits

Organization: Alliance of Automobile Manufacturers (Alliance)

The Alliance has concerns over impacts to emissions, fuel economy and expensive facility upgrades for both MHDV and LDV. We recommend that additional study and discussion with EPA and stakeholders is necessary before further consideration in a rulemaking can be initiated. [EPA-HQ-OAR-2010-0162-1621.1, p.3]

Response:

EPA and NHTSA considered all of the stakeholder comments and has decided that the original light-duty RTI values, given the technologies considered for low and medium complexity, should no longer be used and that we should rely solely on the modified-Delphi values for these complexity levels. As a result, the modified-Delphi values were to become the working ICMs for low and medium complexity rather than averaging those values with the original RTI report values. This decision impacts the low and medium complexity heavy-duty ICMs too because the modified-Delphi values alone were now to be applied to the heavy-duty RPEs to arrive at heavy-duty ICMs rather than using the averaged values developed for the 2012-2016 rule.

As part of this recalculation of appropriate ICM values, a secondary-level change was also made to the light-duty ICMs, which are used in this analysis for HD pickups and vans. That change was to revise upward the RPE level reported in the original RTI report from an original value of 1.46 to 1.5 since the original value excluded net income. As a result, even the High 1 and High 2 ICMs used for HD pickups and vans has changed.

RIA Chapter 2 shows both the ICM values used in the proposal and the new ICM values used for the analysis supporting this final rule. Near term values (2014 through 2021 in this analysis) account for differences in the levels of R&D, tooling, and other indirect costs that will be incurred.

Organization: American Automotive Policy Council

While the technologies and associated potential greenhouse gas reduction and fuel consumption benefits identified by EPA and NHTSA are generally in line with the estimates of other third party sources, cost estimates are consistently skewed to the low end of the ranges projected in reputable studies such as the NAS Report. [EPA-HQ-OAR-2010-0162-1762.1, pp.4-5]

By way of illustration: [EPA-HQ-OAR-2010-0162-1762.1, p.4]

The NAS Report estimates costs of engine friction reduction to range from $13-$49 per cylinder while the NPRM estimates the cost at $14 per cylinder. [EPA-HQ-OAR-2010-0162-1762.1, p.4]

The NAS Report estimates the cost of gasoline direct injection to be $512–$930 per engine while the NPRM estimates the cost at $395 per engine. AAPC members are concerned that these optimistic cost projections lead to an overstatement of the cost-benefits of the proposed regulation and are particularly concerned if this methodology is extended into future rulemakings requiring advanced technologies with smaller incremental benefits and/or much larger incremental costs. The technology costs in the NPRM appear to be largely in line with previous estimates for the same technologies applied to light-duty vehicles without full consideration of the unique challenges required to implement them in heavy-duty service classes. For example, adapting a transmission for higher loads may require a complete redesign to meet all functional requirements. [EPA-HQ-OAR-2010-0162-1762.1, p.4]

Response:

The agencies note that cost estimation is not the most exact science. This is especially true with respect to indirect costs associated with technologies. In the NAS report, the authors note that they have estimated costs using an RPE multiplier. In contrast, the agencies have used an indirect cost multiplier(s) (ICM). In the proposal, the GDI technology was considered a low complexity technology with an ICM of 1.17. As a result, the agencies are not including as many of the indirect costs in the technology cost estimate because we believe that those costs are not attributable to the rule. Using the NAS approach, all indirect costs associated with the technology would be included in the cost of the rule. For example, costs associated with retiree pension and healthcare benefits would increase due to our rule, even those benefits paid to employees that have already retired. We do not consider this to be appropriate because retiree pension and benefits—for those employees that have already retired—should not be affected by our rule and, hence, we have developed the ICM approach.

That being said, in reconsidering costs for the final rule, the agencies have revised the complexity of the GDI technology and now consider that technology to be of medium complexity. As a result, the ICM for the GDI technology has increased to 1.39 resulting in a near term technology cost of $481 (2009$) for the 2014MY. This result is actually in-line with the low end of the NAS estimate and, arguably is equivalent to the NAS estimate given the differences in the ICM versus RPE approach. [61]

As regards other technology estimates, one must remember that the agencies have separately estimated considerable costs associated with research and development (primarily

[61] As noted by the comment, the low end of the NAS range was $512, with an RPE of 1.5. The result being $341 in direct manufacturing costs ($512/1.5). The agencies' estimate is $481 with an ICM of 1.39, or $346 in direct manufacturing costs ($481/1.39).

development costs) of $170 million dollars per year for 5 years, or over $853 million dollars. We have estimated this as being roughly $280 per engine sold over that five year period. While this cost does not show up in any of the technology costs being noted as “low,” it nonetheless is a considerable indirect cost being attributed to the rule.

Organization: American Council for an Energy-Efficient Economy (ACEEE)

In discussing their framework for evaluating impacts of the rule (p.74303), the agencies review five market barriers to adoption of heavy-duty efficiency technologies. They do not however consider supply side barriers, which may also contribute substantially to the discrepancy between the engineering analysis of potential cost-effective improvements and real-world technology adoption. These barriers include vehicle and parts manufacturers' costs to bring advanced technology to market. While the technologies relied upon to meet the proposed standards have already been commercialized by at least one manufacturer, the cost to other manufacturers of developing the same technology may be considerable. [EPA-HQ-OAR-2010-0162-1894.1, p.28]

For future phases of these standards, research and development costs may become a far larger barrier. The high cost of technology development for a relatively small market (compared, for example to the light-duty vehicle market), along with volatile fuel prices, may cause manufacturers to be especially risk-averse in the absence of standards that will ensure a future market for highly efficient products. Manufacturers may also be highly subject to 'first mover' penalties, which result from making large investments in developing technologies that are then adopted at low cost by competitors. [EPA-HQ-OAR-2010-0162-1894.1, p.28]

Another consideration is the fact that heavy-duty vehicle manufacturing is not vertically integrated. Manufacturers of engines, transmissions, and other components, who are at least one step removed from buyers, may find it difficult to generate a demand for efficient products through their OEM customers. [EPA-HQ-OAR-2010-0162-1894.1, p.28]

Response:

While we have estimated considerable costs for development of technologies, we do not believe that any of the technologies being considered in this rule are such that research and discovery is necessary. All of the technologies to which the agencies point are existing technologies that merely need to be implemented on engines that do not currently employ them. While that effort is not easy and is, in fact, costly (estimated at $853 million dollars over 5 years), it is not so difficult as to place the high quality of manufacturers involved in any difficulty.

Organization: American Trucking Associations, Inc. (ATA)

The trucking industry is wary of cost increase projections associated with federal rulemakings and for good reason. A good example of why ATA is skeptical of such projections is the recent rulemaking to reduce particulate matter and nitrogen oxide emissions from on-road diesel engines commonly referred to as the EPA 2007/2010 Diesel Engine Emissions Rule. The EPA estimated that the proposed standards would add about $1,200 to $1,900 per new vehicle depending on the vehicle size. However, the trucking industry saw record-setting cost increases up to $20,000 per new vehicle which equates to an increase between 1,567% and 1,667%. While the current rulemaking is not a technology-forcing standard and fleets will still be able to specify their equipment needs, some aspects of the rule will result in increases and/or pass-throughs related to engine improvements, research and develop costs, and warranty coverage. ATA urges the agencies to use cost estimates that reflect reality when implementation of the rule begins. [EPA-HQ-OAR-2010-0162-2263.1, pp.15-16]

Response:

The agencies agree with the commenter that accurate cost projections are fundamental to effective regulatory development. The agencies believe the estimates we have made are as accurate as possible given the inherent uncertainties in making projections of future costs. As with all aspects of our analyses, we benefit significantly when stakeholders provide detailed specific comments that we can use in order to improve our estimates.

By way of history (and not to reopen any aspect of the 2007/2010 diesel engine emission rule), EPA estimated the costs of the 2007/2010 standards at $2,000 to $3,200 per vehicle in the near term and $1,200 to $1,900 in the long term. Those estimates were in 1999 dollars. In 2009 dollars, the near term estimates would be $2,500 to $4,000. That being said, the cost estimates are still well below the price increases claimed by the commenter. However, the comment does not provide sufficient detail to shed light on what might and might not be included in the price increase noted. We do not know the derivation of the $20,000 price increase claimed. While we do not doubt the validity of the comment, we believe the noted price increase may well contain many more engine and truck changes than only those for complying with EPA standards. For example, it may well contain costs for safety improvements, more than one level of EPA emission standard improvements (i.e., 2004 and 2007/2010 standards), and other features not driven by regulation but by owner/driver demand such as improved comfort and improved communication and geo-positioning systems. Without all the details behind the $20,000 price increased claimed by the commenter, it is impossible to do a true comparison of it to our cost estimates. Given that the technologies considered in this final rule are readily available technologies that are not driving new research and/or technology discovery, we believe that our costs estimates are as accurate as we can make them. The agencies make every effort to estimate accurately the cost impacts due to our rules.

Organization: Competitive Enterprise Institute

NERA's November 2008 report examines customer behavior in response to EPA's 2007 Rule and the implications of EPA's 2010 NOX standard. It confirms in spades that EPA's diesel-emissions program imposes a significant opportunity cost on truckers. NERA found that EPA's 2007 Rule increased the unit cost of a Class 8 truck by $7,000 between the 2006 and 2007 model years. That additional expense is money truckers could not spend to purchase vehicles with better fuel economy. [EPA-HQ-OAR-2010-0162-2418.1, 10]

In addition, NERA estimated that EPA's 2010 NOX standard would increase the cost of a Class 8 truck by another $7,000-$10,000. [EPA-HQ-OAR-2010-0162-2418.1, p.10]

In line with GAO's expectations, NERA found that truckers engaged in massive pre-buying as the 2007 Rule phased in. In 2005-2006, truckers purchased about 120,000 more trucks with older engines than EPA had forecast, and in 2007-2008, they purchased about 183,000 fewer trucks with new engines than EPA had forecast. Consequently, the 2007 rule also produced smaller environmental benefits than EPA had forecast. [EPA-HQ-OAR-2010-0162-2418.1, p.10]

[See p.10-11 of this comment for additional comments pertaining to: Additional evidence for the alternative hypothesis]

Response:

We have updated our discussion of the conceptual framework in the preamble to reflect the suggestion that one reason for lower than expected fuel saving technology adoption in the fleet can be traced to capital spending to comply with EPA's criteria emission standards. As we note there, the commenter's hypothesis does not explain why existing technologies that are already available and would pay back their higher initial cost with 1-2 years have not been adopted. Rather, the commenter's hypothesis seems better able to provide a basis for why advanced technologies such as Rankine Bottoming Cycle have not progressed further toward commercialization. We should note that no OEM has suggested to the agencies that advanced technologies would have been available sooner had OEMs not had to comply with EPA's criteria pollutant standard, but we have noted this potential hypothesis in our preamble discussion.

Organization: Daimler Trucks North America

While we have not had the opportunity to analyze all of the cost estimates used in the Agencies' NPRM and in the associated Regulatory Impact Analysis, we have some concern because some appear to be questionable. [EPA-HQ-OAR-2010-0162-1818.1, p.26]

Response:

The agencies described in the NPRM the sources and methodologies used to establish the cost projections of the technologies. The agencies did not receive any specific recommendations from HD vehicle manufacturers on costs. The agencies are using the proposed technology costs for HD engines and vehicles, with the exception of the increase in ICMs, as discussed in RIA Chapter 2.

Organization: Horiba Instruments Inc.

Please consider this an official comment to Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles (October 2010). Horiba plans to have further comments but this comment is directed to policy as opposed to technical comments. Page 118 of the document on the OTAQ website [hd-preamble-regs.pdf] contains the following text: [EPA-HQ-OAR-2010-0162-0353, p.1]

Manufacturers without the capability to measure N2O by the 2015 model year would need to acquire and install appropriate measurement equipment in response to this proposed program. EPA has established four separate N2O measurement methods, all of which are commercially available today. EPA expects that most manufacturers would use photo-acoustic measurement equipment, which EPA estimates would result in a onetime cost of about $50,000 for each test cell that would need to be upgraded. [EPA-HQ-OAR-2010-0162-0353, p.1]

This third sentence has already been perceived by our customers as EPA indicating a preference for one manufacturer over all other methodologies. If EPA is simply addressing cost for standalone operation this could be the lowest cost but in EVERY application of this measurement the analyzer has to be part of a system including bag measurement and other emissions analyzers. Horiba offers three options (soon a fourth option). The least expensive option is a continuous NDIR analyzer at base cost of $15,300 and a new bag NDIR analyzer at $21,000. While these analyzers are not stand alone, they would fit into Horiba's most common gas analysis systems for emission measurement. In some cases there would be extra cost but that is dependent upon the existing system. Horiba has loaned this new NDIR bag analyzer to the OTAQ Ann Arbor laboratory for demonstration in a newly delivered bench. [EPA-HQ-OAR-2010-0162-0353, p.1]

This prediction about the photo-acoustic may be carry over from the light-duty automotive manufacturers that plan to use this analyzer for this application. It should be noted that the cost to these automotive manufacturers is much less than $50,000 because some manufacturers already have the analyzers and only need a new wheel of filters in order to measure N2O. Horiba requests that either this third sentence be removed or an additional sentence added that includes a LOWER cost implementation into existing emission measurement systems. [EPA-HQ-OAR-2010-0162-0353, p.1]

EPA expects that most manufacturers would use either photo-acoustic measurement equipment ($50,000) for standalone, existing FTIR instrumentation or upgrade existing emission measurement systems with NDIR analyzers ($25,000) for each test cell that would need to be upgraded. [EPA-HQ-OAR-2010-0162-0353, p.1]

Response:

The agencies further analyzed our proposed N_2O measurement cost assumptions along with Horriba's comments. Thus, we have revised the equipment costs estimates and assumed that 75 percent of manufacturers would update existing equipment while the other 25 percent would require new equipment. The agencies are estimating costs of $63,087 (2009 dollars) per engine manufacturer per engine subcategory (light-, medium- and heavy-HD) to cover the cost of purchasing photo-acoustic measurement equipment for two engine test cells. This would be a one-time cost incurred in the year prior to implementation of the standard (i.e., the cost would be incurred in 2013).

Organization: Institute for Policy Integrity

Where the agencies can lower compliance costs without sacrificing regulatory objectives, they should pursue those strategies. [EPA-HQ-OAR-2010-0162-1895.1, p.13]

Response:

The agencies have worked together to streamline the compliance process with respect to the requirements of each agency. The final rulemaking contains several improvements relative to the sharing of data between the agencies and requiring only manufacturers to submit a single application for certification which covers both agencies. The agencies have also reduced the burdens associated with the number of vehicle families for combination tractors, the amount of GEM simulation runs that are required at the time of certification, and procedures for the aerodynamic assessment of low and mid roof tractors.

Organization: Motor & Equipment Manufacturers Association (MEMA)

MEMA's data relative to the cost up charge for shifting to lightweight wheels differs from what is presently noted in the NPRM. While the proposal appears to have included list pricing for the wheel/tire up charge, typical fleet customers pay less than direct pricing utilizing the truck OE catalog/order book, less traditional discounts. In Figure II-2, please note the wide variation between the agencies' presumed costs and those seen in the real-world. [EPA-HQ-OAR-2010-0162-1752.1, p.10]

Figure II-2

Application	EPA/NHTSA Class 7	EPA/NHTSA Class 8	MEMA Class 7	MEMA Class 8
Single Wide Tire (per tire)	$322	$644	$0	$0
Aluminum Steer Wheel	$523	$523	$250	$250
Aluminum Wheels – Dual	$1,569	$2,615	$500	$1,000
Aluminum Wheel – Single Wide	$627	$1,254	$378	$756

Finally, there is a positive offset to the up charges noted in the previous figure. It is generally recognized in the industry that truck tractors equipped with 100 percent aluminum wheels increase the resale value of the truck in the range of $1,100 and $1,775 because the return on investment is favorable. Similar to our earlier discussion with OEMs about weight savings, while this is not quantifiable from their standpoint, OEMs generally agreed that there is increased value in the resale market with aluminum wheel-based trucks. [EPA-HQ-OAR-2010-0162-1752.1, p.10]

[Figure II-3 can be found on page 10 of this comment.]

Therefore, with this additional cost and weight information, MEMA asks the agencies to reevaluate the costs and weights for incorporating lightweight wheels and single wide tires. [EPA-HQ-OAR-2010-0162-1752.1, p.10]

Response:

EPA based the proposed cost estimates for single wide tires and aluminum wheels from the information gathered by ICF for the agency (Investigation of Costs and Strategies to Reduce Greenhouse Gas Emissions for Heavy-Duty On-Road Vehicles, July 2010, Docket #EPA-HQ-OAR-2010-0162-0070). The agencies used these estimates, calculated the direct manufacturing cost, and then applied ICM and learning to derive the cost estimates projected in the NPRM. The agencies recognize that there are a wide range of cost estimates for single wide tires and aluminum wheels. For example, TIAX found costs ranging between $0 and $1,800 for a set of four single wide tires with aluminum wheels (TIAX report, 2009, page 4-56). Though the agencies' proposed cost estimate is near the high end of the range, we continue to believe our projections are appropriate for the final rulemaking.

The agencies appreciate the information regarding the resale of the vehicles with aluminum wheels, but generally do not use this information in the cost projections for the technologies that manufacturers may install to comply with the new vehicle standards.

Organization: National School Transportation Association (NSTA)

We applaud measures intended to provide manufacturers with flexibility on how best to meet the standard. This flexibility should include the opportunity to employ a host of available voluntary measures, including both vehicle modifications and effective operational measures such as those to control driver behavior, that can help to conserve fuel or improve how the vehicle is used. However, these technologies often come at a cost. Over the past few years, school districts and bus operators have had to bear vehicle price increases of up to 25 percent to meet EPA mandated emission control requirements, some of which have actually negatively impacted fuel economy. Therefore, we would oppose any additional requirements that are not cost effective and would have a net negative impact on our ability to provide safe and affordable bus transportation for the Nation's school children. [EPA-HQ-OAR-2010-0162-1751.1, pp. 2-3]

Response:

The agencies have projected that the payback period for vocational vehicles will be as short as one year, based on the projected costs of engine and tire improvements for this category of vehicles (see preamble Section VIII.E.4 for the payback results). In other words, the fuel savings associated with the final standards will quickly offset the upfront costs of technologies.

The agencies have included provisions in the final rulemaking which encourage the use of innovative technologies that can improve fuel efficiency and GHG emissions.

Organization: Nose Cone Manufacturing Company

The cost of Nose Cone products was not listed in the Table IX-8: Aerodynamic Technology Costs and there seems to be some confusion regarding the Trailer Aerocone. The Trailer Aerocone is a gap fairing identical to the Nose Cone 3D Gap Reducer which is also a gap fairing. It's not clear why the Trailer Aerocone was singled out in this document but it does fall under the category of "Gap Fairings" and should be listed there. The Table IX-A further confuses how another name brand device is represented. Identifying the brand "Air Tabs" has given the impression that it is a certified aerodynamic technology. As of January 31, 2011 Air Tabs are not listed on the SmartWay website as a verified device. A more general term for the Air Tabs is "vortex generators". [EPA-HQ-OAR-2010-0162-1943.1, p.3]

It should also be noted that this table considers only those solutions identified by the EPA SmartWay program with regard to the full height aerodynamic tractor. A separate category for "front fairings" would be helpful in calculating the cost factors for a wider range of tractor-trailer combinations this regulation attempts to make requirements for. That category would be aptly referred to as "Front Fairings" which is identified in Table IX-7. The general Nose Cone products (other than the 3D Gap Fairing) would fit in this category. These devices range in cost from $350 up to $1,200 depending on the specific model. This wide price range is indicative of the number of configurations best suited to an individual tractor and trailer combination. The range of tractor-trailer combinations in existence and how they may be appropriately addressed in terms of the proposed regulation are discussed in the "Including Commercial Trailers" section above. [EPA-HQ-OAR-2010-0162-1943.1, pp.3-4]

Response:

The agencies listed sample technology costs in the Draft RIA based on information included in the ICF cost report and the NAS study. As discussed in the preamble, the agencies are not setting standards at this time for trailers. When the agencies develop a proposal for a future rulemaking for trailers, then the agencies will conduct a complete cost analysis of the technologies available to reduce GHG emissions and fuel consumption from trailers.

Organization: Volvo Group

The current certification proposal as outlined in the NPRM preamble is extremely burdensome to vehicle manufacturers. See 75 FR 74152, 74270 – 74277, sections V (D) & (E). Section XI (3) and Table XI-1 give an estimate of 25,052 hours annual information collection burden on vehicle manufacturers as a whole. See 75 FR 74152, 74357. [EPA-HQ-OAR-2010-0162-1812.2, pp.23-24]

It is unclear how these hours are divided among the 34 vehicle manufacturers EPA claims are affected by the requirements. However, some of the 34 manufacturers are manufacturing vehicles in the heavy duty pickup trucks and vans category, with a significantly reduced certification burden. See Section V(B)(1)(a), 75 FR 74152, 74260. In addition, many of the 34 are only active in vocational categories with a GVWR of less than 33,000, which again have a reduced certification burden due to the limited vocational regulatory program. Thus, it can be assumed that an increased percentage of the burden will be placed on manufacturers of Class 7 and 8 tractors due to the complex certification and reporting processes (as defined in 40 CFR 1037 Subpart C and Preamble sections V(D) and (E)). [EPA-HQ-OAR-2010-0162-1812.2, p.24]

For simplicity, assuming division of these hours equally among the 34 affected manufacturers, the total projected hours is 737 hours per OEM. The current burden on Volvo Powertrain for EPA engine criteria emissions for certification paperwork alone is in excess of 8,000 hours annually. This does not include time and expense for test personnel and equipment utilization. This burden will likely increase with engine CO2 requirements, but will increase significantly with the addition of the subject vehicle regulations given the complexity of the certification process. [EPA-HQ-OAR-2010-0162-1812.2, p.24]

Response:

The agencies have re-evaluated the burden estimates of the final rulemaking reflecting the comments received regarding the ICR. The final ICR reflects significantly greater number of hours and costs of compliance. For example, the agencies estimate over 32,000 hours and a cost of $4.7 million for the first year of compliance for combination tractor manufacturers, which is consistent with the estimate of hours provided in the comment, assuming four major tractor manufacturers.Other Impacts

Organization: American Lung Association & Environmental Defense Fund

The United States consumes more than 19 million barrels of oil a day, which is nearly a quarter of the oil consumed in the entire world, and more than all European Union nations combined. Over half of the oil we use each day is imported from foreign countries, and more than 70 percent of the oil we consume is used for transportation. [EPA-HQ-OAR-2010-0162-3129.1, p.3]

The nation's fleet of trucks and buses consumes more than 100 million gallons of fuel per day - 13 percent of total U.S. petroleum consumption. To put this in perspective, the BP oil spill is estimated to have leaked nearly 200 million gallons of crude into the Gulf of Mexico. Our commercial trucks and buses use the same amount of oil in 2 days as was leaked from the entire Deepwater Horizon rig disaster. Reducing our consumption of oil will save consumers money and reduce the harmful impact on our environment. [EPA-HQ-OAR-2010-0162-3129.1, p.3]

Our nation's dependence on oil is also a threat to national security. The U.S. consumes nearly 25 percent of the world's oil production, but controls less than 2 percent of the supply. And over half of the oil we use each day is imported from foreign countries, many of which do not like us. In 2008, we sent over $1 billion a day overseas to pay for oil, the majority of it going to nations deemed "dangerous or unstable." The rate at which we consume oil helps our enemies by paying to finance and sustain their unfriendly regimes. And the longer the U.S. remains dependent on petroleum, the more the U.S. will have to engage in tough fights just to protect our energy supplies. [EPA-HQ-OAR-2010-0162-3129.1, p.3]

More than 70 percent of the oil we consume is for transportation. If we want to reduce our dependence on oil, we must address fuel consumption from our transportation sector. Former CIA director Jim Woosley has said, "Except for our own Civil War, this is the only war that we have fought where we are paying for both sides. We pay Saudi Arabia $160 billion for its oil, and $3 or $4 billion of that goes to the Wahhabis, who teach children to hate. We are paying for these terrorists with our SUVs." And retired General and 28th Commandant of the Marine Corps P.X. Kelley and Frederick W. Smith, Chairman, President, and CEO of FedEx Corporation said together in a letter to President Obama, "Simply put, energy security cannot be improved without addressing oil dependence, and oil dependence cannot be meaningfully reduced without addressing transportation." [EPA-HQ-OAR-2010-0162-3129.1, pp.3-4]

The U.S. Environmental Protection Agency (EPA) estimates that by 2030, this program will save nearly 5.8 billion gallons of oil annually. By 2030, this rule alone would reduce daily oil use by enough to offset all of the oil we imported this year from Iraq, based on current vehicle miles traveled. And together with policies underway to address fuel consumption and greenhouse gases from passenger vehicles, our nation could save enough oil to offset more than all of the oil we import from the entire Middle East by 2025. [EPA-HQ-OAR-2010-0162-3129.1, p.4]

The nation's fleet of trucks and buses also contributes significantly to greenhouse gas pollution. In 2008, the transportation sector as a whole accounted for 32 percent of carbon dioxide (CO_2) emissions, 24 percent of methane (CH_4) emissions, and 65 percent of nitrous oxide (N_2O) emissions from fossil fuel combustion, respectively. And medium- and heavy-duty vehicles are responsible for 22 percent of CO_2 emissions from the transportation sector. Between 1990 and 2008, CO_2 emissions from medium- and heavy-duty trucks increased from nearly 240 million metric tons to nearly 400 million metric tons - a 69 percent increase and the largest increase among on-road vehicles. [EPA-HQ-OAR-2010-0162-3129.1, p.4]

As clearly outlined in the proposal, GHG emissions threaten our health and the environment by contributing to climate change. And like oil consumption, climate change is a real threat to our national security at home and abroad. These threats have been clearly laid out in a number of reports by federal agencies, military experts and independent organizations. For example, the National Intelligence Council issued two reports detailing the threat of climate change. And the Pentagon, in its 2010 Quadrennial Defense Review, acknowledges that climate change is already being observed in every region of the world and outlines the dramatic threats climate change will have on our military and national security. The Center for American Progress also released a report, "Securing America's Future," that shows the inextricable link between global warming pollution and our national security. [EPA-HQ-OAR-2010-0162-3129.1, pp.4-5]

This proposed rule would result in significant and necessary greenhouse gas emissions reductions for the nation as a whole. EPA estimates that the program could reduce annual GHG emissions by 72 million metric tons in 2030, or a total of 250 million tons over the lifetime of MY2014-2017 vehicles, mitigating the impacts on our environment and improving national security. [EPA-HQ-OAR-2010-0162-3129.1, p.5]

EDF and ALA recommend, where feasible, the Agency must estimate the monetized benefits associated with the following currently omitted, but important, impact categories: [EPA-HQ-OAR-2010-0162-3129.1, p.16]

• Effect of the rule on public health: the effects of reduced emissions of pollutants such as carbon monoxide (CO), nitrogen oxides (NOx), volatile organic compounds (VOCs), and particular matter (PM), are significant on human health (both in terms of premature mortality and morbidity) and cannot be left out of any impact assessment of a proposed fuel efficiency standard. We understand EPA did not include this assessment in the proposal but plans to include it in the final rule. These important benefits must not be omitted. [EPA-HQ-OAR-2010-0162-3129.1, p.16]

• Effect of the rule on GHG leakage effects (mentioned in the RIA on p. 9-26). The issue is the potential increase of global fuel consumption as a side effect of a decrease in global petroleum prices. Increased fuel consumption would lead to an increase of GHGs outside the U.S. [EPA-HQ-OAR-2010-0162-3129.1, p.16]

We also recommend that where monetization is not feasible, the Agency must present a qualitative list of benefits and explain why it is not feasible to monetize such benefits. This recommendation is in accordance with a recent Presidential Executive Order: "It must take into account benefits and costs, both quantitative and qualitative." "(c) In applying these principles, each agency is directed to use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible. Where appropriate and permitted by law, each agency may consider (and discuss qualitatively) values that are difficult or impossible to quantify, including equity, human dignity, fairness, and distributive impacts." [EPA-HQ-OAR-2010-0162-3129.1, p.16]

EDF commented extensively on the consideration of the Social Cost of Carbon (SCC) in the light-duty greenhouse gas rulemaking and the Draft Environmental Impact Statement (DEIS) for new medium- and heavy-duty (MD/HD) fuel efficiency standards. We hereby incorporate those comments in their entirety. See attachments A and B. We re-iterate many of our previous comments here as they now apply to this proposed rulemaking. [EPA-HQ-OAR-2010-0162-3129.1, pp.16-17; see pp.17-18 of this comment summary for re-iterated comments from the light-duty greenhouse gas rule making and the Draft Environmental Impact Statement]

- Lower Range of Discount Rates: In assigning a dollar value to reductions in CO2 emissions, EPA used the social cost of carbon and the discount rates included in the Interagency Working Group on Social Cost of Carbon. This includes the use of 5 percent, 3 percent and 2.5 percent discount rates. We believe it is not appropriate to include a 5 percent discount rate and we encourage EPA to use a range of discount rates of 3 percent and below in its SCC analysis, including 1 percent and 2 percent discount values, as some analysts suggest values as low as 1.4 percent.[32] These lower values reflect the scientific, economic, and ethical complexities inherent in inter-generational discounting. We also reiterate our recommendation to use declining discount rates. As an alternative to constant rate discounting, including hyperbolic discounting, should be considered.
- We strongly agree that a global value for the SCC is appropriate given the public good characteristic and the intent of GHG controls. The effects of a U.S. ton of carbon are global and will in the end affect us all. To the extent that a domestic percentage is calculated, it must incorporate "spillover effects" where environmental harm in one country can have economic impacts in another country, especially given the special economic, diplomatic, and military place of the United States in the world.
- Evaluating Non-Monetized Benefits: GHG reduction policies can significantly undervalue benefits simply because some of these benefits are not easily quantifiable. The White House Office of Management and Budget recognizes that some costs and benefits will be difficult to monetize, but directs agencies to consider other means of quantification.[33] We request that climate impacts omitted from the models should be identified explicitly. A table should be provided that lists, for each economic model, what impacts were not included in the model's estimate of monetized damages. Accompanying text should serve to explain and complement the table entries but not be a substitute for them. Below, we have provided an example table listing impacts typically omitted from SCC models.

Oil dependence has serious consequences. Extracting oil fouls land and water, kills wildlife, and destroys habitat—as we've seen too grimly in the recent BP oil spill in the Gulf of Mexico. Refining oil creates air pollution and water pollution. Combustion of oil—burning oil and oil-based fuels in engines—releases CO2, which causes global warming (about 42 percent of the world's energy-related CO2 emissions come from oil). Emissions from oil refining and combustion also contribute to ozone, which worsens asthma, causes premature death and contributes to other health problems. [EPA-HQ-OAR-2010-0162-3129.1, pp.18-19]

In addition, oil dependence makes the U.S. economy vulnerable to short-and long-term increases in energy costs. In terms of imported oil, an increase in the price of imported oil could lead to 'imported inflation' and vulnerability of the local manufacturers and consumers alike. [EPA-HQ-OAR-2010-0162-3129.1, p.19]

We commend EPA and NHTSA for recognizing the importance of U.S. energy security and the positive impact more efficient use of transportation rules would have. However, we do not fully agree with the approach to valuation of these effects. In particular we disagree with the decision to exclude the monopsony effect from the energy security benefits. [EPA-HQ-OAR-2010-0162-3129.1, p.19]

The Draft RIA accompanying this proposal discusses at length why, in accordance with OMB's Circular A–4, domestic pecuniary benefits can be included. Note that the Circular clearly states: [EPA-HQ-OAR-2010-0162-3129.1, p.19] "analysis should focus on benefits and costs that accrue to citizens and residents of the United States." [EPA-HQ-OAR-2010-0162-3129.1, p.19]

However, the draft RIA and Proposed Rule both conclude that "the Agency has determined that using only the macroeconomic disruption component of the energy security benefit is the appropriate metric for this rule" due to the "redistributive nature of this monopsony effect" from a global perspective. We request that the final rule include the monopsony effects as a true benefit to the "citizens and residents of the United States" per OMB guidance. This will more than double the energy security benefits used in the current Proposed Rule. [EPA-HQ-OAR-2010-0162-3129.1, p.19]

In determining the full benefits of fuel consumption reduction and energy security, it is worth considering cost estimation proposals such as that included in Sen. Richard Lugar's (R-Ind.) Practical Energy and Climate Plan, S. 3464. This proposed legislation included both an extensive list of potential impacts to be considered and an alternative approximation valuation methodology for the "external cost of petroleum use" (i.e. this does not include the actual fuel savings). [EPA-HQ-OAR-2010-0162-3129.1, p.19]

It included the recommendation to determine the cost effectiveness of proposed fuel efficiency standards by taking into account the following: [EPA-HQ-OAR-2010-0162-3129.1, p.19;See pp.20-21 of this comment summary for an excerpt for Sen. Richard Lugar's Practical Energy and Climate Plan]

In other words, the proposal endeavors to either undertake a multi-factored analysis to value an extensive list of the external costs of petroleum use (many of which have not been estimated in this particular proposal) or to simply approximate the value of those external costs of petroleum use, by "using a value for such costs equal to 50 percent of the value of a gallon of gasoline saved".

As a simple exercise we used the fuel savings found in the preamble of the proposed rule, Table VIII-24, 75 Fed. Reg. at 74332 and applied the "50 percent of a value of a gallon saved". The resulting estimates of total benefits of reduce petroleum use are much higher than found in the RIA. Even considering the 95% percentile SCC with discount rate of 3%, the estimated benefits fall short of what the simple approximation based on a 50% of the per gallon saving would yield.

This is illustrated in the following Table 1 [See p.21 of this comment summary for Table 1: Estimated Annual Monetized Costs Benefits of the Proposed Program (Millions of $2008 dollars) for the Indicated Years], which has in gray shading an estimate of the "total value to the Nation of reduced petroleum use, including the value of reducing external costs of petroleum use, using a value for such costs equal to 50 percent of the value of a gallon of gasoline saved" by simply halving the yearly estimated fuel savings.

<u>Response:</u>

<u>Effect of the rule on public health</u>

The agencies have quantified and monetized the benefits of the final rulemaking of the human health benefits, as discussed in preamble Section VIII.H.

<u>Effect of the rule on GHG leakage effects</u>

EPA recognizes that as the world price of oil falls in response to lower U.S. demand for oil, there is the potential for an increase in oil use outside the U.S., resulting in a modest increase in GHG emissions, the so called "GHG leakage effect". The GHG leakage effect is hard to estimate. Given that oil consumption patterns vary across countries, there will be different demand responses to a change in the world price of crude oil. For example, in Europe, the price of crude oil comprises a much smaller portion of the overall fuel prices seen by consumers than in the U.S. Since Europeans pay significantly more than their U.S. counterparts for transportation fuels, a decline in the price of crude oil is likely to have a smaller impact on demand. In many other countries, particularly developing countries, such as China and India, oil is used more widely in industrial and even electricity applications, although China and India's energy picture is evolving rapidly. In addition, many countries around the world subsidize their oil consumption. It is not clear how oil consumption would change due to changes in the market price of oil with the current pattern of subsidies. Emerging trends in worldwide oil consumption patterns illustrates the difficulty in trying to estimate the overall effect of a reduction in world oil price on GHG emissions. However, the Agency recognizes that this effect is important to capture and will continue to examine methodologies for quantifying this effect.

Social Cost of Carbon

EPA appreciates the commenter's recommendations about the SCC estimates, which were developed through an interagency process that included DOT/NHTSA, EPA, and other executive branch entities, and concluded in February 2010. EPA and other federal agencies have since used these estimates to estimate the social benefits of various regulatory actions that have small or marginal impacts on cumulative global emissions, documenting why the estimates and underlying methodology are appropriate. However, the U.S. government intends to revise these estimates, taking into account new research findings that were not included in the first round. To help motivate and inform this process, DOE and EPA are hosting a series of workshops. The first workshop focused on conceptual and methodological issues related to integrated assessment modeling and valuing climate change impacts, along with methods of incorporating these estimates into policy analysis. The second workshop reviewed research on estimating impacts and valuing damages on a sectoral basis. See http://yosemite.epa.gov/ee/epa/eerm.nsf/vwRepNumLookup/EE-0564?OpenDocument for details about the workshop series.

The interagency group committed to update the SCC estimates as the science and economic understanding of climate change and its impacts on society improves over time. The group set a preliminary goal to revisit the SCC values within two years or at such time as substantially updated models become available, and to continue to support research in this area. EPA will consider the comments and recommendations submitted to this rulemaking when the current SCC estimates are updated. In the meantime, it will use the SCC estimates developed through the 2009-2010 interagency process. The basis for those estimates discussed in detail in the SCC Technical Support Document (SCC TSD).[62]

EPA has reviewed the commenter's specific comments about discount rate selection and analyzing effects on future generations. In sum, the interagency group applied three constant certainty-equivalent discount rates (2.5, 3, and 5 percent) to the SCC estimates to account for various perspectives about risk and uncertainty. The upper value of 5 percent accounts for the view that there may be a high correlation between climate damages and market returns while the rest of the SCC analysis centers on a discount rate consistent with concerns about risk aversion. EPA recognizes the limitations of the discounting approach used in the interagency modeling exercise, but finds it to be the most defensible and transparent given its consistency with the

[62] *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Carbon*, with participation by Council of Economic Advisers, Council on Environmental Quality, Department of Agriculture, Department of Commerce, Department of Energy, Department of Transportation, Environmental Protection Agency, National Economic Council, Office of Energy and Climate Change, Office of Management and Budget, Office of Science and Technology Policy, and Department of Treasury (February 2010). Available at http://epa.gov/otaq/climate/regulations.htm

standard contemporary theoretical foundations of benefit-cost analysis and with the approach outlined in OMB's existing guidance.

EPA appreciates the comment regarding use of a global SCC value and notes that the global estimates have been used to assess the benefits of this rulemaking.

Regarding the commenter's recommendation to identify non-monetized benefits, it is not possible at this time to provide a precise list of each model's treatment (i.e., included, excluded) of climate impacts. Instead, the SCC TSD presents a robust discussion of this key analytical issue, e.g., how each model estimates climate impacts, the known parameters and assumptions underlying those models, and the implications of incomplete treatment of impacts (catastrophic and non-catastrophic) for the SCC estimates. EPA notes that the table presented by the commenter does not provide a complete listing for all three models used to estimate the SCC. Moreover, the discussion in the SCC TSD underscores the difficulty in accurately distilling the models' treatment of impacts in table-form. Most notably, the use of aggregate damage functions—which consolidate information about impacts from multiple studies—in two of the models poses a challenge in listing included impacts. For example, within the broad agricultural impacts category, some of the sub-grouped impacts are not explicitly modeled but are highly correlated to other subcategories that are explicitly modeled. Therefore, it may be misleading to identify these kinds of impacts as either "included" or "omitted" from the model. Along those lines, impacts may be included in models but not directly; the Dynamic Integrated Climate and Economy (DICE) model represents adaptation implicitly through the choice of studies used to calibrate the aggregate damage function, and the Climate Framework for Uncertainty, Negotiation, and Distribution (FUND) model includes adaptation both implicitly and explicitly (see the SCC TSD for details).

Accordingly, EPA recognizes the need for a thorough review of damage functions—in particular, how the models incorporate adaptation, technological change, and catastrophic damages. As noted above, DOE and EPA are hosting a series of workshops to explore the treatment of impacts in the models.

Energy and National Security

After reviewing the OMB's Circular A–4 guidelines cited by the commenter, the agencies have concluded that excluding the monopsony benefit from its overall costs and benefits analysis continues to be appropriate when a global perspective is taken. However, the agencies recognize that the monopsony benefit has distributional impacts between the U.S., and the rest of the worlds, and continue to describe and discuss the monopsony benefit in Section VIII.E.2 of the preamble.

The agencies recognize that potential national and energy security risks exist due to the possibility of tension over oil supplies. Much of the world's oil and gas supplies are located in countries facing social, economic, and demographic challenges thus making them even more vulnerable to the potential local instability. A more thorough discussion of this issue can be found in Section VIII.I.(2) of the preamble.

Although the agencies recognize that there clearly is a benefit to the United States from reducing dependence on foreign oil, the agencies have been unable to calculate the monetary benefit that the United States will receive from the improvements in national security expected to result from this rule. In contrast, the other portion of the energy security premium, the U.S. macroeconomic disruption and adjustment cost that arises from U.S. petroleum imports is included in the energy security benefits estimated for this program. To summarize, the agencies have included only the macroeconomic disruption portion of the energy security benefits to estimate the monetary value of the total energy security benefits of this program. The agencies have calculated energy security in very specific terms, as the reduction of both financial and strategic risks caused by potential sudden disruptions in the supply of imported petroleum to the U.S. Reducing the amount of oil imported reduces those risks, and thus increases the nation's energy security.

Organization: American Road and Transportation Builders Association (ARTBA)

ARTBA encourages efforts to reduce emissions and improve fuel economy. It is inappropriate, however, to promulgate such proposals without acknowledging and attempting to mitigate the adverse effect they would have on other areas of federal responsibility. ARTBA is particularly concerned with the potential effect of EPA and NHTSA's proposed rule on revenues generated for the Highway Trust Fund (HTF). The HTF was created in 1956 as an investment construct by which users of the national highway infrastructure are charged a direct user fee to maintain and improve the system on which they rely. Currently, 18.3 cents are directed to the federal HTF from each gallon of gasoline purchased and federal highway investment accounts for 45 percent of the national capital investment in highway and bridge construction. [EPA-HQ-OAR-2010-0162-1777.1, p.2]

As fuel efficiency has increased and innovations in automotive technologies have progressed, revenues into the HTF have been negatively impacted. These positive developments in reducing the motor fuel usage, however, do not have to be inconsistent with the goal of meeting the nation's transportation infrastructure needs. Unfortunately, policymakers in the legislative and executive branches have not increased the per gallon rate of the federal motor fuels user fee since 1993 and as a result the revenues flowing into the HTF and their corresponding purchasing power has fallen further behind the documented needs of the nation's surface transportation system. This problem affects the amount of funding that all 50 states receive from the federal government to build and maintain their transportation infrastructure. [EPA-HQ-OAR-2010-0162-1777.1, pp.2-3]

ARTBA encourages the development and use of more energy efficient vehicles. This proposal, however, should be expanded to ensure it does not dilute existing or future federal HTF revenues. This adjustment could include an increase in the federal motor fuels tax or some other method of generating federal revenues that will accurately capture the benefit received by users of the system and protect against the effects of inflation, increases in construction costs, and advances in fuel efficiency. [EPA-HQ-OAR-2010-0162-1777.1, p.3]

Response:

Federal policy makers across the spectrum recognize that more fuel efficient vehicles are a boon to the consumer and public alike but will inevitably lead to lower fuel tax collection per mile driven and hence an imbalance in the collection of fuel taxes relative to highway infrastructure needs. The Department of Transportation is more than aware of this concern and is working with the Congress to address this issue. The Highway Trust Fund is outside of the scope of the EPA and NHTSA HD National Program.

Organization: Virginia Department of Transportation (VDOT)

First, among a host of stakeholders with interest in the new rule, manufacturers and suppliers will be the first to be affected as engine and material costs increase. As a fleet owner and end-user of those products, VDOT may be directly impacted due to escalating equipment costs resulting from the proposed rule, which may be offset by the phased in approach and corresponding increases in fuel efficiency. With a current inventory of affected vehicles in excess of 5,000 units, the cumulative dollar effect of these increases to VDOT will be significant. From data in the proposed rule, we project aggregated incremental equipment cost increases of 9.7 percent for pickup trucks, 2.3 percent for medium and heavy dump trucks, and 18.3 percent for tandem tractors. In dollar terms, this equates to an estimated increase in equipment replacement costs of approximately $500,000 annually. [EPA-HQ-OAR-2010-0162-1611.1, pp.1-2]

Our final comment relates to the impact of continued improvements in fuel economies on Virginia's transportation program. As federal and state fuel tax revenues are the single largest source of funding for our transportation program, the proposed increased fuel efficiency standards are likely to continue to erode the amount of revenue coming into Virginia for this purpose from federal and state gas tax sources. In the long term, decreased transportation revenues from fuel tax receipts are likely to result in the delay or cancellation of highway infrastructure maintenance and construction projects. [EPA-HQ-OAR-2010-0162-1611.1, p.2]

Response:

As noted in the previous response, federal policy makers across the spectrum recognize that more fuel efficient vehicles are a boon to the consumer and public alike but will inevitably lead to lower fuel tax collection per mile driven and hence an imbalance in the collection of fuel taxes relative to highway infrastructure needs. The Department of Transportation is more than aware of this concern and is working with the Congress to address this issue. The Highway Trust Fund is outside of the scope of the EPA and NHTSA HD National Program.

Organization: BlueGreen Alliance

While this will likely increase the acquisition cost of medium- and heavy-duty vehicles, the upfront cost is expected to be minimal and quickly offset by significant savings at the pump. The Notice of Proposed Rulemaking (NPRM) estimates the market cost to implement the proposed standards will be $7.7 billion, while truckers could save $28 billion at the pump. This means less money spent on oil, more money going back into the U.S. economy, and reduced shipping costs. Most importantly, it means more job creation to deliver an American-made cleaner truck fleet. [EPA-HQ-OAR-2010-0162-2117.1, p.2]

Developing and manufacturing cleaner vehicles and their underlying components domestically will bolster efforts to re-energize the U.S. manufacturing sector, which has shed more than a million jobs in the recent economic recession, and strengthen America's ability to compete in the global economy. According to recent analysis by the Union of Concerned Scientists, the proposed standards would create tens of thousands of jobs by 2020. [EPA-HQ-OAR-2010-0162-2117.1, p.2]

The final rule, and subsequent rulemakings, should ensure that economic benefits and costs are equitably distributed to drivers and workers in the industry, not just licensed motor carriers. Further, it is critical that any new or existing programs outside of these standards to promote clean vehicle technology and vehicle acquisition include accountability mechanisms to ensure incentives for new vehicle purchase and truck retrofits deliver the highest benefit to workers and drivers. [EPA-HQ-OAR-2010-0162-2117.1, p.3]

Response:

The agencies expect that these regulations will in the end lead to lower freight transportation costs and therefore to lower prices for goods and services of all kinds. We have no ability to control how the benefits of such lower transportation costs are spread between producers, drivers and consumers in this regulation. We have no reason to believe the regulation will alter the relative dynamics among these groups, and we simply conclude that more efficient transportation is in the best interest of all of these groups.

Organization: Center for Biological Diversity

We have provided extensive comments on the shortcomings of the Agencies' cost-benefit analysis in our prior comment letters, including the understatement of the social cost of carbon and the failure to monetize the damages attendant to crossing tipping points and ocean acidification, among other things. We have urged the Agencies to abandon an approach that removes the use of technologies presently available or that can be implemented during the rulemaking years based on cost concerns even though the proposed rulemaking results in net profits to the regulated industry (without ever taking the social cost of carbon into consideration at all). [33] We have also described the Agencies' failure to provide the public and decision-makers with truly relevant comparisons that put the consequences of the proposed alternatives into sharp focus. We add here that the Agencies themselves acknowledge defects in their analysis when they state that the "monetized benefits of CO2 reductions . . . represent only a partial accounting of total benefits due to omitted climate change impacts and other factors that are not readily monetized" and omit "other impacts such as benefits related to non-GHG emission reductions." [EPA-HQ-OAR-2010-0162-2506.1, p.9]

For example, one such benefit is the reduction of costs required to maintain a U.S. military presence to help secure stable oil supplies. In addition, the Agencies have simply failed to analyze the costs and benefits of the most technologically advanced alternatives, Nos. 6b and 8. [EPA-HQ-OAR-2010-0162-2506.1, p.10]

Since the time of our January 3, 2011 Comment Letter, additional studies have been published that add to the overwhelming evidence that climate change is currently underway and that the failure to reduce greenhouse gases will cause catastrophic consequences. 37 We include here studies showing record melts from the Greenland ice sheet in 2010; the bigger-than estimated impact on climate from the melting Arctic; and the higher-than previously-estimated risk of lung damage due to ozone pollution, and ask the Agencies to include them in their analysis of climate change impacts. [EPA-HQ-OAR-2010-0162-2506.1, p.10]

In light of the highly significant black carbon emissions from HD Vehicles, we also urged the Agencies in our January 3, 2011 Comment Letter to include these emissions in their environmental impact statement and their decision-making process in selecting appropriate technologies and HD Vehicle standards. The discussion of this subject is equally relevant here. [EPA-HQ-OAR-2010-0162-2506.1, p.10]

Moreover, a robust and increasing literature continues to highlight the inherent flaws in cost-benefit analysis as a decision-making tool. The estimated costs of a proposed regulation almost universally far overstate the actual costs, sometimes by an order of magnitude or more, due to a number of well-understood factors. First, the information for the cost side of the equation is largely generated by the regulated industries themselves, which have a clear incentive to overstate the costs and thus avoid regulation they oppose. Second, cost-benefit analysis is premised on the incorrect assumption of a static, rather than dynamic, world. Cost-benefit analysis projects costs based on a snapshot in time, ignoring the fact that the costs will in fact change over time due to the regulation itself and other factors. Environmental and health protection rules spur innovation and lower the cost of pollution prevention. For these reasons, the use of cost-benefit analysis almost universally biases an agency's decision against a more ambitious pollution reduction rule and is a fundamentally flawed and inappropriate decision-making tool. All of these pitfalls are present in the current rulemaking, in addition to the other problems already discussed. Thus, the Agencies' use of cost-benefit analysis in the proposed rulemaking is not only highly arbitrary but also prevents the accomplishment of the statutory mandate to require the maximum feasible level of fuel economy. [EPA-HQ-OAR-2010-0162-2506.1, pp.10-11]

[33] This Court has previously stated that "[c]ost-benefit analysis means weighing the marginal gain against the marginal cost of each increment of further regulation and then setting the level of regulation at the point at which the latter exceeds the former." Natural Resources Defense Counsel v. EPA, 804 F.2d 710, 727 (D.C. Cir. 1986), reversed on other grounds, 824 F.2d 1146 (D.C. Cir. 1987). A profit-making regulation certainly does not meet that test. [EPA-HQ-OAR-2010-0162-2506.1, p.9] 37 We note that unfortunately, the Proposed Rule contains this misleading summary of these dangers: "Setting GHG emissions standards for the heavy-duty sector will help to address climate change, which is widely viewed as a significant long-term threat to the global environment." Id. at 74156. The Agencies here seem to overlook EPA's own endangerment finding concerning greenhouse gases and the vast scientific evidence that supports its devastating conclusions. Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66496 (December 15, 2009). These threats posed by climate change are a matter of established fact rather than a matter of opinion. The misleading language cited above should be removed. [EPA-HQ-OAR-2010-0162-2506.1, p.10]

Response:

First, the agencies decisions as to which standards to adopt is not based only on a cost-benefit test, but rather in weighing the statutory criteria under each agency's respective statute and, based on that weighing, determining which standards are appropriate under CAA section 202 (a)(1) and maximum feasible under EISA section 32902 (k). The commenter's generalized critique of biases in cost-benefit analysis is thus not directly pertinent to the rules at issue.

Second, the agencies are not quantifying the benefit of maintaining a U.S. military presence to help secure stable oil supply from potentially vulnerable regions of the world because the attribution of these costs to particular missions or activities is difficult to quantify.

EPA appreciates the commenter's observation about the magnitude of SCC estimates, in particular the omission of certain climate change impacts. EPA has provided a more robust discussion about these important issues in the SCC Technical Support Document (SCC TSD) that complements the SCC estimates and better informs policy makers.[63] EPA considered these limitations and, as a participant in the interagency group, used best available information and techniques to quantify such impacts as feasible and supplement the SCC with qualitative assessments. In particular, the SCC TSD discusses in detail how each model estimates climate

[63] *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Carbon*, with participation by Council of Economic Advisers, Council on Environmental Quality, Department of Agriculture, Department of Commerce, Department of Energy, Department of Transportation, Environmental Protection Agency, National Economic Council, Office of Energy and Climate Change, Office of Management and Budget, Office of Science and Technology Policy, and Department of Treasury (February 2010). Available at http://epa.gov/otaq/climate/regulations.htm

impacts, the known parameters and assumptions underlying those models, and the implications of incomplete treatment of impacts (catastrophic and non-catastrophic) for the SCC estimates. Accordingly, EPA recognizes the need for a thorough review of damage functions—in particular, how the models incorporate adaptation, technological change, and catastrophic damages. As noted above, DOE and EPA are hosting a series of workshops to explore the treatment of impacts in the models.

EPA and other federal agencies have used the SCC estimates, which were developed through an interagency process that included DOT/NHTSA, EPA, and other executive branch entities, and concluded in February 2010, to estimate the social benefits of various regulatory actions that have small or marginal impacts on cumulative global emissions. However, the U.S. government intends to revise these estimates, taking into account new research findings that were not included in the first round. To help motivate and inform this process, DOE and EPA are hosting a series of workshops. The first workshop focused on conceptual and methodological issues related to integrated assessment modeling and valuing climate change impacts, along with methods of incorporating these estimates into policy analysis. The second workshop reviewed research on estimating impacts and valuing damages on a sectoral basis. See http://yosemite.epa.gov/ee/epa/eerm.nsf/vwRepNumLookup/EE-0564?OpenDocument for details about the workshop series.

The interagency group committed to update the SCC estimates as the science and economic understanding of climate change and its impacts on society improves over time. The group set a preliminary goal to revisit the SCC values within two years or at such time as substantially updated models become available, and to continue to support research in this area. EPA will consider the comments and recommendations submitted to this rulemaking when the current SCC estimates are updated. In the meantime, it will use the SCC estimates developed through the 2009-2010 interagency process.

The agencies recognize that potential national and energy security risks exist due to the possibility of tension over oil supplies. Much of the world's oil and gas supplies are located in countries facing social, economic, and demographic challenges making them even more vulnerable to the potential local instability associated with the impacts of climate change. A more thorough discussion of this issue can be found in Section VIII.I.(2).

Although the agencies recognize that there clearly is a benefit to the United States from reducing dependence on foreign oil, the agencies have been unable to calculate the monetary benefit that the United States will receive from the improvements in national security expected to result from this rule. In contrast, the other portion of the energy security premium, the U.S. macroeconomic disruption and adjustment cost that arises from U.S. petroleum imports is included in the energy security benefits estimated for this program. To summarize, the agencies have included only the macroeconomic disruption portion of the energy security benefits to estimate the monetary value of the total energy security benefits of this program. The agencies have calculated energy security in very specific terms, as the reduction of both financial and strategic risks caused by potential sudden disruptions in the supply of imported petroleum to the

U.S. Reducing the amount of oil imported reduces those risks, and thus increases the nation's energy security.

Organization: Competitive Enterprise Institute

The proposed standards, which phase in during model-years 2014–2018, apply to three types of heavy duty (HD) vehicles: (1) "combination tractors" (semi-trucks), (2) large pickups and vans, and (3) "vocational trucks" (a wide-ranging assortment of trucks and buses). The agencies estimate that the technologies needed to comply with the proposed standards will cost $7.7 billion but that the rule will generate $27 billion or $41 billion in net benefits (depending on whether future benefits are discounted at 7% or 3%). [EPA-HQ-OAR-2010-0162-2418.1, p.2]

Although the ostensible objective of the rule is to reduce greenhouse gas (GHG) emissions and oil imports, the overwhelming lion's share of the claimed benefits – fuel savings for truckers – has nothing to do with either climate change or energy security. For example, based on the unverifiable assumption that each ton of carbon dioxide (CO2) emitted has a "social cost" of $22-$46, the agencies attribute only $2.3 billion — about 6% — of the rule's net benefits in 2030 to its CO2 reductions and climate impact. [EPA-HQ-OAR-2010-0162-2418.1, p.2]

The agencies' press release crows that the standards will reduce GHG emissions by 250 million metric tons (mmt) and save 500 million barrels of oil over the lives of vehicles manufactured during the program's first five years (2014-2018). Such tiny changes can have no detectable effect on the alleged perils of either global warming or oil import dependence. [EPA-HQ-OAR-2010-0162-2418.1, p.2]

Let's put those numbers in perspective. The agencies consider 10 years to be the "useful life" of medium- and heavy-truck engines. U.S. emissions topped 7,000 mmt in 2008, so cumulative U.S. emissions over a 10-year period are likely to be at least 70,000 mmt. Cutting HD vehicle emissions by 250 mmt would reduce total U.S. emissions by a mere 0.7%. The climate change "benefit," if any, would exist only on paper. There would be no discernible evidence of it in the real world. [EPA-HQ-OAR-2010-0162-2418.1, p.2]

EPA's calculations implicitly confirm this. By 2100, the proposed GHG standards are estimated to reduce atmospheric CO2 concentration by 0.732 parts per million, which in turn is estimated to avert 0.002-0.004°C of global warming and 0.012-0.048 centimeters of sea-level rise. Such changes would be too small for scientists to distinguish from the "noise" of natural climate variability. [EPA-HQ-OAR-2010-0162-2418.1, p.2]

NHTSA estimates that its fuel economy standards will reduce oil imports by 0.177 million barrels per day (bpd) in 2020 — about 65 million barrels lower than the baseline projection for that year. The U.S. imported 4,267 million barrels in 2009, so the rule would avoid the equivalent of about 1.5% of current oil imports. Note that oil demand and imports may fluctuate by substantially more than that from year-to-year. For example, from 2008 to 2009, U.S. oil imports declined by 460 million barrels. Has this fluctuation materially weakened Al Qaeda, the Iranian Mullahs, or the Taliban? The rule's national security benefit is undetectable and symbolic –even if one accepts the premise that oil import dependence is an important measure of national security. [EPA-HQ-OAR-2010-0162-2418.1, pp.2-3]

In reality, the relationship between energy security and oil import dependence is a lot less straightforward than conventional wisdom suggests. Net oil imports account for well over half of current U.S. petroleum consumption. The proposed rule will not get us even close to where things stood in 1973, when oil imports accounted for 35% of U.S. consumption. A few simple questions should help put things in perspective: Was 1973 a good year for peace in the Middle East? Was it a time when OPEC was a shy and retiring actor on the world stage? Was it an innocent age that knew not hijackings, bombings, and the rise of international terror organizations? No, no, and no. The notion that EPA and NHTSA can make America safer by engineering a downtick in U.S. petroleum imports defies history and logic. [EPA-HQ-OAR-2010-0162-2418.1, p.3]

Response:

Social Cost of Carbon

EPA disagrees with the commenter's characterization of the SCC as an "unverifiable assumption." The SCC estimates used in the rulemaking analysis were developed from three integrated assessment models that synthesize available scientific and economic research and have been used in the IPCC assessment. Integrated assessment models are particularly well suited to the estimation of SCC because they combine climate processes, economic growth, and feedbacks between the climate and global economy into a single modeling framework. See the SCC TSD[64] for a complete discussion about the 3 models used to develop the SCC estimates.

In addition, EPA notes that the SCC estimates do not include all significant climate changes damages and are therefore underestimates. As a result, EPA has supplemented the quantified benefit estimates with a qualitative discussion about benefits.

Energy and National Security

[64] *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Carbon*, with participation by Council of Economic Advisers, Council on Environmental Quality, Department of Agriculture, Department of Commerce, Department of Energy, Department of Transportation, Environmental Protection Agency, National Economic Council, Office of Energy and Climate Change, Office of Management and Budget, Office of Science and Technology Policy, and Department of Treasury (February 2010). Available at http://epa.gov/otaq/climate/regulations.htm

This commenter felt that there is no relationship between reduced U.S. oil imports and U.S. energy security; the commenter sees no relationship between reduced oil imports and, for example, the number of hijackings, bombings, and other terrorist-related activities that have occurred through time.

The agencies recognize that potential national and energy security risks exist due to the possibility of tension over oil supplies. Much of the world's oil and gas supplies are located in countries facing social, economic, and demographic challenges making them even more vulnerable to the potential local instability associated with the impacts of climate change. A more thorough discussion of this issue can be found in Section VIII.I.(2).

Although the agencies recognize that there clearly is a benefit to the United States from reducing dependence on foreign oil, the agencies have been unable to calculate the monetary benefit that the United States will receive from the improvements in national security expected to result from this rule. In contrast, the other portion of the energy security premium, the U.S. macroeconomic disruption and adjustment cost that arises from U.S. petroleum imports is included in the energy security benefits estimated for this program. To summarize, the agencies have included only the macroeconomic disruption portion of the energy security benefits to estimate the monetary value of the total energy security benefits of this program. The agencies have calculated energy security in very specific terms, as the reduction of both financial and strategic risks caused by potential sudden disruptions in the supply of imported petroleum to the U.S. Reducing the amount of oil imported reduces those risks, and thus increases the nation's energy security.

Organization: Natural Resources Defense Council (NRDC)

In order to fully calculate and appreciate the economic benefits that the Heavy-Duty National Program would bring by reducing GHG emissions, it is very important that the economic analysis correctly account for the social cost of carbon (SCC). We strongly recommend that EPA and NHTSA rely on SCC values that correct errors used to determine current values published by the Interagency Task Force on Social Cost of Carbon. [EPA-HQ-OAR-2010-0162-1776.1, p.14]

The analysis by the Interagency Task Force makes several methodological errors that systematically bias the SCC downwards including the following:

- Failing to account for many damages (as enumerated in the Task Force's document detailing its derivation of the SCC),

- Neglecting to employ the full range of recommended discount rates for benefits and damages that are incurred by future generations (discount rates of 2.5%, 3%, and 5% were chosen, while OMB and EPA guidelines specify that 1% to 3% represents an appropriate range),

- Failing to consider discounting methodology well established in the mainstream economics literature that takes into account risk aversion to uncertainty in future interest rates—uncertainty that implies declining discount rates over time should be used, and

- Failing to weigh damages to poor countries, who are expected to bear the most burdens from climate change but contributed to it the least, more heavily than those experienced by wealthy countries. [EPA-HQ-OAR-2010-0162-1776.1, p.14]

Every qualification in the Task Force's report is that if anything, the SCC is likely to be biased downward. [EPA-HQ-OAR-2010-0162-1776.1, p.14]

NRDC commented on the SCC methodology during the rulemaking process for the joint EPA/NHTSA Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for MY 2012 to 2016. Many of the issues raised remain unaddressed, which undercuts the benefits of the Heavy-Duty National Program and could result in a standard that does not maximize societal benefits. [EPA-HQ-OAR-2010-0162-1776.1, p.14]

Response:

EPA appreciates the commenter's recommendations about the SCC estimates, which were developed through an interagency process that included DOT/NHTSA, EPA, and other executive branch entities, and concluded in February 2010. EPA and other federal agencies have since used these estimates to estimate the social benefits of various regulatory actions that have small or marginal impacts on cumulative global emissions. However, the U.S. government intends to revise these estimates, taking into account new research findings that were not included in the first round. To help motivate and inform this process, DOE and EPA are hosting a series of workshops. The first workshop focused on conceptual and methodological issues related to integrated assessment modeling and valuing climate change impacts, along with methods of incorporating these estimates into policy analysis. The second workshop reviewed research on estimating impacts and valuing damages on a sectoral basis. See http://yosemite.epa.gov/ee/epa/eerm.nsf/vwRepNumLookup/EE-0564?OpenDocument for details about the workshop series.

The interagency group committed to update the SCC estimates as the science and economic understanding of climate change and its impacts on society improves over time. The group set a preliminary goal to revisit the SCC values within two years or at such time as substantially updated models become available, and to continue to support research in this area. EPA will consider the comments and recommendations submitted to this rulemaking when the current SCC estimates are updated. In the meantime, it will use the SCC estimates developed through the 2009-2010 interagency process.

Regarding the commenter's observation about the limited treatment of damages, e.g., the omission of certain climate change impacts: EPA has provided a more robust discussion about these important issues in the SCC Technical Support Document (SCC TSD) that complements the SCC estimates and better informs policy makers.[65] EPA considered these limitations and, as a participant in the interagency group, used best available information and techniques to quantify such impacts as feasible and supplement the SCC with qualitative assessments. In particular, the SCC TSD discusses in detail how each model estimates climate impacts, the known parameters and assumptions underlying those models, and the implications of incomplete treatment of impacts (catastrophic and non-catastrophic) for the SCC estimates. Accordingly, EPA recognizes the need for a thorough review of damage functions—in particular, how the models incorporate adaptation, technological change, and catastrophic damages. As noted above, DOE and EPA are hosting a series of workshops to explore the treatment of impacts in the models.

EPA has reviewed the commenter's specific comments about discount rate selection and analyzing effects on future generation. The basis for the current discounting approach is discussed in detail in the SCC Technical Support Document (SCC TSD).[66] In sum, the interagency group applied three constant certainty-equivalent discount rates (2.5, 3, and 5 percent) to the SCC estimates to account for various perspectives about risk and uncertainty. The upper value of 5 percent accounts for the view that there may be a high correlation between climate damages and market returns while the rest of the SCC analysis centers on a discount rate consistent with concerns about risk aversion. EPA recognizes the limitations of the discounting approach used in the interagency modeling exercise, but finds it to be the most defensible and transparent given its consistency with the standard contemporary theoretical foundations of benefit-cost analysis and with the approach outlined in OMB's existing guidance.

The SCC TSD also summarizes the consideration of the literature about handling uncertainty in discounting (e.g., Newell and Pizer (2003), Weitzman (2001), and the UK's "Green Book" for regulatory analysis) and concludes that the proper way to model discount rate uncertainty remains an active area of research. See EPA-HQ-OAR-2009-0472-11581 for further discussion about key questions about potential time inconsistencies that arise with differential discounting approaches.[67]

[65] *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Carbon*, with participation by Council of Economic Advisers, Council on Environmental Quality, Department of Agriculture, Department of Commerce, Department of Energy, Department of Transportation, Environmental Protection Agency, National Economic Council, Office of Energy and Climate Change, Office of Management and Budget, Office of Science and Technology Policy, and Department of Treasury (February 2010). Available at http://epa.gov/otaq/climate/regulations.htm

[66] *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, Interagency Working Group on Social Cost of Carbon*, with participation by Council of Economic Advisers, Council on Environmental Quality, Department of Agriculture, Department of Commerce, Department of Energy, Department of Transportation, Environmental Protection Agency, National Economic Council, Office of Energy and Climate Change, Office of Management and Budget, Office of Science and Technology Policy, and Department of Treasury (February 2010). Available at http://epa.gov/otaq/climate/regulations.htm

[67] See Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards: EPA Response to Comments Document for Joint Rulemaking. EPA-420-R-10-012a, April 2010. Can be found at http://www.epa.gov/otaq/climate/regulations/420r10012a.pdf

Regarding the comment about how damages to poor and wealthy countries are treated: notwithstanding the theoretical claims on behalf of equity weighting, the interagency group concluded that this approach would not be appropriate for estimating an SCC value used in domestic regulatory analysis. Please see the SCC TSD for further discussion about the basis for this decision. This issue may be explored further when the interagency group reconsiders the SCC estimates.

It is also useful to recognize the somewhat limited role that the monetary value placed on the SCC plays in the determination of what emissions standards should be adopted in this final rule. EPA used the benefit-cost analysis as one consideration among many to evaluate the overall reasonableness of the emissions standards chosen. See Section III of the preamble for a complete discussion of the various factors on which EPA determined the stringency of the final standard. In this case, the benefits of the standards are significantly greater than the costs, and this would be the case whether EPA considered the domestic value for the SCC, the global value for the SCC, or a range of values including higher SCC values. The specific range or values used in this analysis are therefore not outcome determinative as far as deciding what emissions standards to adopt, as the standards adopted by EPA would still be reasonable from a net benefits perspective under a wide range of SCC.

Organization: National Automobile Dealers Association (NADA)

Even in years when freight demand is high, and truckers and businesses are flush with cash, only a few hundred thousand potentially regulated trucks and engines are built for sale nationwide. This number pales in comparison to the 10-17 million new light-duty vehicles sold nationwide each year. Moreover, while light-duty customers often do not place a high value on fuel efficiency, fuel cost is the number one variable cost for the trucking industry. In fact, the overwhelming majority of new commercial vehicle customers focus on fuel efficiency once they've determined which vehicle and drivetrain features are essential to meet their specific needs. Consequently, the final rule must leverage, not resist, the fact that an acceptable return on investment is critical to commercial motor vehicle purchasers. [EPA-HQ-OAR-2010-0162-2705, p.4]

While fuel efficiency may never rank first on the list of purchase decision criteria for commercial truck customers, it will always rank near the top. First and foremost are the customers' practical needs; the vehicle and drivetrain features necessary to meet expected use conditions. Every vehicle potentially covered by the proposal has a work purpose that must be met through the design, specification, ordering, and manufacture process. Every customer's needs are different. To its credit, the proposal takes pains to recognize this fact by applying several attribute-based categories to combination tractors, and by limiting cross-cutting mandates for vocational trucks. However, several other aspects of the proposal fail to truly recognize the degree to which inappropriate mandates could unduly limit customer choice by reducing vehicle performance or by increasing vehicle cost. [EPA-HQ-OAR-2010-0162-2705, p.4]

Cost is always a concern. The fact that some of the nation's largest fleets can afford to be "early adopters" and to experiment with new fuels and high-cost technologies is commendable, but it is by no means representative. The vast majority of prospective new truck buyers are businesspersons who must carefully consider the up-front cost of vehicle features, especially during times when credit is tight and/or freight rates and profit margins are low. To be effective, commercial fuel economy mandates must pass economic muster. Prospective customers almost always have the option to keep existing vehicles on the road longer, opting for enhanced maintenance and repair strategies that may even include engine and/or vehicle re-building. Alternatively, customers may meet their needs with a used truck or tractor, often at a cost significantly lower than that of a new federally-compliant vehicle. Again, fuel efficiency/GHG mandates must be affordable and cost justifiable up front to be successful in the marketplace. [EPA-HQ-OAR-2010-0162-2705, p.4]

[See p.5 of this comment for additional comments pertaining to New Truck and Engine Standards Must be Affordable and Must not Compromise Performance]

Specifically, NHTSA and EPA propose to regulate combination tractors, heavy-duty pickup trucks and vans, and vocational trucks, using fuel efficiency (not economy) metrics such as gallons/100 miles (grams CO2/100 miles) and gallons/1,000 ton-miles(grams CO2/ton mile). For each vehicle group, the proposal suggests that fuel savings over time will offset the up-front and ongoing costs of new technologies, including improved aerodynamics, more efficient tires, engine and transmission upgrades, and anti-idling controls. However, in addition to higher costs, these strategies inevitably will make vehicle ownership and operation more complex. With most commercial truck purchasers being very risk averse, any higher costs, reduced performance, or increased complexities associated with this rule will be top-of-mind, especially in light of the compromised rollout of EPA's 2010 and 2007 truck emissions standards. [EPA-HQ-OAR-2010-0162-2705, p.6]

Response:

As our analyses summarized in the preamble and regulatory impact analysis make clear, the agencies believe these regulations will repay the vehicle purchaser's additional investment within 1 to 3 years, in the form of savings in fuel costs. Our final program is projected not to affect adversely any vehicle attributes that are important to the trucking industry, thus we believe this regulation is in keeping with the commenter's admonition to "leverage, not resist, the fact that an acceptable return on investment is critical to commercial motor vehicle purchasers." Similarly, we believe the final action is consistent with the position that "fuel efficiency/GHG mandates must be affordable and cost justifiable".

Organization: National RV Dealers Association (RVDA)

RVDA feels that should EPA intend to cover recreational vehicles under this proposal, then it must perform a separate and detailed Regulatory Flexibility Analysis on the rules impact on non-commercial industries, i.e. the RV industry. The EPA must assess the economic impact that is specific to non-commercial vehicles and it should not attempt to apply a cost-benefit assessment for commercial vehicles to personal use vehicles such as motorhomes. [EPA-HQ-OAR-2010-0162-1775.1, p.4]

EPA will need to look at the number of motorhome owners, duration of trips by motorhome owners, the number of hours they are on the road, and the number of miles driven by motorhome owners. Likewise the EPA will need to address the costs for a limited non-commercial market segment to comply with the costs the EPA intends place on the commercial trucking industry. Using industry estimates, the average RV owner takes four to five trips per year, for generally less than 5000 miles total. RVDA believes that once the EPA performs this analysis, it will find that the dramatic costs to the RV industry do not outweigh the limited environmental benefits. [EPA-HQ-OAR-2010-0162-1775.1, p.4]

Response:

As the commenter notes, recreational vehicles like many vocational vehicles have widely varying use patterns with the potential for lower and higher annual usage compared to heavy-duty vehicle market on whole. While we have not done a separate analysis for recreational vehicles in the rulemaking, we would note that given the nature of the regulation and the engine market this program is likely to provide similar benefits for recreational vehicle owners at a small incremental cost. In response to the comment below, the agencies show the payback analysis for a theoretical RV which travels 3,700 miles per year. In general, the regulation we are finalizing today will lead to the use of better tires and engines in recreational vehicles. As a consumable item the tire benefits over the lifetime of the tires are essentially the same among all users. Hence other than temporal differences, the analyses conducted by the agencies should be equally applicable to recreational vehicles. In the case of engine regulation, it should be noted that recreational vehicles are only a small fraction of vocational engine purchases, far too small to dictate engine designs. Hence, even if EPA were to exclude recreational vehicle engines from this regulation, the engines supplied to the recreational market would almost certainly contain the same technologies and achieve the same level of performance as other vocational engines. Excluding recreational engines would only add additional overhead costs for separate certification and tracking of engines for recreational vehicle applications. Such regulatory complexity is wholly unneeded and is not in the public interest nor in the interest of recreational vehicle operators.

Organization: Recreation Vehicle Industry Association (RVIA)

RVIA recommends that EPA and NHTSA conduct a separate non-commercial vehicle cost-benefit analysis for LRR tires and in the process of doing so account for the extensive costs associated in developing and testing the chassis suspension modifications that will be necessary for motorhomes . When examining benefits, EPA and NHTSA should be sure to account for the fact that motorhomes are used on average 4.8 times per year for about only 38 days and driven on average between 3,700 miles per year. EPA and NHTSA should not apply the LRR requirement to non-commercial vehicles if it is not justified and supported by a cost-benefit analysis that is representative of motorhome use. [EPA-HQ-OAR-2010-0162-3300, p.9]

Summary & Recommendations RVIA supports the agencies' goals of improving the fuel efficiency of medium- and heavy-duty trucks and work trucks. Consumers and the environment alike will benefit if the standards are developed in a thoughtful and careful manner. Unfortunately, it is apparent that in proposing to extend the CO2 requirements to non-commercial vehicles, EPA did not consider and perhaps was not even aware of important differences that exist between businesses that acquire non-discretionary commercial vehicles and private individuals who may be considering the purchase of a purely discretionary non-commercial vehicle such as a motorhome. As we explain in these comments, private citizens who may be considering the purchase of a motorhome or a work truck capable of towing an RV are much more likely to defer or abandon the purchase due to economics. This was demonstrated during the last recession - please see the data provided in the Introduction Section of these comments. Given the estimated cost increases that EPA and NHTSA have provided for vocational vehicles and work trucks used for RV towing, we believe that, unless revised, the new regulatory requirements will result in a loss of RV industry jobs due to a reduction in the sales of motorhomes and towable RVs. For EPA and NHTSA to comply with the January 18, 2011, Executive Order issued by President Obama, the agencies must revise their joint proposal to promote economic growth and create jobs. It is unacceptable to put thousands of U.S. RV industry jobs at risk purely because of self-imposed regulatory deadlines and/or the fear that assessing indirect costs and their implications might expose the true cost of the regulations and thus prevent the agencies from implementing their desired approach. The agencies must perform the due diligence necessary to prevent an unnecessary and totally preventable reoccurrence of the job losses that the RV industry suffered in 2008 and 2009. [EPA-HQ-OAR-2010-0162-3300, pp.10-11]

For work trucks, EPA and NHTSA should conduct a separate cost-benefit analysis for private citizens purchasing work trucks for purely discretionary purposes (e.g., RV towing). [EPA-HQ-OAR-2010-0162-3300, p.12]

Absent the elimination of non-commercial vehicles from the regulation, EPA should conduct a separate non-commercial vehicle cost-benefit assessment for LRR tires and in doing so take into consideration not only the extensive costs of modifying motorhome suspensions but also the limited benefits that will ensue given the low mileages accrued by motorhomes. [EPA-HQ-OAR-2010-0162-3300, p.12]

Response:

As noted in the previous response above, while we have not done a separate analysis for recreational vehicles, we would note that given the nature of the regulation and the engine market this program is likely to provide similar benefits for recreational vehicle owners at a small incremental cost. In general, the regulation we are finalizing today will lead to the use of better tires and engines in recreational vehicles. As a consumable item the tire benefits over the lifetime of the tires are essentially the same among all users. Over the 50-100 thousand mile life of a tire, the overall fuel efficiency savings and GHG reductions will essentially be the same whether the mileage is accumulated over one year or ten. The payback period of the average RV user described in the comments (assuming 3,700 miles per year) is 6 years, as shown in the calculations below. Hence other than temporal differences, the analyses conducted by the agencies should be equally applicable to recreational vehicles. In addition, the agencies' evaluation of the best selling tires in many vocational applications showed that many tires today already meet the tire rolling resistance target level used to set the vocational vehicle standards. Hence, we can conclude that existing chassis suspension designs which must also work effectively for replacement tires with different characteristics are unlikely to require modifications.

Payback for RV which travels 3,700 miles per year	
VMT (miles)	3,700
Base mpg	7.00
% FE improvement due to tire improvements	2%
New mpg	7.14
Gas price per gallon (AEO2011 projection in 2011)	$2.80
Baseline annual fuel cost	$1,480
Annual fuel cost with tire improvements	$1,451
Annual fuel savings	$29
Upfront Tire Costs	$186
Payback (years)	6

In the case of engine regulation, it should be noted that recreational vehicles are only a small fraction of vocational engine purchases far too small to dictate engine designs. Hence even were EPA to exclude vocational engines from this regulation, the engines supplied to the recreational market would almost certainly contain the same technologies and achieve the same level of performance as other vocational engines. Excluding recreational engines would only add additional overhead costs for separate certification and tracking of engines for recreational vehicle applications. Such regulatory complexity is wholly unneeded and is not in the public interest nor in the interest of recreational vehicle operators.

11.1. General Impact Comments

<u>Organizations Included in this Section:</u>

Conservation Law Foundation
Desjardin, Randy
Environmental Defense Fund
Heavy-Duty Fuel Efficiency Leadership Group
Interfaith Care for Creation
Investor Network on Climate Risk
Lim, Daniel
Missourians for Safe Energy
Pew Environment Group

Organization: Conservation Law Foundation

The new standards, which will apply to trucks and buses manufactured in model years 2014 to 2018, will help strengthen our economy, increase our national security and reduce dangerous air pollution. By 2030, the projected daily oil savings from the proposed standards would be large enough to entirely offset America's Iraq oil imports. [EPA-HQ-OAR-2010-0162-3128, p.1]

Organization: Desjardin, Randy

Our reliance on fossil fuels is a danger for both our economy and our environment. As President Barack Obama has stated that the continence reliance 'will jeopardize our national security, it will smother our planet and will continue to put our economy and our environment at risk.' By increasing the fuel efficiency requirements for the most inefficient vehicles on the highway and city roads today, we will be able to decrease our demand for foreign oil and be able to use the savings on oil for bigger and better things such as research for renewable fuel resources (i.e. solar power, hydrogen, water, wind). [EPA-HQ-OAR-2010-0162-1329-cp, p.1]

While the new program will come with costs such as upgrades for the medium and heavy trucking manufacturing industry for re-tooling of assemble lines and research for more efficient engines, the overall beneficial outcome far surpasses the costs. The EPA and NHTSA estimate the costs for the new regulation around $7.7 billion but would generate $49 billion in savings. The social benefits are also outstanding, with 250 metric tons of GHG begin reduced from spilling into our atmosphere. The United States has always been a beacon of leadership for the world in political, economic and social stances. Lets lead the world in environmental preservation too. [EPA-HQ-OAR-2010-0162-1329-cp, p.1]

Organization: Environmental Defense Fund (EDF)

The new standards, which will apply to trucks and buses manufactured in model years 2014 to 2018, will help strengthen our economy, increase our national security and reduce dangerous air pollution. By 2030, the projected daily oil savings from the proposed standards would be large enough to entirely offset America's Iraq oil imports. [EPA-HQ-OAR-2010-0162-1965_Mass, p.1]

Organization: Heavy-Duty Fuel Efficiency Leadership Group

1) Achieve U.S. Environmental, Economic and Energy Security Benefits: Important national environmental, economic and energy security goals can and should be achieved through the rulemaking by requiring significant fuel efficiency improvements to medium- and heavy-duty vehicles. A properly designed GHG/fuel efficiency program for medium- and heavy-duty (Class 2B-8) will achieve significant energy security benefits and GHG emission reductions while lowering the cost of fuel as a percentage of overall operating costs to fleets. A strong national program should be balanced by pragmatic phase-in schedules to allow for positive returns on investment in order to minimize the downstream costs that will be passed along to shippers and consumers. [EPA-HQ-OAR-2010-0162-1620.1, p.2]

The Leadership Group believes that the EPA/NHTSA proposal does achieve important GHG and fuel consumption reductions over the 2014-2018 period. With the U.S. increasingly dependent on foreign petroleum imports and with transportation accounting for 72% of petroleum use, the EPA/NHTSA proposal charts an initial course for reducing that dependency thereby improving U.S. energy security. [EPA-HQ-OAR-2010-0162-1620.1, p.2]

The combined proposed standards are estimated to save roughly 500 million barrels of oil over the life of the vehicles sold during 2014-2018. The proposal is also expected to result in a nearly 250 million metric ton reduction of GHG emissions. [EPA-HQ-OAR-2010-0162-1620.1, p.2]

The EPA/NHTSA standards are projected to cost affected industries approximately $7.7 billion while generating societal benefits of $49 billion – much of which will benefit heavy duty fleets through a rapid (1-2 year) return on investment anticipated for long-haul vehicle operators. [EPA-HQ-OAR-2010-0162-1620.1, p.2]

Taken together, these GHG, fuel use reduction and economic benefits are consistent with the Leadership Group’s first principal. [EPA-HQ-OAR-2010-0162-1620.1, p.2]

Organization: Interfaith Care for Creation

The new standards, which will apply to trucks and buses manufactured in model years 2014 to 2018, will help strengthen our economy, increase our national security and reduce dangerous air pollution. By 2030, the projected daily oil savings from the proposed standards would be large enough to entirely offset America's Iraq oil imports. [EPA-HQ-OAR-2010-0162-1587-cp, p.1]

These vehicles from the largest pickups to 18-wheelers use more than 100 million gallons of oil per day and are responsible for about 20% of the climate pollution from America's transportation sector. [EPA-HQ-OAR-2010-0162-1587-cp, p.1]

Organization: Investor Network on Climate Risk

Such standards would be important drivers of job creation and economic growth. For example, in a joint report, the Union of Concerned Scientists3 and CALSTART concluded that a 38% reduction in truck fuel use would result in the creation of 124,000 new jobs by 2030, in every state. [EPA-HQ-OAR-2010-0162-3142.1, pp.1-2]

Strict standards are also key to retaining the US leadership position in efficient truck manufacturing, and expanding job opportunities in that sector. We are currently the world leader in the development, production and use of energy efficient and hybrid trucks. Without strong standards in place, companies and investors will lack the requisite certainty to invest in the development and production of new technologies that will allow us to retain our leadership position and increase job growth. Job opportunities associated with this sector are significant. According to CALSTART, there are over 15,000 US jobs directly tied to hybrid and high efficiency truck technologies, and that number can grow to more than 55,000 jobs in 2020 with appropriate policies. [EPA-HQ-OAR-2010-0162-3142.1, p.2]

Stricter standards will ultimately save businesses money, since advanced fuel efficient trucks will more than pay for themselves over a typical ownership period. The UCS/CALSTART report concluded that these benefits would accrue to the greater economy; as operating costs come down due to more fuel efficient trucks, business owners and consumers could invest that money in goods and services throughout the economy. According to the report, under stricter standards GDP would expand by $10 billion by 2030. [EPA-HQ-OAR-2010-0162-3142.1, p.2]

Strict standards are also critical to national energy security. We are increasingly dependent on trucking to transport goods and services, and so need to minimize our vulnerability to the rising price of fuel. Standards requiring the use of existing and emerging technologies would significantly reduce our dependence on oil. According to a UCS report, cutting fuel use using existing and emerging technologies would save a total of 100 billion gallons of fuel from 2010-2030. [EPA-HQ-OAR-2010-0162-3142.1, p.2]

Finally, companies in a variety of sectors are increasingly interested in tracking Scope 3 emissions, including GHG emissions associated with transportation and freight movement, as part of their publicly disclosed GHG assessment. Thus, a growing number of companies support policies such as strict truck standards that would help them achieve their own GHG emission reduction goals as well as save money. [EPA-HQ-OAR-2010-0162-3142.1, pp.2-3]

Strict standards are also critical to national energy security. We are increasingly dependent on trucking to transport goods and services, and so need to minimize our vulnerability to the rising price of fuel. Standards requiring the use of existing and emerging technologies would significantly reduce our dependence on oil. According to a UCS report, cutting fuel use

using existing and emerging technologies would save a total of 100 billion gallons of fuel from 2010-2030. [EPA-HQ-OAR-2010-0162-1946.1, p.3]

Organization: Lim, Daniel

Setting strong global warming pollution and fuel efficiency standards for medium- and heavy-duty trucks will help break our addiction to oil, increase our national security, curb global warming, and save truckers and businesses money at the pump and consumers at the store. [EPA-HQ-OAR-2010-0162-3297_Mass, p.1]

Organization: Missourians for Safe Energy (MSE)

The new standards, which will apply to trucks and buses manufactured in the model years 2014 to 2018, will help strengthen our economy, increase our national security and reduce dangerous air pollution. [EPA-HQ-OAR-2010-0162-1597-cp, p.1]

These vehicles, from the largest pickups to 18-wheelers, use more than 100 million gallons of oil per day and are responsible for about 20% of the climate pollution from America's transportation sector. [EPA-HQ-OAR-2010-0162-1597-cp, p.1]

Organization: Pew Environment Group

For economic, environmental and security reasons, it is imperative that the United States do everything it can to use key resources as efficiently as possible. At present, the transportation sector is almost completely dependent on oil. The majority of this transportation fuel is imported from foreign countries, including some regimes hostile to American interests. When oil markets tighten or prices increase, the burden of increased costs falls heavily on vehicle owners and operators. It is in our national economic and security interest to use oil as efficiently as possible and to develop long-term alternatives to oil in the transportation sector. [EPA-HQ-OAR-2010-0162-1610.1, p.1]

Today, the transportation sector accounts for 72 percent of domestic oil consumption. Within the transportation sector, the vehicles covered under the proposed rulemaking account for 17 percent of oil consumption and 20 percent of greenhouse gas emissions. These vehicles also constitute one of the fastest growing segments in the sector, which will result in increasing oil consumption. [EPA-HQ-OAR-2010-0162-1610.1, p.1]

The standards proposed in the rulemaking are much needed, scientifically-supported and wise. They will produce multiple benefits for the American people, including:

• Economic benefits -- the proposed rulemaking will result in net economic benefits of $41 billion for the American economy;

• Energy security benefits – the proposed rulemaking will save 500 million barrels of oil;

• Environmental benefits – the proposed rulemaking will avoid 250 million metric tons of greenhouse gas emissions. [EPA-HQ-OAR-2010-0162-1610.1, p.2]

Response:

EPA agrees with the commenters' assertions that the HD National Program is an important step towards curbing GHG emissions and reducing the nation's dependence on oil. As provided in preamble Sections VI, VII, and VII, the agencies estimate that the HD vehicles built in the 2014 through 2018 model years will emit approximately 280 MMT less CO_2 emissions and use over 0.5 billion barrels less fuel over their lifetimes due to the HD National Program.

The agencies also agree with the commenter's observations that this program will create national security benefits. To the degree to which the final rule reduces reliance upon imported energy supplies or promotes the development of technologies that can be deployed by either consumers or the nation's defense forces, the United States could expect benefits related to national security, reduced energy costs, and increased energy supply. This benefit is why President Obama has identified this rule as a key component for improving energy efficiency and putting America on a path to reducing oil imports in the Blueprint for a Secure Energy Future.[68]

A more thorough discussion of this issue can be found in Section VIII.I.(2) of the preamble.

11.2. Employment Impact

Organizations Included in this Section:

Investor Network on Climate Risk
Business for Innovative Climate & Energy Policy
CERES
Union of Concerned Scientists
Environmental Defense Fund

Organization: Investor Network on Climate Risk

Such standards would be important drivers of job creation and economic growth. For example, in a joint report, the Union of Concerned Scientists3 and CALSTART concluded that a 38% reduction in truck fuel use would result in the creation of 124,000 new jobs by 2030, in every state. [EPA-HQ-OAR-2010-0162-3142.1, pp.1-2]

[68] The White House, *Blueprint for a Secure Energy Future* (March 30, 2011) (http://www.whitehouse.gov/sites/default/files/blueprint_secure_energy_future.pdf) (Last accessed May 27, 2011).

Strict standards are also key to retaining the US leadership position in efficient truck manufacturing, and expanding job opportunities in that sector. We are currently the world leader in the development, production and use of energy efficient and hybrid trucks. Without strong standards in place, companies and investors will lack the requisite certainty to invest in the development and production of new technologies that will allow us to retain our leadership position and increase job growth. Job opportunities associated with this sector are significant. According to CALSTART, there are over 15,000 US jobs directly tied to hybrid and high efficiency truck technologies, and that number can grow to more than 55,000 jobs in 2020 with appropriate policies. [EPA-HQ-OAR-2010-0162-3142.1, p.2]

Stricter standards will ultimately save businesses money, since advanced fuel efficient trucks will more than pay for themselves over a typical ownership period. The UCS/CALSTART report concluded that these benefits would accrue to the greater economy; as operating costs come down due to more fuel efficient trucks, business owners and consumers could invest that money in goods and services throughout the economy. According to the report, under stricter standards GDP would expand by $10 billion by 2030. [EPA-HQ-OAR-2010-0162-3142.1, p.2]

Organization: Business for Innovative Climate & Energy Policy (BICEP)

Such standards would be important drivers of job creation and economic growth. For example, in a joint report, the Union of Concerned Scientists and CALSTART concluded that a 38% reduction in truck fuel use would result in the creation of 124,000 new jobs by 2030, in every state. [EPA-HQ-OAR-2010-0162-2165.1, p.1]

Stricter standards will ultimately save businesses money, since advanced fuel efficient trucks will more than pay for themselves over a typical ownership period. The UCS/CALSTART report concluded that these benefits would accrue to the greater economy; as operating costs come down due to more fuel efficient trucks, business owners and consumers could invest that money in goods and services throughout the economy. According to the report, under stricter standards GDP would expand by $10 billion by 2030. [EPA-HQ-OAR-2010-0162-2165.1, pp.1-2]

Strict standards are also critical to national energy security. We are increasingly dependent on trucking, so need to minimize our vulnerability to the rising price of fuel. Standards requiring the use of existing and emerging technologies would significantly reduce our dependence on oil. According to a UCS report, cutting fuel use using existing and emerging technologies would save a total of 100 billion gallons of fuel from 2010-2030. [EPA-HQ-OAR-2010-0162-2165.1, p.2]

Organization: Anita Green, General Board of Pension and Health Benefits of the United Methodist Church and CERES

We believe that by adopting efficient energy efficiency -- excuse me, fuel efficiency standards, that they will have the following benefits with very little downside risk: One, create jobs and support economic growth; two, save businesses money; three, retain our country's leadership position in high efficiency truck manufacturing; four, promote energy security; and, five, reduces greenhouse gas emissions.

One: Job creation and economic growth. In a joint report called "Delivering Jobs: The Economic Costs and Benefits of Improving Fuel Economy of Heavy-Duty Vehicles," the Union of Concerned Scientists and CALSTART concluded that a 38 percent reduction in truck fuel use resulted in the creation of 124,000 new jobs by 2030 in every state. Under their analysis, Illinois would gain 5,440 jobs within the next 20 years.

The report demonstrates that investments in advanced truck technologies would create jobs across the truck manufacturing sectors. And as operating costs come down due to more fuel-efficient trucks, business owners and consumers will be able to make additional investments in other goods and services throughout the economy. The report estimates that GDP would expand by 4 billion in ten years and 10 billion in 20 years.

Three: Regain our position as leaders in efficient truck manufacturing. The United States is currently the world leader in the development, production, and use of energy-efficient and hybrid trucks. To retain our position, we need clear policy signals.

According to CALSTART, at least 15,000 jobs in truck manufacturing can be retained and 25,000 additional high efficiency truck technology jobs can be created if U.S. leadership in this field is preserved. Many companies have told us that without clear policy signals from Washington, innovation stalls and capital sits on the sidelines. Setting strong standards will be the signal companies are looking for to begin production that incorporate new technologies. In turn, this will boost production and innovation throughout the supply chain and allow manufacturers to bring new and more efficient products to revitalize this market.

Organization: Union of Concerned Scientists (UCS)

A soon to be released assessment of the economic and employment benefits of the proposed standards conducted for the Union of Concerned Scientists shows that improving truck fuel economy will be good for our economy. Investments made by manufacturers to produce fuel efficient components and design next generation technologies will spur job growth in the truck manufacturing sector. In addition, the resulting fuel savings from more efficient trucks will substantially exceed the added cost of these technologies, reducing shipping costs for consumers and fuel bills for truck operators. In 2020, the proposed standards are estimated to save over $9 billion in fuel costs while the added investment in new trucks would total just under $2 billion. These new investments and fuel savings are estimated to result in an overall nationwide increase in employment of more than 40,000 jobs and increase gross domestic product by $3 billion. Strong standards are necessary to help overcome barriers that have hindered investments in truck fuel efficiency technologies and make these economic benefits a reality. [EPA-HQ-OAR-2010-0162-1764.1, p.3]

Organization: Union of Concerned Scientists, Mr. Bell

In addition to the environmental and energy security benefits, strong standards can deliver important economic benefits as well. Strong standards will deliver significant fuel savings for truck owners and operators, and create markets for new technology to help keep America's truck manufacturing sector competitive in an increasingly global marketplace. According to UCS analysis, the economic impact of substantially increasing the fuel efficiency of the nation's trucking fleet over the next 20 years, using technology available today and in development, will create more than 63,000 jobs by 2020 in both the truck manufacturing sector and the U.S. economy as a whole, and that's both due to direct investments in truck manufacturing and also in the fuel savings, as a growth for the entire economy. By 2030, our analyses show that continued advances in fuel efficiency would create more than 120,000 jobs.

Organization: Environmental Defense Fund, Mr. Mathers

Job Growth. The agencies' proposed standards are good for American business. The clear, common-sense regulatory structure will help companies develop clean technology and efficiently take those technology innovations to market. In a recent op-ed that Brian mentioned, Environmental Defense Fund's President, Fred Krupp, and the CEO of Cummins, Tom Linebarger, recognized the critical role these standards play in "getting innovations to market that will create economic opportunity for American companies and jobs for American workers." American truck and engine manufacturers, like Cummins, are poised to reap the economic benefits of these standards, ensuring that American manufacturers are both leading innovation here at home and leading exporters of advanced clean-truck technologies.

<u>Response:</u>

Although EPA and NHTSA did not undertake an employment analysis of the proposed rules, several commenters suggested that we undertake an employment analysis for the final rulemaking. Therefore, we have provided a qualitative discussion of the potential employment impacts of the Heavy-Duty National Program.

When the economy is at full employment, an environmental regulation is unlikely to have much impact on net overall U.S. employment; instead, labor would primarily be shifted from one sector to another. These shifts in employment impose an opportunity cost on society, approximated by the wages of the employees, as regulation diverts workers from other activities in the economy.[69] In this situation, any effects on net employment are likely to be transitory as workers change jobs (e.g., some workers may need to be retrained or require time to search for new jobs, while shortages in some sectors or regions could bid up wages to attract workers).

On the other hand, if a regulation comes into effect during a period of high unemployment, a change in labor demand due to regulation may have a positive effect in the near term on net overall U.S. employment. In this case, when the economy is at less than full employment, an increase in employment can result due to the potential hiring of idle labor resources by the regulated sector to meet new requirements (e.g., to install new equipment) and new economic activity in sectors related to the regulated sector.

Given the current level of unemployment, net positive employment effects are possible, especially in the near term, due to the potential hiring of idle labor resources by the regulated sector to plan for and meet new requirements. In the future, when full employment is expected to return, any changes in employment levels in the regulated sector due to this program are mostly expected to be offset by changes in employment in other sectors.

For the final rule, we have outlined the key sectors that are likely to see changes in employment from this rule: truck and engine manufacturers, the trucking industry, truck parts manufacturing, fuel production, and consumers. These are discussed in Section VIII.M of the Preamble and Chapter 9.9 of the RIA.

[69] Schmalensee, Richard, and Robert N. Stavins. "A Guide to Economic and Policy Analysis of EPA's Transport Rule." White paper commissioned by Excelon Corporation, March 2011.

12. Trailers 2-1

12.1. Support for Prompt Regulation

Organizations Included in this Section:
American Council for an Energy-Efficient Economy (ACEEE)
American Lung Association (ALA) & Environmental Defense Fund (EDF)
BlueGreen Alliance
California Air Resources Board (ARB)
Clean Air Task Force (CATF)
Center for Biological Diversity
Daimler Trucks North America
ecoFridge
Institute for Policy Integrity
International Council on Clean Transportation (ICCT)
Investor Network on Climate Risk
National Association of Clean Air Agencies (NACAA)
National Automobile Dealers Association (NADA)
Natural Resources Defense Council (NRDC)
Northeast States for Coordinated Air Use Management (NESCAUM)
National Wildlife Federation
ArvinMeritor, Inc
Union of Concerned Scientists (UCS)
Sierra Club
United States Senators

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Recommendation (trailer standards): Ensure that trailer standards are in place for the 2014 model year, and design tractor protocols accordingly. The largest shortcoming in the regulation for combination trucks is the omission of trailers. The agencies note that they are not proposing trailer standards but may do so in a future rulemaking (p.74157). We support the agencies' use of the NPRM as an "advanced notice-style" discussion of trailer regulation (p.74346). Improvements to the aerodynamics of the trailer and of the tractor-trailer as a unit are among the largest, most cost-effective, and most technologically straightforward opportunities for savings. We urge the agencies to ensure that trailer standards are in place for the 2014 model year, both to avoid unnecessary delay in capturing these important savings from trailers and to allow the optimization of tractor aerodynamics in combination with an aerodynamic trailer. Tractor and trailer standards together should achieve at least 30 percent reduction in fuel consumption or these vehicles in 2014. [EPA-HQ-OAR-2010-0162-1894.1, p.6]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

AGENCIES SHOULD FINALIZE TRAILER STANDARDS IN TIME FOR MY2014 IMPLEMENTATION [EPA-HQ-OAR-2010-0162-3129.1, p.14]

EDF and ALA support the proposal to consider this rulemaking an advanced notice of proposed rulemaking for adopting fuel economy and GHG emissions standards for trailers. We request the agencies finalize a rulemaking for heavy-duty trailers in time to require implementation of standards beginning in MY 2014. [EPA-HQ-OAR-2010-0162-3129.1, p.14]

Trailers provide a significant opportunity for fuel consumption and GHG emissions reductions from medium- and heavy-duty vehicles. And these reductions would likely not occur absent regulation, as stated in the NAS report and reiterated by the agencies in this proposal. In the 2013-2015 timeframe, trailers can reduce fuel consumption and GHG emissions by as much as 10-12 percent through aerodynamics and 3-6 percent through lower rolling resistance. Additional reductions in aerodynamics of up to 15 percent are feasible in the 2015-2020 timeframe. The technologies needed to make the first phase reductions are already on the shelf today and in use by numerous fleets. 26 For this reason, significant lead-time for these standards is not necessary, making it feasible to require them as early as MY 2014. [EPA-HQ-OAR-2010-0162-3129.1, p.14]

Organization: BlueGreen Alliance

1) While much of the fuel efficiency improvements required by these standards will be achieved using off-the-shelf technology, we hope advanced vehicle technology is also increasingly utilized, in this and future rulemakings, to achieve further progress on fuel efficiency, oil savings, and greenhouse gas reductions to the highest degree technically and economically feasible. Standards to improve trailer design to maximize fuel savings from freight trucks should be considered for implementation beginning in 2014 along with the standards for the tractors and be incorporated into future rulemakings. [EPA-HQ-OAR-2010-0162-2117.1, p.2]

Organization: California Air Resources Board (ARB)

Although the proposed national program currently does not address trailers, both the US EPA SmartWay Program and the California regulation do, so we are recommending that the agencies, at a minimum, consider adding trailer requirements consistent with the California regulation as part of this rulemaking. [EPA-HQ-OAR-2010-0162-2354.1, p. 2]

The proposed standards for Class 7 and 8 tractors do not consider technologies that may be employed on trailers to improve the fuel efficiency of tractor-trailer combination vehicles.. Currently, there are a number of cost-effective technologies in the market that may be employed on 53-foot or longer box-type trailers to improve the fuel efficiency of long-haul tractor-trailer combination vehicles. In fact, the U.S. EPA SmartWay Program has certified/verified tractors, box-type trailers, trailer aerodynamic devices, and low rolling resistance tires that meet specified fuel efficiency improvements. Also, based on the U.S. EPA's SmartWay Program, California adopted requirements for 53-foot or longer box-type trailers and the tractors that pull them to meet specified fuel efficiency standards as certified/verified by the U.S. EPA SmartWay Program. As a result, the development of trailer aerodynamic devices and the number of fleets adopting these technologies has rapidly increased in the past year ARB staff understands the diversity and complexity of setting standards for all types of trailers in this rulemaking. However, ARB staff also believes the U.S. EPA SmartWay Program and California's tractor-trailer GHG requirements have already set the foundation for a rulemaking that will address 53-foot or longer box-type trailers on the national level. In addition, most of the trailer manufacturers that currently produce California-compliant or SmartWay certified 53-foot or longer box-type trailers are large businesses and are installing aerodynamic technologies and low rolling resistance tires that are designed, verified, and manufactured by second party aerodynamic technology and tire manufacturers. Thus, the issue of small businesses should not be a reason to defer rulemaking for, at least, the 53-foot or longer box-type trailers, since the small businesses could also comply by installing technologies designed, verified, and manufactured by second party technology developers. The agencies could, if needed, exempt those trailer manufacturers that are small businesses until a later time and proceed with trailer requirements in this rulemaking. Thus, ARB staff urges the agencies to at least consider standards for 53- foot or longer box-type trailers in this rulemaking and to start as soon as possible the process of establishing standards for all types of trailers. [EPA-HQ-OAR-2010-0162-2354.1, p. 3]

Organization: Clean Air Task Force (CATF)

The most significant difference between EPA's proposed standards and what the NAS panel indicated was possible is the exclusion of commercial trailers from EPA's proposal. According to both the NAS panel and EPA, appropriate regulation of new commercial trailers could reduce fuel consumption from combination trucks by an additional 15 – 20%, primarily by improving their aerodynamics and reducing their rolling resistance. EPA evaluated as part of its alternatives analysis a scenario (Alternative 7) in which commercial trailers were regulated. This alternative resulted in $20.7 billion in net benefits through 2030 and $40.2 billion in net benefits through 2050 (assuming 3% discount rate), exceeding the $20.2 billion and $39.2 billion in net benefits through 2030 and 2050, respectively, for EPA's proposed Rule (Alternative 6). Clearly the regulation of commercial trailers would be cost-effective and would provide additional net benefits compared to EPA's current proposal. [EPA-HQ-OAR-2010-0162-2734.1, p.6]

EPA states that it did not include commercial trailers in the proposed Rule in part due to the fact that trailers have never been regulated before. This rationale is not convincing—there always must be a first time for regulation of any given sector, and in view of the urgency of the climate problem, the time for capturing available GHG emission reductions from new trailers is now. [EPA-HQ-OAR-2010-0162-2734.1, p.6]

EPA also notes that the complexity of the trailer manufacturing industry mirrors the complexity of the heavy duty vehicle manufacturing industry, with numerous types and configurations of trailers and numerous small manufacturers. Although the commercial trailer market may be complicated, approximately 63% of new trailer registrations between 2003 and 2007 were standard box van trailers, and 75% of these were 53-feet long. Furthermore, 89% of these van-type trailers were produced by only five companies. Each of these top five companies sold an average of between 13,000 and 50,000 trailers annually between 2003 and 2007. [EPA-HQ-OAR-2010-0162-2734.1, p.6]

Given the above structure of the trailer industry, EPA could simplify its regulatory task by focusing regulations on this subset of the market (box van trailers), with less stringent or well developed regulations for other types of trailers. Such an approach would provide significant benefits. This sub-set of trailers account for the majority of fuel use from the fleet, are relatively simple and homogenous in terms of design, and are manufactured by a small group of large companies. As such, EPA could design a relatively simple regulation which could be easily implemented. The most likely structure would be one that closely mirrors the proposed regulations for combination truck tractors, and which relies on simulation modeling to certify compliance for individual trailer models. [EPA-HQ-OAR-2010-0162-2734.1, p.7]

Organization: Center for Biological Diversity

In our January 3, 2011 Comment Letter, we discussed technologies that either exist or can feasibly be developed and implemented during the rulemaking period, that are appropriate for HD Vehicles, and that can sharply increase their fuel efficiency gains, but that the Agencies have excluded from their preferred choice (Alternative 6). Specifically, we urged the Agencies to impose fuel efficiency regulations on trailers used with Class 7 and Class 8 tractors, to require the use of bottoming cycle technology within the rulemaking years, and to adopt other viable fuel efficiency improvements. We here add the following comments. [EPA-HQ-OAR-2010-0162-2506.1, p.4]

Organization: Daimler Trucks North America

TRAILERS [EPA-HQ-OAR-2010-0162-1818.1, p.107]

GEM Could Be Used To Find Trailer Improvements, Much The Same Way That It Finds Tractor Improvements. [EPA-HQ-OAR-2010-0162-1818.1, p.107]

As discussed on 75 Fed. Reg. 74173 et seq., the Agencies are not proposing regulations of emission and fuel consumption related to trailers. We recommend that the Agencies reconsider. First, regulation would be simple for trailers than for tractors. Just as tractor manufacturers can put a full vehicle Cd into GEM, and just as tractor manufacturers can find that Cd through various types of aerodynamic testing or modeling using standard, pre-defined trailers, so can trailer manufacturers for their products using standard, pre-defined tractors. Second, regulation would ensure that money spent on improving tractor aerodynamics is not wasted by getting air to flow smoothly around a tractor only to impinge harshly on (for example) the boogie of a non-aerodynamic trailer. Third, crediting both tractor and trailer CO2 or FE improvements and – more importantly – allowing credit trading between the two would drive tractor and trailer manufacturers to find the most cost-effective savings for the combination vehicle. Of course, discount factors might be necessary, in order to appropriately represent the relative amount of use of tractors and trailers. [EPA-HQ-OAR-2010-0162-1818.1, p.107]

Organization: ecoFridge

There are currently approximately 650,000 refrigerated trailer units and refrigerated trucks (collectively transportation refrigeration units or 'TRUs') operating in the United States. These refrigeration units are nearly all diesel powered and use conventional refrigerants. There are now proven non-diesel solutions available for TRUs. When such technology is fully deployed, it will eliminate the emission of 24-30 tons of CO2 equivalent per unit annually, eliminate the emission of diesel particulate matter that has been identified as a toxic air contaminant, as well as eliminate the inadvertent emission of HCFC or HFC refrigerants from such units. The payback period for this technology investment is less than 12 months. [EPA-HQ-OAR-2010-0162-2351.1, p.1]

The proposed rule recognizes that trailers, while separate from the vehicle and engine, can dramatically reduce a vehicle's fuel efficiency and increase its GHG emissions. This is particularly true in the TRU industry, where auxiliary diesel engines are commonly used to 'pull down' the temperature of a cargo space and maintain that constant, uniform temperature until the goods being transported are off-loaded at their final destination. The proposed rules apply to the vehicle's performance as a whole, and not just the engine. Failure to extend these regulations to include trailers and TRUs ignores a significant portion of these vehicles' performance and reduces the beneficial impact of engine and vehicle regulations. [EPA-HQ-OAR-2010-0162-2351.1, p.2]

Adoption of this new technology will provide additional benefits to industry stakeholders. Improvements in materials, aerodynamics and refrigeration transport units can reduce fuel and operational costs. The EPA and NHTSA correctly recognize improvements can be made by moving away from the traditional refrigeration technology that utilizes a non-road diesel auxiliary engine. Technology solutions exist which provide alternative refrigeration solutions which are less expensive to run and maintain and that provide a cost savings over the life of the product. Such solutions are now being regularly and successfully deployed in European TRU operations. [EPA-HQ-OAR-2010-0162-2351.1, p.2]

A number of industry trends are converging to drive deployment of alternative refrigeration technologies which do not involve HCFCs or HFCs. These trends are occurring independent of any action of the EPA or NHTSA and demonstrate that industry stakeholders are beginning to address the goals of these regulations. Those trends include: [EPA-HQ-OAR-2010-0162-2351.1, pp.2-3]

• California regulation

• Corporate carbon footprint reduction

• Relieving the dependence on diesel

• Cost reduction [EPA-HQ-OAR-2010-0162-2351.1, p.3]

California Regulation. In 2004, the California Air Resources Board (CARB) passed the in-use, diesel-fueled Transport Refrigeration Unit, Airborne Toxic Control Measure (ATCM), which will be enforced in 2011. The regulation covers refrigerated trailers in California and any trailer that crosses the state border. It is estimated that there are at least 40,000 refrigerated trailers in the state of California alone. [EPA-HQ-OAR-2010-0162-2351.1, p.3]

Carbon Reduction. In general, large corporations are seeking ways to reduce overall carbon emissions, particularly those companies that consume large amounts of carbon based fuel. Within logistics, several major companies such as Wal-Mart, Safeway, Costco, SYSCO, as well as European grocery chains such as Groupe Casino and Marks & Spencer, are proactively trying to reduce their carbon footprints. TRU alternatives exist that allow companies to both reduce their carbon footprint and cut their operational costs. [EPA-HQ-OAR-2010-0162-2351.1, p.3]

Diesel price volatility. Diesel fuel prices are up nearly 60 percent over the past two years in the US. This significant transportation cost is driving interest in alternative fuel efficient technology. Furthermore, diesel prices in the US have stayed above gasoline prices for the last five years, due to increased demand from developing countries and because of the transition to lower sulfur content diesels, which has increased the cost of production and distribution. Given these trends, companies have a tangible incentive to shift away from diesel fueled systems. [EPA-HQ-OAR-2010-0162-2351.1, p.3]

Cost Reduction. The current global economy has forced the entire transport refrigeration industry to squeeze more profit out of every dollar of revenue. When examining the purchase price for a refrigeration system, maintenance and operational costs must too be considered.

Companies need to make decisions based upon the life-cycle of the technology being developed. [EPA-HQ-OAR-2010-0162-2351.1, p.3]

Depending on the technology utilized, there are significant opportunities to increase fuel efficiency while reducing GHG emissions. The benefits of these alternative solutions vary depending on the power source, method of cooling and other factors. Determining which operating system works 'best' can be based upon a company's individual goals and transport needs. Improvements can be achieved because diesel emits high carbon and other particulate matter content. A customer's usage of the non-diesel ecoFridge LN2 system for over 1.5 years in the UK yielded the elimination of 24-30 tons of CO2/truck/year. [4] In addition to the CO2 reductions, the ecoFridge system does not use HCFC or HFC refrigerants. [EPA-HQ-OAR-2010-0162-2351.1, p.3]

Improvements in fuel economy and reductions in GHG emissions are particularly achievable in the TRU industry because of its heavy reliance on all-diesel refrigeration systems. These units are reliable and durable but are environmentally harmful, inefficient and expensive to operate and maintain. These engines are inefficient since they are designed to rapidly complete the 'pull-down' operation, however, the power required to provide air circulation inside the cargo space and maintain temperature ('temperature maintenance' mode) is potentially only 15 percent of the power required to complete the 'pull-down' operation. However, the engine continues to operate and consume fuel at a high rate during the 'temperature maintenance' mode even though less than a sixth of this rated power is required - a major source of inefficiency. [EPA-HQ-OAR-2010-0162-2351.1, p.4]

Because EU regulation has already addressed many of the concerns that drive the EPA's proposed rules, significant alternatives have been developed in Europe which provide companies with solutions. Several alternative technologies currently exist in the marketplace: [EPA-HQ-OAR-2010-0162-2351.1, p.4]

Hybrid TRU. Hybrid-diesel are very different that their automobile counterparts and do not use, electric power while in motion. This technology consists of a full-capacity diesel engine combined with an electric standby unit, which is used to maintain temperature when the truck/trailer is stationary and has access to a 3-phase electric outlet. In Europe, due to noise regulations and wider availability of 3-phase power, these units have gained wider acceptance. [EPA-HQ-OAR-2010-0162-2351.1, p.4]

All electric TRUs (eTRUs). In order to overcome the limitation of the diesel-hybrid systems, 'all-electric' transport refrigeration units (eTRUs) have been developed. The major difference between eTRUs and diesel-hybrid systems is that eTRUs can perform the pull-down operation using an electric motor instead of a diesel engine as is the case with the hybrids. However, even eTRUs have a small auxiliary diesel engine to maintain temperature during on-road travel. The use of the truck engine draws 15-40 horse power, thus burning more gasoline or diesel. [EPA-HQ-OAR-2010-0162-2351.1, p.4]

Liquid Carbon-dioxide based cryogenic systems. Liquid CO2 systems use the 'indirect' method of cooling and use liquid CO2 as fuel. These 'indirect' systems do not directly spray the refrigerant on the product, but diffuse nitrogen in a heat exchanger to cool the cargo space. A system based on this technology has been developed by Ingersoll Rand's Thermo King unit. [EPA-HQ-OAR-2010-0162-2351.1, p.4]

Fuel cell based systems. These systems are still in the developmental stage and there are no known commercially available systems. Currently these systems have the following drawbacks:

1. The tanks for hydrogen are heavier and more expensive than LN2 tanks, as hydrogen needs to be stored at higher pressures.

2. There is no hydrogen refueling infrastructure.

3. These systems do not have the power to perform either the pull-down operation or maintain temperatures in large trailers. [EPA-HQ-OAR-2010-0162-2351.1, p.4]

Direct Drive systems. These systems connect the refrigeration unit directly to the main tractor engine, thus eliminating the need for another separate TRU engine. While this does reduce noise and emissions to some extent, this can only be used for small trucks and vans. [EPA-HQ-OAR-2010-0162-2351.1, p.5]

Significant time and capital supported the ecoFridge development and commercialization of a transport refrigeration system based on Liquid Nitrogen (LN2). After nine years of product development the ecoFridge system has emerged as the most environmentally friendly and cost effective replacement available for diesel systems. [EPA-HQ-OAR-2010-0162-2351.1, p.5]

ecoFridge is a US corporation with several international distribution subsidiaries. ecoFridge has sales and distribution agreements with trailer manufacturers to pursue sales opportunities with thousands of refrigerated truck purchasers in the U.S. and Europe. [EPA-HQ-OAR-2010-0162-2351.1, p.5]

ecoFridge uses an 'open' cryogenic technology, whereby LN2 stored in low pressure, vacuum sealed tanks is released directly into the cargo space and subsequently into the atmosphere, hence the term 'open'. This is in contrast to 'closed' diesel systems that re-circulate the refrigerant after condensation. [EPA-HQ-OAR-2010-0162-2351.1, p.5]

Liquid Nitrogen has a strong tendency to revert to its original gaseous state. ecoFridge uses this propensity to release LN2's cooling capacity and direct the liquid to the required location, where it is dispersed as gas through sprayers. While mechanically cooled systems require equipment to compress and recompress refrigerant vapor, ecoFridge operates without this step. The ecoFridge system is powered through one primary and one backup 12-volt battery. [EPA-HQ-OAR-2010-0162-2351.1, p.5]

Conventional diesel mechanical systems work through convection produced from a refrigeration unit and a heater attached to the front of the trailer which pushes cold air into the cargo compartment. Hence the convection currents can be disrupted if the freight is not distributed evenly throughout the compartment. Temperature varies radically throughout the compartment with resulting differences in performance. Operators must provide detailed loading instructions to ensure that the coldest items are loaded closest to the refrigeration unit and convection currents are not disrupted through poor loading. Temperature zones require carefully placing the coldest items near the refrigeration unit and warmer items near the rear of the trailer - this procedure increases loading time and the company's labor costs. [EPA-HQ-OAR-2010-0162-2351.1, p.5]

The ecoFridge system works by spraying _326° Fahrenheit liquid nitrogen into the compartment, which quickly vaporizes to efficiently cool the interior. ecoFridge can more effectively create different temperature zones throughout the trailer and is not dependent on the positioning of the refrigeration unit to determine the placement of the zones, thus decreasing loading times and increasing efficiencies. [EPA-HQ-OAR-2010-0162-2351.1, p.5]

ecoFridge's technology provides a number of benefits which create wide ranging value to companies, including: [EPA-HQ-OAR-2010-0162-2351.1, p.5]

1. Environmental benefits

2. Lower operating costs

3. Quicker 'pull-down' to desired temperature allows more operating hours

4. Consistent temperature control reduces spoilage of transported product

5. Increases cargo space utilization [EPA-HQ-OAR-2010-0162-2351.1, p.6]

Environmental Benefits. EcoFridge systems do not emit any carbon emissions, whereas diesel emits high carbon and other particulate matter content. Based on a pilot customer's (ASDA's) usage of the system for over 1.5 years in the UK, ASDA, a Wal-Mart subsidiary, experienced the elimination of 24-30 tons of CO2/truck/year . Furthermore, a study commissioned by the European Bank for Reconstruction and Development to ascertain the lifecyc1e environmental costs of ecoFridge systems indicate that ecoFridge systems have the lowest lifecyc1e carbon emissions when compared to diesel and electric systems. This study takes into account the carbon emissions from the production of diesel, electricity, and LN2 in addition to the carbon emissions from operating the systems. [EPA-HQ-OAR-2010-0162-2351.1, p.6]

The following highlights the environmental differences between the eco-Fridge system and the traditional mechanical system: [EPA-HQ-OAR-2010-0162-2351.1, p.6]

[Table can be found on page 6 of this comment.]

LN2 systems reduce carbon emissions by a factor of 4 when compared to diesel systems and by a factor of 2.5 when compared to electric systems. Additionally, ecoFridge does not emit any high-GWP HFCs or HCFCs. [EPA-HQ-OAR-2010-0162-2351.1, p.6]

[Figure can be found on page 7 of this comment.]

Lower Operating Costs. ecoFridge's operating costs can be 25 to 40 percent lower than the costs of comparable mechanical systems. Maintenance required for ecoFridge is to re-vacuum tanks every 8-10 years, clean the filters annually, and perform regular system checks. In contrast, mechanical systems require frequent regular maintenance, as with any industrial engine. Therefore transportation fleets with mechanical systems incur significant downtime related costs because the trailers are not productive. [EPA-HQ-OAR-2010-0162-2351.1, p.7]

Additionally ecoFridge systems are expected to last for a minimum 15 years, whereas mechanical systems have to be replaced or undergo a major overhaul every 5-7 years, increasing the total cost of ownership to the customer. [EPA-HQ-OAR-2010-0162-2351.1, p.7]

As shown below, the ecoFridge system has 30 to 40 percent lower maintenance and fuel costs than both diesel and diesel hybrid systems. The graph below shows that ecoFridge becomes even more attractive as diesel prices increase - a trend which is likely to continue for the foreseeable future. [EPA-HQ-OAR-2010-0162-2351.1, p.7]

[Figure can be found on page 7 of this comment.]

Quicker 'Pull-down' to desired temperature. ecoFridge takes a fundamentally different approach to refrigeration of cargo than that adopted by mechanical systems. The system works by removing the atmosphere in the compartment and replacing it with super-cooled liquid nitrogen, which vaporizes when introduced into the interior of the trailer. This unique approach allows ecoFridge to cool the cargo space rapidly; the difference in time is summarized in the table below: [EPA-HQ-OAR-2010-0162-2351.1, p.8]

[Table can be found on page 8 of this comment.]

Accurate Temperature Control and Reduction in Spoilage. When temperature-sensitive goods are transported for long periods, it is extremely important to customers that constant temperature be maintained. This task is further complicated by large fluctuations in ambient temperature that make diesel mechanical systems work harder to maintain a constant, accurate temperature. Furthermore, the cargo space in diesel mechanical systems contains normal oxygen levels which can lead to faster degradation of the cargo when temperature fluctuates, thus causing food spoilage. ecoFridge significantly reduces spoilage due to more accurate temperature controls. [EPA-HQ-OAR-2010-0162-2351.1, p.8]

Increases Cargo Space Utilization. Since mechanical systems do not provide uniform cooling across the cargo space, customers have to plan the cargo space layout carefully if they are transporting temperature sensitive goods. EcoFridge eliminates these problems because it provides uniform cooling, thereby allowing a customer to better utilize the cargo space and reduce costs. [EPA-HQ-OAR-2010-0162-2351.1, p.8]

In addition to the above-mentioned trends, it is worth noting that the ecoFridge system also provides significant improvements over diesel-based systems in terms of noise abatement. Noise issues have become a critical issue in some municipalities, particularly where night deliveries are made in close proximity to residential areas. [EPA-HQ-OAR-2010-0162-2351.1, p.8]

The ED has already begun to largely adopt alternative refrigeration technology to replace the traditional auxiliary diesel system. Hybrid mechanical systems (which combine diesel power when in transit and plug-in power when stationary) and electric technologies now comprise over 70% of the TRD market . This market penetration was encouraged through numerous government regulations, including:

• Local regulations requiring noise reductions in urban areas;

• The ED Emission Trading Scheme;

• France's carbon tax on diesel fuel; [EPA-HQ-OAR-2010-0162-2351.1, p.8]

• New mechanical HCFC systems were phased out from 2001 in Europe (Montreal Protocol) with a total ban effective from 2015 (Kyoto Protocol). [EPA-HQ-OAR-2010-0162-2351.1, p.9]

In the U.S., ecoFridge is teaming with Wabash National, the U.S.'s largest trailer manufacturer, to make this technology available to U.S.TRU operators. [EPA-HQ-OAR-2010-0162-2351.1, p.9]

As indicated above, there exists significant potential to improve fuel economy and reduce GHG emissions through the expansion of regulations to trailers and TRUs. Adoption of ecoFridge's technology and operating system, TRUs can eliminate 24-30 tons of CO2 per unit per year; eliminate the use of harmful refrigerants like HCFCs and HFCs and save in both fuel costs on a per truck per year basis and the additional emissions associated with such fuel use. [EPA-HQ-OAR-2010-0162-2351.1, p.9]

In addition to the fuel economy and environmental goals stated above, adoption of alternative refrigeration technologies creates the potential for companies to achieve long-term savings over traditional diesel systems. ecoFridge systems will derive annual economic benefit through lower fuel costs, maintenance costs, increased efficiency and reduced downtime. [EPA-HQ-OAR-2010-0162-2351.1, p.9]

[Table can be found on page 9 of this comment.]

An ecoFridge system becomes progressively more cost effective as the fleet size increases. ecoFridge systems become economically competitive when a customer purchases more than 9 systems, at the point at which the diesel-hybrid and ecoFridge cost curves intersect. [EPA-HQ-OAR-2010-0162-2351.1, p.9]

The following assumptions were made in the above analysis: [EPA-HQ-OAR-2010-0162-2351.1, p.9]

1. 10% price premium for the ecoFridge unit over the diesel TRU and equivalent in price to the diesel hybrid.

2. A 20,000 liter, fixed Liquid Nitrogen filling station would be leased by the customer from the Liquid Nitrogen supplier. A telemetry system is installed on this liquid nitrogen storage tank, which will notify the carrier when the storage tank is running low on LN2.

3. Off-road diesel price: $2.37/gallon and Liquid Nitrogen price: $0.34/gallon.

4. Additionally, it was assumed that ecoFridge will consume 6.43 gallons/hr (24liters/hr) of Liquid Nitrogen, whereas diesel systems will consume .99 gallons/hr (3.74liters/hr) [EPA-HQ-OAR-2010-0162-2351.1, p.10]

The EcoFridge system also generates savings through reduced down-time. A refrigerated trailer/truck is out of service for 6 days/year for routine maintenance for the refrigeration system only. Utilization of the alternative TRU technology produces savings of $2,205/trailer/year. [EPA-HQ-OAR-2010-0162-2351.1, p.10]

[Table can be found on page 10 of this comment.]

It is for these reasons that we believe the EPA and NHTSA should consider extending these regulations to the trailer industry. These regulations could be phased in over an appropriate time which would allow industry stakeholders to adjust their purchasing decisions as current units are replaced at the end of their useful life. We believe this can be achieved over a ten year period; but that early-adoption incentives may be beneficial to see these alternative refrigeration technologies penetrate the current U.S. market. [EPA-HQ-OAR-2010-0162-2351.1, p.10]

---

[4] ASDA case study to be published by the UK Department of Transport. Up to 30 tons when assuming 3,000 hours operation, consuming 4 liters of diesel per hour, producing 2.63 kg's of carbon per liter of diesel burned. [EPA-HQ-OAR-2010-0162-2351.1, p.3]

Organization: Institute for Policy Integrity

Trailers play an important role in fuel consumption. Their size and shape affect the aerodynamic drag, rolling resistance, and overall weight of combination tractor-trailers, all of which impact fuel efficiency and greenhouse gas emissions. Regulation of trailer design therefore could offer substantial opportunities for increased fuel economy and greenhouse gas reductions. Indeed, the agencies recognize that current SmartWay technologies allow for reductions in fuel consumption and greenhouse gas emissions similar in magnitude to those available from truck design, and larger than those that can be accomplished through engine design. Refrigerated trailers offer a further opportunity to reduce greenhouse gas leaks from the air conditioning systems. “Not only do trailers represent a significant opportunity for reductions,” the agencies note, but there is “strong reason to believe that these reductions would not occur absent regulation,” due to split incentives and coordination problems between trailer owners versus truck owners. [EPA-HQ-OAR-2010-0162-1895.1, p.3]

The agencies base their decision not to regulate on the diversity of trailer types and trailer manufacturers, who have not previously been subject to much regulation. The agencies instead propose to defer trailer regulation to a future rulemaking, given the lead time required and the President’s request to implement a final rule for heavy-duty trucks by July 30, 2011. However, the agencies do not explain what lead time is necessary, or why some lesser level of implementation could not be achieved within the proposed timeframe. Moreover, the agencies do not explain their failure to select the policy alternative that includes trailer regulation (Alternative #7), even though that alternative has the greatest quantified net benefits. More precisely, the agencies do not explain why any additional administrative costs or compliance difficulties (which would likely be temporary and dissipate as both government and industry build experience with this type of regulation) would outweigh the significant and ongoing benefits of regulation. [EPA-HQ-OAR-2010-0162-1895.1, p.3]

The agencies do note that, as of the 2010 model year, 5% of new trailers employ state-of-the-art technology under EPA’s voluntary SmartWay program. If this is evidence that the diversity of the trailer sector is an obstacle to wider adoption of available technology, and not instead evidence that such technology can be readily adopted by many manufacturers, the agencies do not adequately explain the basis for that conclusion. [EPA-HQ-OAR-2010-0162-1895.1, p.3]

Given the recommendation by the National Academy of Sciences to regulate trailers and the agencies’ calculation of net benefits, trailers should be covered in the final rule. If including trailers in the final rule would significantly delay promulgation, or if the agencies are able to explain why additional administrative and compliance costs necessitate a temporary delay, the agencies should detail in the final rule a clear plan and schedule for moving forward. Though generally the agencies should at least reevaluate and probably drop the small business exemptions in the rule (see next subsection), the agencies could also consider whether trailers could be regulated more quickly if a small business exemption were applied. That alternative might still represent a substantial opportunity for increased fuel economy and greenhouse gas reductions, as three trailers manufacturers account for over half of all production, and the top ten manufacturers by output account for nearly 90% of production. [EPA-HQ-OAR-2010-0162-1895.1, p.4]

Organization: International Council on Clean Transportation (ICCT)

Regulate trailers. The agencies have committed to developing a subsequent rulemaking to establish regulations for trailers. The ICCT fully supports a rule to address trailers – as does the recommendations of the NAS panel – as there are substantial fuel reduction and GHG benefits available for streamlined trailers. [EPA-HQ-OAR-2010-0162-1945.1, p.3]

Organization: Investor Network on Climate Risk

We also urge the agencies to move aggressively to set standards for trailers for model year 2014, which will result in significant overall fuel savings for combination tractors. [EPA-HQ-OAR-2010-0162-3142.1, p.1]

Organization: National Association of Clean Air Agencies (NACAA)

NACAA respectfully disagrees with the proposal to forego any standards for trailers. There is a wide range of feasible technologies that can be employed to reduce the energy consumption associated with trailer operation, including improved aerodynamic drag, light-weight materials and low-rolling-resistance tires. EPA's SmartWay program has extensively documented the wide range of benefits associated with more efficient trailer design.[1] There are significant aerodynamic benefits of such systems as trailer fairings, side-skirts, nose cones and trailer tails. Single wide tires and aluminum wheels have been demonstrated to reduce weight and rolling resistance. While additional lead time may be required to fully implement such GHG and fuel savings technology options, it is crucial that EPA and NHTSA provide a strong signal to the industry that more efficient trailer design benchmarks are feasible and cost effective. It is also noteworthy that significant industry leadership is already being demonstrated by a wide range of trailer manufacturers, including Great Dane, Trailmobile, Utility, Wabash, Hyundai, Manac, Stoughton and Vanguard. California now requires SmartWay technology certification on all 2011 and subsequent MY sleeper cab tractors if they pull 53-foot or longer box van trailers, while day cab tractors must have SmartWay-approved low-rolling-resistance tires. For trailers, California now requires 53-foot or longer van trailers (whether new or in-service) to be SmartWay-certified, or retrofitted with SmartWay-verified aerodynamic and tire technologies, although a phase-in is permitted for 2010 and older MY larger fleets from 2010 to 2015 and for smaller fleets from 2013 to 2016. NACAA therefore recommends that the federal agencies, at a minimum, consider a requirement similar to this California mandate and that rulemaking focused on setting trailer standards should be initiated as soon as possible. [EPA-HQ-OAR-2010-0162-1607.1, pp.3-4]

Organization: National Automobile Dealers Association (NADA)

The NAS study emphasized that long-haul trailers could achieve upwards of a 10% reduction in fuel and GHGs through aerodynamics and tire improvements. NHTSA and EPA should reconsider their decision not to impose trailer requirements in the MY 2014-18 timeframe. However, should reliable data justifying a timely Supplemental Notice of Proposed Rulemaking prove to be insufficient, potential trailer regulations should be deferred. [EPA-HQ-OAR-2010-0162-2705, p.12]

Organization: Natural Resources Defense Council (NRDC)

EPA and NHTSA should finalize standards for commercial trailers that would go into effect in 2014, consistent time frame of this proposal for tractors and engines. The trailer requirements should be designed to achieve emissions and fuel savings in addition to this proposal. The NPRM includes a discussion of potential trailer regulatory program in “an advanced notice of proposed rulemaking style”; having provided this initial information, we request that the agencies move forward as soon as possible with a proposed rule on trailers. [EPA-HQ-OAR-2010-0162-1776.1, p.10]

Trailer efficiency can be improved dramatically through cost-effective aerodynamic adjustments, fuel-efficient tires and weight reduction. The agencies point out that the potential savings from trailers is very significant and that regulations are necessary to capture the fuel and emission savings: [EPA-HQ-OAR-2010-0162-1776.1, p.10]

“…an evaluation of SmartWay trailer technologies…found that they provide the opportunity to reduce fuel consumption and greenhouse gas emissions from tractor trailers by up to 10 to 12 percent for aerodynamics and 3 to 6 percent for lower rolling resistance tires. Reductions of this magnitude are larger than can be readily accomplished from improvements in engine design and are roughly of the same magnitude as reductions possible through improvements in truck designs. Not only do trailers represent a significant opportunity for reductions…but we have strong reason to believe that these reductions would not occur absent regulation as noted in the recent NAS report.” (75 Fed. Reg. at 74346) [EPA-HQ-OAR-2010-0162-1776.1, p.10]

These are well-known and very cost effective technologies that could be integrated into new trailer manufacturing relatively quickly. The agencies comment that “trailers are far less mechanically complex than are the trucks that haul them.” (75 Fed. Reg. at 74347) Therefore, the lead time for incorporating trailers into the Heavy-Duty National Program should be relatively short. Expeditious inclusion of trailers will also benefit truck and engine manufacturers working to comply with a future full vehicle standard because it would encourage better integration of tractor and trailer designs, especially with regard to aerodynamic fittings but also in optimizing vehicle engine and transmission design. The agencies should take advantage of this low-hanging fruit with trailer standards starting in 2014. [EPA-HQ-OAR-2010-0162-1776.1, p.10]

Organization: National Wildlife Federation – multiple comments from comment campaign

These standards are a critical first step, and I encourage you to explore a number of opportunities for even greater improvements. Such opportunities include setting efficiency standards for the trailer portion of long haul tractor trailers; encouraging greater use of hybrids, advanced transmissions and weight reduction in vocational trucks, and for the 2B work trucks, taking full and more rapid advantage of the technologies that are being developed to meet the 2012- 2016 light-duty vehicles rule. [EPA-HQ-OAR-2010-0162-2164, p.1]

Organization: ArvinMeritor, Inc.

- Trailers to Be Included in Next Wave of Regulations - There are significant opportunities for trailers to mitigate emissions and fuel usage, including:

o Aerodynamic – side skirts, “boat tails,” front fairings to block tractor-trailer gap

o Low rolling resistance tires

o Reflective surfaces for refrigerated trailers

o Weight reduction (such as Meritor’s lightweight tandem for SuperTruck)

o Tire Pressure Management (as a requirement) [EPA-HQ-OAR-2010-0162-1605.1, p.10]

Due to the significantly greater number of trailers in the market, and the longer service life of trailers versus power units, fuel efficiency and emissions improvements resulting from regulating trailers will be slower to develop; but the sooner the regulations are put in place, the sooner the benefits will be ultimately realized. [EPA-HQ-OAR-2010-0162-1605.1, p.10]

It is recommended that the agencies reach out to the trailer manufacturers well in advance of drafting the regulations in order to gain a full understanding of the trailer industry, its constraints, and potential obstacles to compliance with future regulations. [EPA-HQ-OAR-2010-0162-1605.1, p.10]

Organization: Northeast States for Coordinated Air Use Management (NESCAUM)

The proposed standards for heavy-duty combination tractors represent an important step in reducing emissions from Class 7 and Class 8 vehicles. These standards would reduce combination tractor fuel consumption and greenhouse gas emissions by up to 20 percent by 2017 compared to a 2010 baseline. This level of reduction is technically feasible using a combination of commercially available engine and vehicle technologies and with the realization of additional improvements in efficiency from exhaust aftertreatment systems or other approaches. The proposed standards will not require the introduction of advanced technologies such as bottoming cycle or hybridization. [EPA-HQ-OAR-2010-0162-1757.1, p.3]

It is our view, however, that the proposed rules should be complemented by the establishment of GHG and fuel economy standards for trailers, which have not been included in the proposal. In 2009, under the auspices of the Northeast States Center for a Clean Air Future (NESCCAF) NESCAUM published a comprehensive study on the technical feasibility and costs associated with reducing heavy-duty long haul truck fuel consumption and greenhouse gas emissions.4 Our study found that a 40 percent reduction in fuel consumption and emissions is achievable in the 2018 timeframe for combination tractor-trailers without exceeding current limits on truck weight and length. We found that the reductions could be achieved through the use of engine technologies, transmission improvements, improvements in tractor and trailer aerodynamic drag and tire rolling resistance, and other strategies. We wish to emphasize that significant emissions reductions are achievable through the use of aerodynamic drag improvements on trailers. We attach our study to these comments for submittal into the rulemaking docket. [EPA-HQ-OAR-2010-0162-1757.1, p.3]

Because it is important to obtain improvements from the full vehicle in order to maximize the potential emissions and fuel consumption reductions from these heavy trucks, we encourage the agencies to propose regulations for trailers at the earliest possible date. [EPA-HQ-OAR-2010-0162-1757.1, p.3]

Organization: Union of Concerned Scientists (UCS)

Trailer improvements could reduce long-haul tractor-trailer fuel consumption by at least an additional 10 percent using available low-cost, off-the-shelf technology like low resistance rolling tires and aerodynamic side and rear fairings. [4] [EPA-HQ-OAR-2010-0162-1764.1, pp.7-8]

The agencies should begin a rulemaking as soon as possible proposing standards for new trailers with implementation starting in model year 2014. We believe it is possible to begin standards as early as model year 2014 for a number of reasons. EPA's SmartWay program currently identifies numerous tires that are low-rolling resistance as well as aerodynamic technologies that are available for trailers. California regulations require model year 2011 and newer trailers to be SmartWay certified including the use of low rolling resistance tires and aerodynamic components. [5] Many of the largest van-trailer manufacturers, including Wabash National, Stoughton Trailers, Utility Trailer Manufacturing, Hyundai Translead, and Great Dane Trailers, are currently offering SmartWay certified trailers. The availability of off-the-shelf technology, the existence of trailer OEM SmartWay certified products, and existing California regulations requiring trailers to meet aerodynamic and rolling resistance performance standards, support moving quickly to implement trailer standards starting in model year 2014. [EPA-HQ-OAR-2010-0162-1764.1, p.8]

We strongly support the agencies intentions to move forward with performance standards for trailers and believe these should begin starting in model year 2014 given their importance to overall tractor-trailer fuel economy and availability of off-the-shelf technology. As noted by the agencies (75 FR 74346), trailers and tractors are often owned by separate entities creating a split incentive for fuel efficiency improvements. Performance standards are needed to overcome this and other barriers to achieve the substantial fuel savings offered by trailer improvements.[EPA-HQ-OAR-2010-0162-1764.1, p.7]

Long-haul tractor-trailers could reduce their fuel consumption at least 35% by 2017, based on a review of technologies identified in the recent NAS study. In comparison, the proposal calls for a 20% reduction in fuel consumption from long-haul tractors and excludes trailers (specified in the proposal as tractors with sleeper cabs). [EPA-HQ-OAR-2010-0162-1764.1, p.7]

---

[4] Delivering the Green: Reducing Trucks' Climate Change Impacts While Savings at the Pump, Union of Concerned Scientists, 2008. Online at http://www.ucsusa.org/clean_vehicles/solutions/cleaner_diesel/delivering-the-green.html

[5] As most recently adopted by the California Air Resources Board in December 2010. The proposed regulation order can be found online at http://www.arb.ca.gov/regact/2010/truckbus10/truckbusappc.pdf.

Organization: Sierra Club, Ms. Coplon-Newfield

Transcript from 11/18/2010 Public Hearing

Thirdly, EPA and NHTSA should account for advanced technologies and improvements from the entire vehicle. The focus on just engines and tractor improvements for long-haul freight trucks limits the oil savings and CO2 reduction benefits. Significant decreases in fuel consumption are possible from improvements to trailers. As Coralie mentioned, the National Academy of Sciences (NAS) found that improvements to trailers represent one-quarter to one-third of all potential fuel savings from long-haul tractor trailers. Standards for trailers should include aerodynamic improvements, options for lightweight materials, and efficient tires.

Organization: Sierra Club – multiple comments from comment campaign

Technology is available to reduce pollution and fuel consumption for long haul freight trucks by as much as 35%. It is important that the new standards ensure the continued development and deployment of advanced technologies including engines, transmissions and hybrid systems. [EPA-HQ-OAR-2010-0162-1947.1_Mass, p.1]

Further, it is critical that standards for all vehicles, from large pickups to delivery vans to tractor trailers, be set at the strongest level possible. [EPA-HQ-OAR-2010-0162-1947.1_Mass, p.1]

Organization: United States Senators (Dianne Feinstein, Olympia Snowe, Maria Cantwell, Richard Durbin, Barbara Boxer, Benjamin Cardin, Sheldon Whitehouse, Jack Reed, Jeff Merkley, Joseph Lieberman, Frank Lautenberg, Bill Nelson, Robert Menendez, Mark Udall, Thomas Carper, Daniel Akaka, Daniel Inouye, and John Kerry)

Similarly, we recommend that DOT and EPA reconsider whether to establish standards regarding truck trailer impacts on fuel consumption. The National Academy Report specifically states that "by the 2015 to 2020 time frame, the use of aerodynamic features can provide fuel consumption reductions of about 15 percent for tractor-van trailer vehicles operating at 65 mph." A standard that fails to capture this considerable fuel savings potential would likely not demonstrate the maximum feasible improvement.

Response:

Neither EPA nor NHTSA is adopting standards at this time for GHG emissions or fuel consumption, respectively, for heavy-duty commercial trailers or for vehicles or engines manufactured by small businesses. While we are deferring action today on setting trailer standards, the agencies are committed to moving forward in a timely manner to create a complementary regulatory program for trailers. See preamble Section IX for more details on the agencies' decisions regarding trailers.

The agencies recognize that aerodynamic and tire rolling resistance improvements to trailers represent a significant opportunity to reduce fuel consumption and GHGs as evidenced by the work of the EPA SmartWay program. See 74 FR at 73348-49. However, the inclusion of trailers would not be feasible at this time due to the diversity and complexity of the trailer industry, as well as a lack of critical information from the SmartWay program, industry and other key stakeholders. Additionally, since a number of trailer manufacturing entities are small businesses, EPA and NHTSA need to allow sufficient time to convene a SBREFA panel to conduct the proper outreach to the potentially impacted stakeholders. The agencies agree that the regulation of trailers, when appropriate, is likely to provide fuel efficiency benefits. However, as discussed below, the agencies continue to believe that both agencies must perform a more comprehensive assessment of the trailer industry, and therefore that their inclusion at this time is not feasible

The agencies believe that they have made a reasoned choice that it is better to defer regulation of trailers until the program for engine and vehicle manufacturers is underway. Based on that experience, the agencies will be in a far better position to develop a reasonable program that integrates a whole new regulatory entity (trailer manufacturers) into an already complicated and unprecedented regulatory program. We note further that section 202 (a)(1) requires EPA to consider available lead time in promulgating standards and affords EPA considerable discretion in assessing needed lead time for standards. As indicated in preamble Section IX, it is a reasonable exercise of that discretion to take more time to develop a meaningful and responsible program for trailer manufacturers. Similarly, this is a reasonable exercise of NHTSA's discretion to weigh the statutory factors of technical feasibility, appropriateness, and cost-effectives in setting standards under 49 U.S.C. 23902(k).

The criteria emissions from diesel engines used to power transportation refrigeration units (TRUs) are currently regulated by EPA as nonroad engines under 40 CFR Part 1039 and are not part of the on-highway program. The agencies will consider the technologies described by ecoFridge in any future actions related to trailers and/or nonroad engines.

12.2. Support Delay in Regulating Trailers

<u>Organizations Included in this Section:</u>

American Trucking Associations, Inc. (ATA)
National Tank Truck Carriers (NTTC)
Nose Cone Manufacturing Company
Rubber Manufacturers Association (RMA)

Truck Renting and Leasing Association (TRALA)

Organization: American Trucking Associations, Inc. (ATA)

While ATA recognizes the potential for fuel-efficiency gains from improved trailer design, ATA concurs with EPA and NHTSA in that trailers should not be regulated under the current rulemaking effort. The trailer manufacturing industry is far different from the engine and truck manufacturing sectors. Whereas there are only a handful of truck and engine manufacturers, there are well over 100 trailer manufacturers in the U.S. with almost all being designated as small businesses. The top 10 trailer manufacturers account for over 75% of total sales. Unlike the business relationships between engine and truck manufacturers, trailer manufacturers remain separate and unique entities. [EPA-HQ-OAR-2010-0162-2263.1, p.11]

The potential for trailers to reduce GHG’s and fuel consumption requires far more research and study for several reasons. Trailers come in a variety of different styles including dry vans, refrigerated, tank, flat bed, and specialized to name a few. The ratio of trailers to tractors is 3:1 and upwards and tractors are often paired with a variety of different trailer types depending on a company’s operations. Adding another level of complexity to the equation, the useful life of a trailer can exceed 20 years with proper maintenance and even be remanufactured to provide many more years of useful life. [EPA-HQ-OAR-2010-0162-2263.1, p.11]

As we near the 100-year anniversary of the anniversary of the tractor trailer, ATA agrees that it is time to reassess its design elements. Such an approach should be nationally harmonized and not be done piecemeal such as the approach California has already undertaken as previously discussed above. As a key stakeholder, ATA desires to work with the agencies in developing a logical and cost-effective approach in addressing this issue. [EPA-HQ-OAR-2010-0162-2263.1, p.11]

Organization: National Tank Truck Carriers (NTTC)

While we support the underlying goals of the rule, we share ATA's concerns about how these rules may impact our members, specifically including the following provisions that particularly impact tank truck operations : (1) Clean Air Act Section 203 tampering provisions should not apply to fleets; (2) OEM's should not limit vehicle purchasing options; (3) trailers should not be regulated under the rule; (4) aerodynamic approach needs to be reassessed ; and, (5) the vocational vehicle definition should be revisited. [EPA-HQ-OAR-2010-0162-3316, pp.1-2]

Organization: Nose Cone Manufacturing Company

We agree with the decision to not include commercial trailers into the proposal at this time. Trailer design is the most diverse aspect of the tractor/trailer combination. Our own product line of van-trailer specific aerodynamic applications includes over 20 different models with each one particularly suited to a specific tractor-trailer combination. In addition the diversity of trailer design combined with truck design, the obstacles to regulating a non-engine component that is as much a factor in fuel efficiency as the engine itself, will present the greatest challenge to EPA/NHTSA in the same manner as it does to the industry itself. We agree with the current approach in setting standards for the three tractor types, i.e. full height, mid-roof, and flat top as the best starting point for the proposed regulation, particularly in consideration of issues involved with testing tractor-trailer combinations as we discuss further below. [EPA-HQ-OAR-2010-0162-1943.1, p.2]

Organization: Rubber Manufacturers Association (RMA)

In the NPRM, the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) have proposed regulations limiting greenhouse gas emissions and fuel consumption for medium- and heavy-duty truck engines and tractors. RMA appreciates that EPA and NHTSA have chosen to focus on the entire tractor, instead of individual non-engine components. This approach gives truck manufacturers the flexibility to select nonengine components, including tires, that are appropriate for each vehicle's applications as long that the tractor meets the standards. However, RMA members recognize the significant role in overall fuel consumption and greenhouse gas emissions that trailers play as well. RMA encourages EPA and NHTSA to develop trailer standards in the future. RMA suggests that EPA and NHTSA consider potentially developing a "standardized tractor" to assess the fuel efficiency of trailers. [EPA-HQ-OAR-2010-0162-1963.1, p.2]

Organization: Truck Renting and Leasing Association (TRALA)

TRALA concurs with EPA and NHTSA that trailers should not be regulated - at least not at this time. We do not believe that sufficient reliable data and/or models exist to support issuance of GHG emissions and/or fuel consumption standards for trailers (75 Fed. Reg. at 74,157, 74,161) particularly in light of their disparate manufacture and use. [EPA-HQ-OAR-2010-0162-1816.1, p.6]

Response:

Neither EPA nor NHTSA is adopting standards at this time for GHG emissions or fuel consumption, respectively, for heavy-duty commercial trailers or for vehicles or engines manufactured by small businesses. The agencies recognize that aerodynamic and tire rolling resistance improvements to trailers represent a significant opportunity to reduce fuel consumption and GHGs as evidenced by the work of the EPA SmartWay program. While we are deferring action today on setting trailer standards, the agencies are committed to moving forward in a timely manner to create a complementary regulatory program for trailers. See preamble Section IX for more details on the agencies' decisions regarding trailers.

13. Safety

13.1. Tires

Organizations Included in this Section:

American Automotive Policy Council
American Trucking Associations, Inc. (ATA)
Bendix Commercial Vehicle Systems LLC (Bendix)
Fire Apparatus Manufacturers' Association
National Ready Mixed Concrete Association (NRMCA)
National School Transportation Association (NSTA)
New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority
Oshkosh Corporation
Recreation Vehicle Industry Association (RVIA)
Waste Management

Organization: American Automotive Policy Council

AAPC strongly encourages EPA and NHTSA to consider the potential impact of future planned FMVSS tire performance and stopping distance requirements for heavy duty vehicles when determining the appropriate rolling resistance targets for GHG compliance. These sometimes contradictory performance standards must be addressed in concert to insure the appropriate balance between safety and environmental performance. [EPA-HQ-OAR-2010-0162-1762.1, p.20]

Organization: American Trucking Associations, Inc. (ATA)

The safety effects of low rolling resistance tires are not well understood. While the proposed rule provides only cursory discussions of potential safety impacts, further documentation and/or research in support of these discussions is needed to better evaluate the conclusions presented. While both EPA's and NHTSA's primary focus under this rulemaking is on tire rolling resistance, the agencies must not lose focus on the issue of tire traction. [EPA-HQ-OAR-2010-0162-2263.1, p.6]

For example, some motor carriers have expressed concerns that low rolling resistance tires do not provide the traction performance they require, especially during adverse weather conditions. ATA's review of published literature revealed few studies which provide quantifiable traction performance evaluations with respect to the low rolling resistance tires, especially for commercial truck tires. Other studies which have focused on passenger vehicle tires acknowledge that traction may be affected by modifying a tire’s tread to reduce rolling resistance but detailed analyses were unavailable. [EPA-HQ-OAR-2010-0162-2263.1, p.7]

With projected application rates for low rolling resistance tires for Class 7 and 8 trucks ranging from 60% to 90%, new truck purchasers will need to understand which applications may, or may not, be appropriate for these tires. Currently, the lack of detailed information on the performance of low rolling resistance tires precludes this type of evaluation. Issues including traction under wet or icy conditions, braking impacts during descents, and pavement wear need to be further addressed. ATA asks the agencies to further study and fully understand the costs and benefits of each of these aspects before finalizing the rule. [EPA-HQ-OAR-2010-0162-2263.1, p.7]

Organization: Bendix Commercial Vehicle Systems LLC (Bendix)

Improper tire pressure is a safety issue that, unfortunately, is often overlooked. Small decreases in tire pressure, even just a few pounds per square inch (psi) results in decreased fuel efficiency, tire life, safety, and vehicle handling/performance. In the commercial vehicle market, there are a variety of systems available to passively monitor tire pressure (tire pressure monitoring systems) as well as to actively manage and maintain proper tire pressure (central tire inflation systems). [EPA-HQ-OAR-2010-0162-1888.1, p.5]

Advanced systems, combine the monitoring and the management technologies to be a completely automated system to alleviate the need for actively maintaining tire pressure by the operator/fleet and continuously monitors and applies air pressure, when needed, to the appropriate tire/wheel position. Typically, a tire pressure management system has the following components: centralized processor, air compressor, air control valves and rotary seals near each wheel. The system takes periodic tire pressure readings and makes adjustments according to the desired pressure setting. These systems typically come with several pre-defined settings but also allow the user to enter their own pressure setting, if needed. Also, the pressure settings, current pressures and flat/leak notifications can be on a dash display. By maintaining proper pressures, not only does it provide the obvious safety benefit of mitigating potential flat tires, but also the consistent pressure maintenance helps retain the optimum rolling resistance, which maintains optimal fuel efficiency. [EPA-HQ-OAR-2010-0162-1888.1, pp.5-6]

Organization: Fire Apparatus Manufacturers' Association

Aggressive tread patterns increase the tires’ ability to provide traction, braking, and cornering performance in soft soil, wet, or snowy conditions. While some fire apparatus operate mainly in urban environments, other apparatus are used in regions that require aggressive or mixed-service tires. Examples of this type of operation include:

- Wildland areas where apparatus operate on dirt or gravel roads, or other off-road environments. [EPA-HQ-OAR-2010-0162-1328.1, p.6]

[Pictures can be found on page 6 of this comment.]

- Rural regions where apparatus must negotiate muddy farm-yards or gain access to outbuildings in non-paved areas. [EPA-HQ-OAR-2010-0162-1328.1, p.6]

[Pictures can be found on page 6 of this comment.]

- Mountainous regions where access to structures is only possible via muddy or snow-packed roads. [EPA-HQ-OAR-2010-0162-1328.1, p.7]

[Pictures can be found on page 7 of this comment.]

- Unimproved regions where apparatus must operate in “sugar sand” or other soils with low rates of compaction. [EPA-HQ-OAR-2010-0162-1328.1, p.7]

[Pictures can be found on page 7 of this comment.]

Another tire related concern involves braking and cornering. Tires produced with rubber compounds that reduce rolling resistance may have a corresponding reduction in on-road braking and cornering performance, particularly in wet, muddy, or snowy conditions. This trade-off will be most concerning for emergency vehicles. Fire apparatus, rescue trucks, and ambulances all respond to time-sensitive situations, often at speeds that exceed posted speeds and push the limits of vehicle performance. It is essential that tires with excellent braking and cornering characteristics be utilized. We believe compromises in this area in an attempt to improve fuel economy will not balance the added risk to emergency workers and the public they serve. [EPA-HQ-OAR-2010-0162-1328.1, pp.7-8]

By their very nature, fire apparatus are designed for specific emergency response needs. Excellent braking and cornering performance are required for safe operation in all weather, road, and soil conditions. [EPA-HQ-OAR-2010-0162-1328.1, p.10]

Organization: National Automobile Dealers Association (NADA)

NHTSA and EPA need to take a second look at what they hope to achieve with low rolling resistant tire mandates for vocational trucks. First and foremost, low rolling resistance tires should never be mandated if their use could result in safety concerns arising from longer stopping distances, cornering issues, or otherwise. Also, customers will avoid lower rolling resistance tires that may compromise intended vehicle use. Unless customers have sufficient test-based performance data upon which to conclude that these tires will meet their reliability and durability needs, especially in “severe” use conditions (i.e., stop/go, heavy-load, bad weather, and off-road operations), they will not invest in them. Certain vocational vehicles (emergency, trash hauling, etc) should be excluded from the tire mandate altogether. [EPA-HQ-OAR-2010-0162-2705, p.9]

Organization: National Ready Mixed Concrete Association (NRMCA)

The NRMCA supports the intent of this proposed rule and its endeavor to serve the interests of the environment and energy conservation. NRMCA does believe that certain aspects of the rule will be counterproductive to the ready mixed concrete industry as concrete mixers (vocational trucks) must often ford road curbs and travel off road. While this distance is usually a short distance, there can be mud, snow, sandy or soft soil present. The low resistance tires have a less deep and aggressive pattern and consequently, the concrete mixers are more apt to become stuck at the jobsite. [EPA-HQ-OAR-2010-0162-1326.1p.1]

NRMCA also believes that these low resistance tires will affect the concrete mixer braking and cornering ability. Concrete mixers already have a higher center of gravity and a shifting load. The braking systems should have the maximum ability to stop the concrete mixer. As far as cornering, the shifting load can contribute to the rollover of a concrete mixer. Some accidents have happened while the concrete mixer was only traveling 15 - 20 miles per hour. These concrete mixers need maximum stability for the safety of the driver as well as the other vehicles on the road. NRMCA believes that this attempt to improve fuel economy will not balance the added rick to the driver and the other vehicles present on the road. [EPA-HQ-OAR-2010-0162-1326.1, p.1]

NRMCA also believes the stiffer side walls on the low resistance tires will present a rougher ride for the concrete mixer and the driver. Concrete mixer already experience an increased level of maintenance due to the nature of the shifting concrete load and having to ford curbs to deliver the concrete at the point of placement. The stiffer side walls will add additional adverse impact to the concrete mixer reliability. [EPA-HQ-OAR-2010-0162-1326.1, p.2]

NRMCA would like to see specific language exempting concrete mixers from having to run low resistance tires. These tires will bring an increased safety risk to the driver and public, along with greater potential for getting the truck stuck at the jobsite, requiring a heavy duty tow truck to remove the stuck mixer. An additional unintended consequence will come in the form of decreased reliability for the concrete mixer. [EPA-HQ-OAR-2010-0162-1326.1, p.2]

Organization: National School Transportation Association (NSTA)

NSTA members welcome efforts to improve fuel economy for school buses, but we believe that efforts to improve fuel economy should not come at the expense of reducing safety for school children riding on the school bus. For example, school buses provide the high level of safety in part because of added structural integrity requirements, which could add weight and might come at the expense of fuel economy. Where there is a tradeoff between fuel economy and safety, we believe the rule should allow for a waiver from fuel economy standards if needed to ensure the safety of our school children. There can be no higher priority than protecting our precious cargo. [EPA-HQ-OAR-2010-0162-1751.1, p. 2]

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

With respect to safety of single-wide tires, some truckers have reported recently that traction of singlewide tires seems to be reduced when compared to the use of dual-tires. This was also described in the agencies' rule-making preamble as potential loss of traction under reduced weight (reduced payload) and a request of additional comment pertaining to the topic was expressed. Performance metrics of singlewide tires should include a traction component for wet, snow and ice conditions as well as payload. . [EPA-HQ-OAR-2010-0162-2047.1, p.4]

Although the proposed rule-making will not provide guidelines or tire maintenance inspection protocols, recommendations should be made to the states to develop and to implement applicable tire inflation and inspection protocols. Automatic tire inflation would be an important technological feature as a means to keep tires properly inflated and ensure proper load distribution with the pavement surface in addition to fuel savings. New York State recommends that automatic tire inflation be included in the host of technology measures under the proposed rules. [EPA-HQ-OAR-2010-0162-2047.1, p.4]

Organization: Oshkosh Corporation

If the current tires do not fall below the 8.0 kg/metric ton, then the industry will be left without aggressive tread products needed to safely and effectively perform their functions. Mobility in soft soil, snow, mud, and sand are critical to many vocational applications. [EPA-HQ-OAR-2010-0162-1588.1, p.3]

Organization: Recreation Vehicle Industry Association (RVIA)

The level of testing required to validate all of the vehicle's dynamic handling characteristics affected by multiple changes of both basic tire characteristics and substantial suspension changes cannot be realistically completed in two short years. LRR tires also typically require longer stopping distances, particularly in wet conditions. In addition to having to address this issue in the vehicle dynamics study, such potential safety issues could further negatively impact sales in this totally discretionary market. Motorhome buyers are not 'risk' takers and they are highly informed consumers. As such, the possibility of a negative sales impact is a real concern. [EPA-HQ-OAR-2010-0162-3300, p.9]

Separate from costs, before and EPA and NHTSA mandate the use of LRR tires across the board for all vocational vehicles, the agencies should verify that these LRR tires are indeed capable of meeting the enhanced endurance and high speed test requirements contained in the NHTSA NPRM that was published September 29, 2010 (see 75 FR 60036) . Furthermore, in light of the forthcoming electronic stability control rule that NHTSA intends to issue for trucks over 10,000 lbs GVWR, the agencies should similarly verify that these tires will not have an impact on vehicle stability control that will diminish the benefits of this rulemaking. [EPA-HQ-OAR-2010-0162-3300, pp.9-10]

If EPA decides to require that non-commercial vehicles must be fitted with LRR tires, it must provide more than two years for motorhome chassis manufacturers to design, develop and prove-out the suspension modifications that will required to offset the loss of ride quality due to the reduced performance characteristics of the LRR tires. [EPA-HQ-OAR-2010-0162-3300, pp.12-13]

Organization: Waste Management

Tire performance is extremely important for refuse vehicle fleets. Tires must meet the federal DOT 10,000 lb rating on the steering axle and state requirements may be more stringent. NHTSA recently tightened the stopping distance requirements by 30 percent, so good traction is critical. Several wide base, low rolling resistance tires are available for heavy, HD vocational vehicle use, but compared to the line-haul application, there are far fewer choices. While WM has had some success with the 455/55R22.5 tires, they cannot be used in all refuse collection applications. Our primary concern is their ability to stand up to high abrasion due to the tight maneuvering and frequent starts and stops that are commonplace in our residential and commercial duty cycles. High tire abrasion can reduce vehicle safety. Quite frankly, any fuel savings afforded by the use of low rolling resistance tires will likely be counteracted by the severe duty cycle experienced by the average refuse truck. [EPA-HQ-OAR-2010-0162-1854.1, p.7]

Response:

As described in Section II.D of the preamble of the final rule, the agencies conducted independent testing of current tires available in the heavy-duty market. The agencies utilized this information in developing the vocational vehicle standards predicated on use of LRR tires.[70] The agencies acknowledge there can be a series of tradeoffs when designing a tire for reduced rolling resistance. These tradeoffs can include characteristics such as wear resistance, cost and scuff resistance. However, the tire test samples were selected from those currently available on the market, and therefore have no known safety issues and meet all current requirements to allow availability in commerce; including wear, scuff resistance, braking, traction under wet or icy conditions, and other requirements. These tires included a wide array of sizes and designs intended for most all vocational vehicle applications, including those used for school buses, refuse haulers, emergency vehicles, concrete mixers, and recreational vehicles. As the test results revealed, there are a significant number of tires available that meet or exceed the rolling resistance targets for vocational vehicles and combination tractors, both Light-Truck (LT) (with an adjustment factor) and non-LT tire types, while meeting all applicable safety standards.

The agencies also conducted a winter traction test of 28 tires to evaluate the impact of low rolling resistance designs on winter traction. The results of the study indicate that there was no statistical difference between rolling resistance and snow traction.[71]

The agencies also made follow-up inquires with tire manufacturers in regard to vehicles responding to time sensitive situations on public road and, at times, possibly exceeding the posted speed limits in response to an emergency situation. The responses to these inquiries with tire suppliers combined with the independent tire test data discussed in the final rule preamble (see preamble Section II.D) further indicate the rolling resistance targets for on-road vocational vehicles can be met with tires that are currently available for many vehicle types and applications.

As part of the final rule, the agencies provided provisions to allow for exemption of specific off-road capable vocational vehicles from the fuel efficiency and greenhouse gas standards. The agencies are adopting provisions to exempt any vocational vehicle having speed restricted tires rated at 55 mph or below. In addition, any vehicle primarily designed to perform work off-road such as in oil fields, forests, or construction sites and having permanently or temporarily affixed components designed to work in an off-road environment (i.e., hazardous material equipment or off-road drill equipment) or vehicles operating at low speeds making them unsuitable for normal highway operation; and meeting one or more of the following criteria:

- Any vehicle equipped with an axle that has a gross axle weight rating (GAWR) of 29,000 pounds; or

---

[70] Bachman, Joseph. Memo to Docket. Heavy-Duty Tire Evaluation. Docket EPA-HQ-OAR-2010-0162.
[71] ibid.

- Any truck or bus that has a speed attainable in 2 miles of not more than 33 mph; or
- Any truck that has a speed attainable in 2 miles of not more than 45 mph, an unloaded vehicle weight that is not less than 95 percent of its gross vehicle weight rating (GVWR), and no capacity to carry occupants other than the driver and operating crew.

Further, NHTSA plans to conduct additional performance-focused testing (beyond rolling resistance) as part of FMVSS rule development for medium and heavy-duty trucks. This testing is targeted for completion toward the end of this year.

Regarding tire maintenance and inflation, the agencies recognize that proper tire inflation pressure can be maintained with a rigorous tire inspection and maintenance program or with the use of tire pressure monitoring and inflation systems. These systems monitor tire pressure; some also automatically keep tires inflated to a specific level. As discussed in the RIA Chapter 2.8.3, the agency recognizes that such devices could have a beneficial effect on fuel efficiency, though their use is not included in this regulatory framework. However, through its SmartWay program, EPA provides information on proper tire inflation pressure and on tire inflation and tire inflation pressure monitoring systems. In addition, most fleet operators require pre-route vehicle inspections by drivers. These inspections typically include air pressure checks not only to help with the fuel efficiency benefits of proper tire inflation pressures, but also to help ensure safe vehicle operational characteristics.

13.2. Vehicle Speed Limiters

Organization: American Trucking Associations, Inc. (ATA)

Limited flexibility must be built into speed limiters as not to interfere with NHTSA and EPA planned rulemaking in response to 2006 ATA petition and 2008 Sustainability Plan calling for national 65 mph limit and 65 mph speed limiter for large trucks manufactured after 1992. ATA recommends: 1) ATA recommends the agencies' pro-rate the GEM input credits to average fleet trade-in cycles; 2) Fleets should be allowed to reset and lower their speed limiters if company policies change during the ownership cycle in which the manufacturer is receiving GEM input credit, and; 3) Manufacturers should be allowed to account for additional GEM input credits associated with the resetting of speed governors made within the useful life of a vehicle. [EPA-HQ-OAR-2010-0162-2263.1, p.8]

Response:

In 2010, NHTSA announced its intent to publish a proposal in 2012 on VSLs in response to the 2006 ATA Petition and 2008 Sustainability Plan. Both agencies have taken steps to avoid potential conflicts between the rulemaking being finalized today for fuel consumption and GHG emissions and the anticipated NHTSA safety rulemaking. As a result, this rulemaking does not require that the maximum speed governed by VSLs be limited to 65 mph but does diminish the benefits in meeting GHG and fuel consumption standards at speeds greater than 65 mph.

The final rule allows manufacturers to set an expiration date based upon a percentage of the vehicle's total useful life miles to reset the maximum governed speed limit of a VSL, and allows manufacturers to provide fleets with the capability to set lower adjustable speeds that can be governed by VSLs. These requirements were adopted to provide the range of flexibilities requested by commenters in response to the NPRM. An equation for prorating the GEM input credit based on the expiration (reset) date of the VSL is provided as Equation II-1 of the preamble (Section II.B) and in the RIA Chapter 2. Adjustable lower limits allowed in the final rule must be set and governed by VSLs independent of the one governing the maximum certified speed limit. However, for this first phase of the HD National Program, the agencies have decided not to allow any additional benefit in GEM to a manufacturer for a lower governed speed in-use than the certified maximum limit because we can only be certain that the VSL will be at the maximum setting.

Organization: Cummins Inc.

Cummins requests that the Agencies clarify their intent for tamper-resistant vehicle speed limiters and idle shutdown. The Agencies should change the regulatory language to clarify that the VSL and idle shutdown trims should be tamper-resistant rather than tamper-proof. [EPA-HQ-OAR-2010-0162-1765.1, p.30]

Feature trims need to be accessible to OEMs. The markets served by the commercial vehicle industry are extremely diverse in nature, leading to the need for significant original equipment manufacturer (OEM) flexibility in setting up electronic features. OEMs need access for setting appropriate trims for managing the VSL and idle shutdown, otherwise significant supply chain issues could be created through an increase in inventory and part numbers. The Agencies should allow tamper-resistant trims to be managed by the vehicle OEM. This would include protecting the trims via a password used by the OEM. [EPA-HQ-OAR-2010-0162-1765.1, p.30]

Fleets need the ability to access tire size trims. Cummins proposes that the trim for tire size remain outside the OEM password umbrella. Not allowing fleets to reset tire size at the time of tire replacement would result in increased service costs and potentially increased GHG/FC if only OEMs could access this trim. [EPA-HQ-OAR-2010-0162-1765.1, p.30]

Current anti-tampering algorithms for the vehicle speed signal are sufficiently robust. For some time, there has been an interest by fleet customers to make the vehicle speed signal tamper-resistant, and anti-tampering algorithms have been put in place to support this desire.

Due to insufficient leadtime to redevelop these algorithms, the Agencies should consider the current anti-tampering feature functionality sufficient. [EPA-HQ-OAR-2010-0162-1765.1, p.31]

The ability for fleets to adjust vehicle speed below the VSL should be maintained. Often during times of fuel price spikes, fleets choose to reduce the VSL. To facilitate this fleet flexibility and enable a GHG/FC reduction post-build, Cummins proposes that vehicle speed remain trimmable by the fleets at a value set below the VSL. [EPA-HQ-OAR-2010-0162-1765.1, p.31]

A temporary increase in the VSL should be allowed. Presently, there exists the capability for fleets to allow drivers a temporary increase in the VSL for a short distance or time. This is done to improve safety by limiting road congestion and enabling passing maneuvers. It is recommended that this feature be maintained and that the impacts of utilizing such a feature be accounted for in the GEM. Cummins commits to work with the Agencies in support of developing such flexibility. [EPA-HQ-OAR-2010-0162-1765.1, p.31]

Response:

After reviewing the comments, the agencies have decided to retain the NPRM proposal and require manufacturers to provide VSLs that cannot be easily overridden in order to meet emissions and fuel consumption standards. Manufacturers will be allowed to select the fixed maximum governed vehicle speed through a VSL feature and to use the maximum governed vehicle speed as an input to the GEM for certification. The agencies continue to believe that VSLs should be resistant to tampering. Therefore, the final rule specifies that manufacturers should design the VSL coding such that it is difficult for itself or a fleet to make changes once the maximum governed speed limit is set. For example, a manufacturer could place the VSL programming behind a firewall and use password protected coding to sufficiently protect the VSL coding.

The agencies are also aware that some fleets/owners make changes to vehicles, such as installing different diameter tires, changing the axle (final drive) ratio and transmission gearing, such that a vehicle could travel at speeds higher than the speed limited by its VSL. To facilitate adjustments for component changes affecting vehicle speed, manufacturers are required to provide fleets/owners with the means to do so unless the adjustments would affect the VSL setting or operation. The agencies have also decided to adopt requirements in the final rule to allow adjustable lower limits that can be set and governed by VSLs independent of the one governing the maximum certified speed limit to provide the desired flexibility requested by the trucking industry. We believe that this flexibility would not decrease the anticipated fuel consumption/CO_2 benefits of VSLs because the adjustable limits would be lower values. Issues identified by the commenters, including the need to change delivery routes requiring lower governed speeds or the desire for greater fuel consumption savings when a fleet's business practices change, are not in conflict with the purpose and benefit of VSLs. As such, the agencies have decided to allow a manufacturer to install features for its fleet customers to set their own lower adjustable limits below the maximum VSL limit specified by the agencies. However, for this first phase of the HD National Program, the agencies have decided not to allow any additional benefit in GEM to a manufacturer for a lower governed speed in-use than the certified maximum limit because we can only be certain that the VSL will be at the maximum setting.

Both agencies further agree manufacturers should be able to provide “soft top” features to be programmed into PCMs to provide additional flexibility for fleet owners. Although the agencies considered limiting the soft top maximum level due to safety and fuel consumption/GHG benefit concerns, we have decided to allow the soft top maximum level to be set to any level higher than the maximum speed governed by the VSL. This approach will provide drivers with the ability to better navigate through traffic. However, the agencies are requiring that manufacturers providing a soft top feature design the system so it cannot be modified by the fleets, and will not decrement the vehicle speed limit causing the vehicle to decelerate while the driver is operating a vehicle above the normal governed vehicle speed limit. For example, if a manufacturer designs a vehicle speed limiter that has a normal governed speed limiter setting of 62 mph, and a “soft top” speed limiter value of 65 mph, the algorithm shall not cause the vehicle speed to decrement causing the vehicle to decelerate while the driver is operating the vehicle at a speed greater that 62 mph (between 62 and 65 mph). The agencies are concerned that a forced deceleration when a driver is attempting to pass or maneuver could have an adverse impact on safety.

Organization: Daimler Trucks North America

We suggest that a customer changing (for example) tire sizes yet not updating the engine parameter for tire size in the engine control unit, which would give the engine an incorrect calculation for vehicle speed, should not be tampering against which the manufacturer must protect. Tire or vehicle changes are currently regular occurrences in the in-use HDV market and not something against which manufacturers can protect. [EPA-HQ-OAR-2010-0162-1818.1, p.98]

The Agencies based their proposed program on existing technologies, so that manufacturers would not challenge the lack of adequate lead time given. ('By focusing on existing technologies and well-developed regulatory tools, the agencies are able to propose rules that we believe will produce real and important reductions in GHG emissions and fuel consumption within only a few years.' Re. 75 Fed. Reg. 74172.) Such a premise only makes sense if the Agencies are speaking of technologies existing at each manufacturer. In other words, the Agencies surely recognize that just because one or a few manufacturers have a technology developed and in production does not mean that all of the other manufacturers can put that technology in production without lead time. In turn, we base our support for the Agencies' program on our understanding that the Agencies will accept our current VSL software. Our engine software for MY 2013 is already 'frozen,' meaning that we cannot significantly alter it. In turn, we may have difficulty making changes to the VSL software we have and, lacking the CAA's required lead time, can only certify with today's VSLs. Moreover, any requirement to make significant changes with such lead time could jeopardize our OBD-2013 engine programs, to which we are currently devoting a large amount of resources. Changing the relevant software protection scheme is not a trivial task. If, however, the Agencies will relax their tamper-resistance standards through 2013, then we (1) can support the Agencies' VSL program and (2) will work towards developing an appropriate level of protection for our VSL as we do with our fuel maps starting in 2014.

Manufacturers must be allowed to offer to its customers multispeed VSLs for which manufacturers would appropriately prorate certification credits. Multispeed VSLs improve safety by allowing an elevated speed for a period of time when the operator must pass another vehicle and a lower speed limit would make passing more difficult or impossible. The multispeed logic limits the cumulative time that an operator can engage the feature over a fixed operation interval. For example the logic can be calibrated to allow an elevated vehicle speed for no more than 15 minutes during an 8 hour period of operating time. For a vehicle programmed in this manner, the manufacturer would discount the associated credits by prorating them according to the minimum fraction of total operating time that the vehicle speed would be constrained (i.e. representing the operator that always takes full advantage of the feature). In this case the credit at the lower speed would be multiplied by the factor of (480 – 15)/480 and the higher speed weighted by 15/480. [EPA-HQ-OAR-2010-0162-1818.1, pp.98-99]

In the same way that many passenger car customers reputedly buy a vehicle suitable for the most extreme operation they expect during the vehicle’s lifetime (and in turn unnecessarily sacrifice fuel efficiency through the remainder of the vehicle’s operation during its lifetime), so might a HDV customer choose a VSL setting suitable for his fastest travel – unless he were offered an option that incents (sic) long periods of low speed VSL settings yet with flexibility for his most extreme needs. At times in a vehicle’s useful life, a customer might need to increase a vehicle speed, for example upon sale to a second owner with a different type of operation. Rather than worsening resale values for vehicles with lower VSLs by limiting the second owners to which a VSL-equipped vehicle can be sold (which would decrease vehicle manufacturers’ ability to sell such vehicles and in turn would diminish the potential effectiveness of the Agencies’ regulations), the Agencies should allow reprogramming of the VSL. To keep Agency models of CO2 and fuel savings consistent with actual savings, however, manufacturers should be required to submit to the Agencies information about any VSL changes. Moreover, manufacturers should be given a disincentive for increasing VSL settings: they should lose CO2 or fuel consumption credits (or alternatively increase their deficits) when they increase a VSL speed setting. To keep credits aligned with actual emission and fuel consumption, the credit loss should be prorated by the mileage during which the increased speed is allowed. In other words, if a manufacturer increases a VSL setting for one quarter of the vehicle’s useful life, the manufacturer should only suffer a quarter of the penalty as if they had used that higher VSL setting for the entire useful life. Such a program will incent minimization of times with high VSL settings, while still recognizing the need for occasional higher speed operation. [EPA-HQ-OAR-2010-0162-1818.1, p.99]

Credit loss or deficit increases should be applied to the year when the VSL is changed. VSLs may be changed long after the three-year window during which a manufacturer must balance a year's credits. In turn, a manufacturer could be forced to keep revisiting past years, which is a waste of effort. Moreover, by applying deficits to the year when the vehicle is built, rather than the year when the VSL is changed, the Agencies would be trying to account for credits or deficits before they have occurred. Rather, the Agencies should minimize the burden of reopening past compliance years and maximize their accuracy by debiting manufacturers in the year that manufacturers make a change. [EPA-HQ-OAR-2010-0162-1818.1, p.99]

What applies for increases in VSL settings equally applies for decreases. Incenting manufacturers and operators to tighten VSL settings (i.e., lower speed limits) requires (1) flexibility throughout a vehicle's useful life, (2) credits for reductions, and (3) recognition that credits should be applied to the year when a reduction is made, as opposed to applied retroactively. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

We recommend that the same requirements that apply to VSLs in the DOT's speed limiter rule also apply to VSLs in the NHTSA/EPA FE/GHG rule. [EPA-HQ-OAR-2010-0162-1818.1, p.100]

Response:

The agencies are aware that some fleets/owners make changes to vehicles, such as installing different diameter tires, changing the axle (final drive) ratio and transmission gearing, such that a vehicle could travel at speeds higher than the speed limited by its VSL. A fleet owner making a change to a tire size but not updating the engine parameters for the tire size in the engine control unit may violate other vehicle regulations, such as FMCSA requirements for speedometers. See 49 CFR § 393.82. Manufacturers must ensure that compliance with all laws and regulations is maintained when making changes to a vehicle.

The agencies have also decided, for this final rule, to retain most of the elements in the NPRM proposal. As presented in the NPRM, the final rule requirements incorporate VSL features that currently already exist in the commercial market and are used by a number of tractor fleet owners. Consistent with the proposal, the agencies did not premise the combination tractor standards on the use of VSLs. This, along with the changes discussed below, lead time is not directly a concern.

The final rule adopts requirements for allowing for multispeed VSLs for which manufacturers can appropriately prorate the VSL input for use in the GEM. The VSL software used by manufacturers today includes a multispeed VSL, thus this change aligns with the manufacturer's current software. A manufacturer may select the maximum governed speed of the VSL at any level to accommodate its customer's needs. However, the level selected by the customer must then be fixed for the vehicle and used to determine the benefits in GEM for the manufacturer. By having a fixed maximum governed speed, GHG and fuel consumption benefits are maintained for the vehicle throughout its entire useful life. An expiration feature is also adopted into the final rule to be programmed into PCMs to provide additional flexibility for fleet owners, and to account for fleets that purchase used vehicles with different VSL policies.

The agencies have also decided to adopt requirements in the final rule to allow adjustable lower limits that can be set and governed by VSLs independent of the one governing the maximum certified speed limit to provide the desired flexibility requested by the trucking industry. We believe that this flexibility would not decrease the anticipated fuel consumption/CO_2 benefits of VSLs because the adjustable limits would be lower values. Issues identified by the commenters, including the need to change delivery routes requiring lower governed speeds or the desire for greater fuel consumption savings when a fleet's business practices change, are not in conflict with the purpose and benefit of VSLs. As such, the agencies have decided to allow a manufacturer to install features for its fleet customers to set their own lower adjustable limits below the maximum VSL limit specified by the agencies. However, for this first phase of the HD National Program, the agencies have decided not to allow any additional benefit in GEM to a manufacturer for a lower governed speed in-use than the certified maximum limit because we can only be certain that the VSL will be at the maximum setting.

The final rule does not allow for any credit losses or deficit increases that are associated with changing the VSL setting over the vehicle useful life miles. The maximum speed governed by the VSL adopted in the final rule must be a fixed setting prior to commercial sale of the vehicle and the GEM prorates the manufacturer's benefit in meeting GHG emissions and fuel consumption standards based on the selected maximum speed limit.

The agencies agree with comments that the HD rule should be aligned with other DOT programs, and note that there are no existing standards for a VSL outside of this current rulemaking activity. However, NHTSA has announced its intent to publish a proposal in 2012 for a VSL. While both agencies have taken steps to avoid potential conflicts between the rulemaking being finalized today for fuel consumption and GHG emissions and the anticipated safety rulemaking, different conclusions may be reached in a safety-based rulemaking on VSLs, particularly in the approach to specifying soft top parameters and VSL expiration.

Organization: Engine Manufacturers and Truck Manufacturers Associations

The proposed requirement that a vehicle speed limiter must be 'tamper-proof' (§1037.520(d)) is unrealistic and inconsistent with the Preamble discussion that the speed limiter must 'not be capable of being easily overridden by the fleet or the owner.' (See 75 FR at 74185.) Also, to ensure that the actual vehicle speed remains accurate in-use, owners must be able to reprogram inputs to the vehicle speed (e.g., tire radius, rear axle ratio, transmission gearing) to correspond with vehicle modifications that affect those inputs. Manufacturers also need to be able to program the speed limit setting to expire at a pre-determined point in time and/or to be exceeded for short periods of time or distance (i.e. a 'soft top' limit). [EPA-HQ-OAR-2010-0162-1940.1, p.27]

To address those issues, §1037.520(d) should be revised to require that the speed limiter be 'tamper resistant' instead of 'tamper proof.' (Only the maximum speed limiter setting entered into GEM should be tamper resistant; a slower speed limit should be easily programmable.) A requirement that the speed limiter be tamper resistant is consistent with the Agencies' stated intent that the setting not be capable of being easily overridden. One means of ensuring that the limiter is tamper resistant is to design the vehicle speed limit setting as a programmable feature that can only be controlled by the engine or vehicle manufacturer (in a manner similar to existing controls on engine programming that affect criteria pollutant emissions). [EPA-HQ-OAR-2010-0162-1940.1, p.27]

The regulatory text and/or Preamble should confirm that intentionally reprogramming the vehicle speed inputs (e.g., modifying tire radius, rear axle ratio, transmission gearing) to allow the vehicle to travel at higher speeds than the speed limiter setting would be considered illegal tampering. Similarly, the final rule should confirm that anyone who upgrades a vehicle component that has a corresponding input to the vehicle speed must also accurately adjust that input to the vehicle speed programming. [EPA-HQ-OAR-2010-0162-1940.1, p.27]

The final rule also should allow manufacturers to program an 'expiration date' (based on time in service or mileage) into the speed limiter, after which it could be reprogrammed by the vehicle owner or service outlet. In addition, the final rule should allow manufacturers to establish a 'soft top' speed limiter that would allow the driver to exceed the speed limit setting for short distances or short periods of time (e.g., in vehicle-passing or safety-related situations). In either case, GEM should be upgraded to allow manufacturers to input the parameters of the specific 'expiration date' and/or 'soft top' features, so it can adjust the modeled CO_2 emissions benefits to account for the use of those features. [EPA-HQ-OAR-2010-0162-1940.1, p.27]

Response:

In response to the comments about how the agencies will evaluate tampering, NHTSA and EPA have added a number of requirements in these final rules relating to the VSL control feature. VSL control features should be designed so they cannot be easily overridden. Manufacturers must ensure that the governed speed limit programmed into the VSL must also be verifiable through on-board diagnostic scanning tools, and must provide a description of the coding to identify the governed maximum speed limit and the expiration mileage both at the time of the initial vehicle certification and in-use. The agencies believe both manufacturers and fleets should work toward maintaining the integrity of VSLs, and the agencies may conduct new-vehicle and in-use random audits to verify that inputs into GEM are accurate.

To facilitate adjustments for component changes affecting vehicle speed, the final rule adds that a manufacturer should provide a fleet/owner with the means to make changes unless such changes would affect the VSL setting or operation. The agencies also agree with comments that VSLs should be adjustable so as not to potentially limit a vehicle's resale value. Manufacturers are allowed the option to expire (reset) the VSL after a percentage of the vehicle's useful life miles have been achieved and the benefit of the VSL relative to the tractor's remaining full lifetime miles would determine the benefit in the GEM.

The final rule will allow manufacturers to provide a "soft top" feature to be programmed into PCMs to provide additional flexibility for fleet owners. Although the agencies considered limiting the soft top maximum level, we have decided to allow the soft top maximum level to be set to any level higher than the maximum speed governed by the VSL. This approach will provide drivers with the ability to better navigate through traffic. However, the agencies are requiring that manufacturers providing a soft top feature design the system so it cannot be modified by the fleets and will not decrement the vehicle speed limit causing the vehicle to decelerate while the driver is operating a vehicle above the normal governed vehicle speed limit. Equation II-1 in the Preamble includes a prorating scheme to adjust the GEM input credit using the expiration (reset) date of the VSL and the soft top feature.

Organization: National Automobile Dealers Association (NADA)

Tamper-proof speed limiters also raise real safety concerns. As with the operation of cruise control systems, there are times when drivers are called upon to exceed the "limit." As long as tamper resistant systems can be manually overridden as conditions warrant, they should be given appropriate credit under the rule. [EPA-HQ-OAR-2010-0162-2705, p.13]

Response:

The agencies agree with NADA that credit in this rule should be given to a manual override for tamper proof speed limiters allowing drivers to exceed the maximum speed limit governed by VSLs for passing maneuvers or to ensure the speed-governed vehicle does not become an obstacle to other on-road vehicles. The "soft top" feature in the final rule provides this flexibility. The soft top feature is software coding programmed into the PCMs that allows drivers for a limited duration of time to accelerate in order to maneuver and pass other on-road vehicles at speeds greater than that governed by the VSL. Programmable soft top features are technologies currently on the market and are used by a number tractor fleet owners (e.g., Wal-Mart). Although the agencies considered limiting the soft top maximum level, the agencies decided to allow the soft top maximum level to be set to any level higher than the maximum speed governed by the VSL. This approach will provide drivers with the ability to better navigate through traffic. However, the agencies are requiring that manufacturers providing a soft top feature design the system so it cannot be modified by the fleets and will not decrement the vehicle speed limit causing the vehicle to decelerate while the driver is operating a vehicle above the normal governed vehicle speed limit. In addition, to prevent the loss of benefits gained by a soft top feature, the final rule specifies that the soft top features be limited in the number of hours and miles traveled to remain operable on a day-to-day basis.

Organization: Truck Renting and Leasing Association (TRALA)

TRALA believes that enforcement of the Proposed Standards should occur only once, and that is when the new engine/vehicle is originally introduced into commerce. In contrast, EPA is 'proposing separate standards that would apply for a specified period of time in use' - and also 2 suggesting that liability for any nonconformities would rest with the fleet or vehicle owner/operator (75 Fed. Reg. at 74163). 2 [EPA-HQ-OAR-2010-0162-1816.1, pp.2-3]

TRALA believes that EPA needs to proceed with care before endeavoring to enforce GHG controls after a vehicle is 'in-use' and then assigning liabilities for non-conformities to the fleet or vehicle owner/operator. Section 207 of the Clean Air Act specifies, for example, that compliance by vehicles and engines 'in use' is done through manufacturer warranties that are provided to the ultimate purchaser (42 U.S.C. § 7541 (a)(l)). The Clean Air Act also limits inspections after sales to ultimate consumers to only those scenarios where 'the owner of such vehicle or engine voluntarily permits such inspection to be made, except as may be provided by any State or local inspection program' (id. § 7541(f)). 3 [EPA-HQ-OAR-2010-0162-1816.1, p.3]

EPA also should clarify that tampering does not include modifications to in-use GHG-related controls or equipment. EPA suggests, for example, that the tampering policy would apply to vehicle speed limiters (75 Fed. Reg. at 74185). [EPA-HQ-OAR-2010-0162-1816.1, p.3]

Section 203(a)(3)(A) of the Clean Air Act makes it unlawful for 'any person to render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.' With respect to this provision, EPA's 'tampering' policy states, in relevant part, that '[a]djustments or alterations of a particular part or system parameter, if done for purposes of maintenance or repair according to the vehicle or engine manufacturer's instructions, or if the dealer has a reasonable basis for knowing that such adjustment or alteration will not adversely affect emissions performance' does not constitute tampering (Mobile Source Enforcement Memorandum No. 1A, § B.1c (EPA 1974)). Memorandum No. 1A goes on to specify when a 'reasonable basis for knowing' exists that a given act will not violate the tampering policy. [EPA-HQ-OAR-2010-0162-1816.1, p.3]

EPA has explained that 'it is clear that EPA's primary objective in enforcing the statutory prohibition on 'tampering' must be to assure unimpaired emission control of motor vehicles throughout their useful life' (Mobile Source Enforcement Memorandum No.1lA, § A.3 (EPA 1974)). [EPA-HQ-OAR-2010-0162-1816.1, p.3]

The tampering policy, by the express terms of Memorandum No. 1A, does not appear to apply to GHG-based controls because such controls are not part of a vehicle's 'emission control' system as that term has historically been understood. We do not believe that vehicle speed limiters, for example, are part of the vehicle's 'emission control' system. TRALA thus recommends that EPA clarify that nothing in the Proposed Standards is intended to make vehicle owners/operators liable under section 203a)(3)(A) of the Clean Air Act for modifications to the vehicle's GHG controls. [EPA-HQ-OAR-2010-0162-1816.1, p.3]

Response:

The final rule requires that compliance to the standards of this rulemaking must be maintained throughout the entire useful life miles for any vehicle or engine applicable to GHG and fuel consumption standards. To ensure compliance over a vehicle's useful life, the agencies may conduct inspections or testing to verify that OEM manufactures ensure vehicles, engines and GHG and fuel consumption components are manufactured to meet the performance levels as originally certified to the agencies prior to production. As proposed in the NPRM and adopted in the final rule, both agencies will conduct enforcement on new vehicle and engine manufacturers. while EPA independently will conduct verification testing on in-use vehicles, engines and components and any fleet owner found to have knowingly made a modification to a certified condition would be liable to be charged with a tampering violation under the Clean Air Act, Section 203(a)(3)(A). EPA views this section of the Clean Air Act to be directly applicable to any certified VSL, in contradiction to TRALA's interpretation, and that these devices are considered a part of a vehicle's emission control system and that any changes made outside of normal maintenance or repair would constitute an illegal tamper in accordance with the provision of this statute. Furthermore, the EPA interprets that charging a fleet with an in-use violation for non-conformances is not limited as suggested by TRALA by Section 207's provisions of the CAA.

In any case, a manufacturers or fleet charged with a non-conformance violation would be given the opportunity to appeal the determination as provided in the Clean Air Act and in NHTSA standards, 49 CFR Part 535.9.

Organization: UPS

UPS Commends the Proposed Rule for Including Vehicle Speed Limiters as a Technology to Meet the Proposed Standards. UPS voluntarily uses speed limiters on its 16,000 Class 7 and 8 heavy tractors nationwide and has done so for over a decade, not only for safety reasons, but also as an effective means of improving fuel economy. With certain limited exceptions, these are set at 68 miles per hour. Our fuel tests show that for each mile per hour increase in speed above 60 miles per hour, a heavy truck loses one-tenth of a mile per gallon. On a heavy truck achieving only several miles per gallon, that is a considerable degradation in fuel economy with speed. [EPA-HQ-OAR-2010-0162-1763.1, p.1]

We believe that greater penetration of speed limiters in the truck fleet would significantly reduce national fuel consumption and engine emissions. As national fuel consumption is reduced, U.S. oil imports diminish, so the use of truck speed limiters is truly an energy security and environmentally beneficial measure. [EPA-HQ-OAR-2010-0162-1763.1, p.1]

If Appropriately Implemented, the Rule May Encourage Greater Voluntary Penetration of Speed Limiters in Truck Fleets. The proposed rule treats speed limiters as a fuel-saving technology, but in a unique way. The proposed rule assumes a penetration rate of zero percent on new heavy trucks. That is, the proposed standards do not assume that any speed limiters are included by the truck manufacturer on new trucks. Thus, the Greenhouse Gas Emission Model (GEM) includes no fuel economy or emissions credit for speed limiters. Rather the rule leaves it to the truck purchaser to decide whether to accept the speed limiter and presumably to determine the specific speed setting that will be permanently imposed on the truck. Once the truck purchaser opts for inclusion of the tamper-proof speed limiter and chooses a permanent speed limit, then this set point is fed into the GEM, resulting in reduced greenhouse gas emissions and higher fuel economy attributable to that truck. This unique treatment of purchaser input for speed limiters in the proposed rule presents an opportunity to incentivize greater voluntary adoption of speed limiters in heavy trucks. [EPA-HQ-OAR-2010-0162-1763.1, p.1]

The agency discussion on the proposed rule states that the GEM shows that a speed limiter set at 62 mph would provide a 4 percent reduction in fuel consumption and CO2 emissions over the prescribed test cycles over a baseline vehicle without a vehicle speed limiter or one set at above 65 mph. (See Fed. Reg. at 74217) Under the proposed rule, this 4% enhancement in attributable fuel economy constitutes a benefit to the purchaser, but also to the manufacturer, either in compliance cost, or in valuable bankable and tradable credits. If the rule is implemented in a transparent way so that truck purchasers could see in advance how much benefit they will provide the manufacturer by opting for the tamper-proof governor at various speed set points, then the purchaser could perhaps use this in negotiating a lower price for the truck and in deciding whether or not to opt for a speed limiter and its set speed. If the value of this leverage due to the speed limiter exceeded the estimated diminution in truck resale value due to the inclusion of this feature, then the rule might spur truck purchasers to opt for tamper-proof speed limiters. We urge EPA and NHTSA to implement the rule with the truck purchaser in mind by providing some quantitative indications of the fuel economy and emissions reductions under GEM that stem from speed limiters at various set points. [EPA-HQ-OAR-2010-0162-1763.1, pp.1-2]

We note NHTSA has accepted a petition by the American Trucking Association to commence a rulemaking in 2012 to make tamper-proof speed governors mandatory on heavy trucks. The proposal would set the speed limiter at no less than 68 mph. Even if this proposed NHTSA rule is adopted in 2012, there would still be potential fuel economy and greenhouse gas emissions benefits under the GEM, where the speed set limit was voluntarily set lower than 68 mph. [EPA-HQ-OAR-2010-0162-1763.1, p.2]

UPS Urges That The Final Rule Permit Truck Purchasers to Decide Whether to Order the Truck With A Speed Limiter, What the Speed Set Limit Is, and Whether to Opt for Tamper-proof Speed Limiters Within the Rule, Or Adjustable Speed Limiters Outside the Rule. [EPA-HQ-OAR-2010-0162-1763.1, p.2]

The acquisition of a speed limiter on a new heavy truck is available at little or no cost today, but the proposed rule would create a new cost for the truck owner. The rule requires that the speed limiter be tamper-proof. (Currently, UPS, not the driver, can adjust the speed governor on its trucks, but this is done only after an internal review process for each truck and is limited to certain time-sensitive routes. Less than a thousand out of our 16,000 heavy tractors are involved in this exception. Even then the speed governor is set at no more than 72 mph.) The tamper-proof requirement will reduce the resale value of the truck, as the subsequent owner may object to the presence of this feature or to the specific setting of the permanent speed limit. This resale penalty could be quite significant, although for UPS this is perhaps less of an issue than for other truck purchasers because of the long service life of UPS trucks. [EPA-HQ-OAR-2010-0162-1763.1, p.2]

The rule as proposed would put the decision on the truck purchaser, not the manufacturer, to opt for the tamperproof speed limiter, so the truck purchaser, like UPS who uses speed limiters, could still decide to continue to procure adjustable speed limiters and opt against inclusion of tamper-proof speed governors on new trucks subject to the rule. Of course, if the speed limiter is adjustable, then under the rule as proposed, the GEM would not reflect a fuel economy and emissions reduction due to the presence of the speed limiter. [EPA-HQ-OAR-2010-0162-1763.1, pp.2-3]

Response:

The agencies appreciate the comment. Neither the proposal nor the final rule mandated the use of VSLs, leaving this option to be selected by the purchaser. The final rule includes a provision that allows manufacturers to set an expiration date based upon a percentage of the vehicle's total useful life miles to reset the maximum governed speed limit of a VSL which can address the commenter's concern about resale value of the vehicle.

Organization: Volvo Group

In order to reduce customers' reluctance to purchase vehicle speed limiters which are fixed or locked for the full vehicle life, Volvo Group proposes the following:

- Pro-rated credit (GEM input) based on VSLs which are locked only for the useful life (or some preset life) of the vehicle

- Pro-rated credit for VSLs which allow for a short period of increased speed in order to pass. For example, this could be an additional 2-5 mph for a short period a limited number of times per day. Currently Volvo offers a "Performance Bonus," where the computer keeps track of the driver's behavior and fuel economy performance and awards them with limited periods of time that the driver may exceed the vehicle speed limiter to pass.

We also believe the vehicle drive cycle unrealistically limits vehicle speeds to a maximum of 65 MPH. The Agencies should provide some credit for speed limiters set at 65 up to 67 MPH. [EPA-HQ-OAR-2010-0162-1812.2, p.41]

Response:

Although the final rule does not contain any standards predicated upon use of a VSL, manufacturers of combination tractors can demonstrate compliance with the standards through the use of VSLs under circumstances set out in the rule. The final rule incorporates a requirement that allows manufacturers to set an expiration date based upon a percentage of the vehicle's total useful life miles to reset the maximum governed speed limit of a VSL. The equation for prorating the GEM input credit based an expiration (reset) date of the VSL is provided in Equation II-1 of the preamble and in the RIA chapter 2.

Both agencies further agree manufacturers should be able to provide "soft top" features to be programmed into PCMs to provide additional flexibility for fleet owners. Although the agencies considered limiting the soft top maximum level, , we have decided to allow the soft top maximum level to be set to any level higher than the maximum speed governed by the VSL. This approach will provide drivers with the ability to better navigate through traffic. However, the agencies are requiring that manufacturers providing a soft top feature design the system so it cannot be modified by the fleets and will not decrement the vehicle speed limit causing the vehicle to decelerate while the driver is operating a vehicle above the normal governed vehicle speed limit. Equation II-1 in the Preamble includes a prorating scheme to adjust the GEM input credit using the expiration (reset) date of the VSL and the soft top feature.

In review of the comments, the agencies have decided to require manufacturers demonstrating compliance (in part) through use of VSLs to implement a fixed maximum governed vehicle speed through a VSL feature and to use the maximum governed vehicle speed as an input to the GEM model for certification. A manufacturer may select the maximum governed speed of the VSL at any level to accommodate its customer's needs. However, the level selected must then be fixed for the VSL and used to determine the benefit in GEM for the manufacturer. By having a fixed maximum governed speed GHG and fuel consumption benefits are maintained for the vehicle throughout its entire useful life. Consequently, the final rule does not require that the maximum speed governed by VSLs be limited to 65 mph but does diminish the benefits in meeting GHG and fuel consumption standards at speeds greater than 65 mph.

13.3. Automatic Engine Shutoff

Organization: Truck Renting and Leasing Association (TRALA)

TRALA is concerned that aspects of the Proposed Standards could be interpreted to put lower vehicle emissions ahead of driver well-being and safety. [EPA-HQ-OAR-2010-0162-1816.1, p.7]

With respect to the use of idle reduction technologies, for example, the Proposed Standards would 'require an automatic main engine shutoff after 5 minutes to help ensure the idle reductions are realized in-use' (75 Fed. Reg. at 74185). Imposition of such an arbitrary requirement could negatively impact driver well-being and safety in a variety of situations, such as extreme cold environments, break-downs and the like. TRALA is opposed to the inclusion of controls on idle reduction technologies that put drivers at risk. [this comment can also be found in section 17a.] [EPA-HQ-OAR-2010-0162-1816.1, p.7]

Response:

Upon further consideration for the final rulemaking, the agencies are adopting override provisions for the automatic engine shutdown. The provisions include the ability to override the engine shutdown due to extreme ambient temperatures, among others as outlined in RIA Chapter 2.5.4.3 and in §1037.660(b) of the regulations.

Organization: American Trucking Associations, Inc. (ATA)

Requirement for 5-Minute Automatic engine shutdown Device Needs to be Stricken. ATA does not support the proposed deployment of a tamper-proof, automatic engine shutdown devices. According to the proposal, all Class 8 sleeper cabs must include 5-minute engine shutdown devices without override capabilities. While ATA supports efforts to reduce unnecessary idling, the mandatory use of this technology warrants additional considerations. Complicating this approach are the various state and local idling regulations which are currently in place. While such idling limits range from 0 to 15 minutes, a variety of exemptions and exclusions are made for emergency vehicle use, ambient air temperatures, traffic congestion, routine maintenance, and other activities which the rule does not address. Given the multitude of exemptions and exclusions deemed necessary by state and local governments, a 5-minute engine shutdown device without override capabilities is too simplistic to address real world operating situations by fleets. Such stringency in the agencies’ approach will lead fleets to purchase idling reduction equipment in after-markets to enable them to regulate their engine shutdown capabilities. [EPA-HQ-OAR-2010-0162-2263.1, pp.5-6]

In 2006, the California Air Resources Board (CARB) adopted a regulation mandating 5-minute engine shutdown devices for heavy-duty diesel engines. The California regulation provides additional flexibilities when the parking brake is not engaged as well as a prescribed warning and reset system. In addition, specific override conditions are identified such as when operating in a power take-off mode, engine coolant drops below a certain temperature, exhaust controls need to regenerate, and performing maintenance. While ATA does not offer an opinion as to the adequacy of these additional flexibilities, they serve to highlight the fact that the projected 100% penetration rate may be overly optimistic and additional flexibilities or alternatives are needed. [EPA-HQ-OAR-2010-0162-2263.1, p.6]

California also provides an “in-lieu-of idling” emission standard that allows engine manufacturers to forego the use of automatic shutdown systems. Based upon a review of California certification orders, few heavy-duty diesel engines currently incorporate a 5-minute shutdown system, and instead, comply by way of the in-lieu-of standard. ATA believes this reflects customer demand which may be driven by a desire to maintain flexibility with regards to engine operations. Many of these customers employ management systems which allow them to monitor and take proactive steps to reduce engine idling, such as deploying idle reduction technologies. [EPA-HQ-OAR-2010-0162-2263.1, p.6]

The overriding presumption should be that if a fleet purchases an idling reduction device, the intent is to use the device and not to circumvent the myriad of local and state idling laws across the country. ATA is opposed to the installation of a mandatory, tamper-proof 5-minute shutdown device based upon safety and other concerns. ATA also recommends that a baseline “assumption” be built into the Greenhouse Gas Emission Model (GEM) that a vehicle equipped with an idling reduction device will not idle for more than 5-minutes. Vehicle manufacturers should be credited with the same efficiency benefits afforded as if such a mandated 5-minute shutdown device was installed on the vehicle. [EPA-HQ-OAR-2010-0162-2263.1, p.6]

Response:

The agencies are adopting six override provisions in response to comments received. The California Air Resources Board (CARB) currently has an anti-idling rule for all medium-and heavy-duty vehicles, with several override provisions. The agencies are adopting four of CARB’s override provisions including overrides for emission component regeneration, engine/vehicle servicing, low coolant temperature and PTO operation. In addition, the agencies are adopting two override provisions that are not from CARB’s rule: low battery state-of-charge and extreme ambient temperatures.

The stringency of the final HD rules is predicated on all Class 8 sleeper cab tractors employing AES to reduce long-term idling of the main engine during mandated driver rest periods. While not mandating any IRT beyond the AES, the agencies anticipate an appropriate device or system would typically be installed as needed to provide an alternate source of power while the main engine is off, for the comfort and safety of the driver during mandated rest periods. The agencies believe that the override provisions adopted in the final rules are justified because they prevent undesirable engine operation, provide for service, maintenance or inspections, or protect driver safety should a tractor not have an alternate power source, or an adequate one for extreme conditions.

The provisions are outlined in RIA Chapter 2.5.4.3 and in §1037.660(b) of the regulations.

Organization: Cummins, Inc

Feature trims need to be accessible to OEMs. The markets served by the commercial vehicle industry are extremely diverse in nature, leading to the need for significant original equipment manufacturer (OEM) flexibility in setting up electronic features. OEMs need access for setting appropriate trims for managing the VSL and idle shutdown, otherwise significant supply chain issues could be created through an increase in inventory and part numbers. The Agencies should allow tamper-resistant trims to be managed by the vehicle OEM. This would include protecting the trims via a password used by the OEM. [EPA-HQ-OAR-2010-0162-1765.1, p.30]

Idle shutdown features should have exclusions for safety. Currently, there exist fleet trimmable limitations to the idle shutdown timers. These include trims that require the parking brake be set and allow idle operation during extreme ambient temperature conditions. It is important to allow these safety exclusions if the Agencies would like to see broad market adoption. [EPA-HQ-OAR-2010-0162-1765.1, p.31]

Response:

Cummins commented on the use of “tamper proof” and “tamper resistant” but the preamble does not directly address these terms as they relate to the AES.

The agencies are adopting six override provisions in response to comments received. The California Air Resources Board (CARB) currently has an anti-idling rule for all medium-and heavy-duty vehicles, with several override provisions. The agencies are adopting four of CARB’s override provisions including overrides for emission component regeneration, engine/vehicle servicing, low coolant temperature and PTO operation. In addition, the agencies are adopting two override provisions that are not from CARB’s rule: low battery state-of-charge and extreme ambient temperatures.

The stringency of the final HD rules is predicated on all Class 8 sleeper cab tractors employing AES to reduce long-term idling of the main engine during mandated driver rest periods. While not mandating any IRT beyond the AES, the agencies anticipate an appropriate device or system would typically be installed as needed to provide an alternate source of power while the main engine is off, for the comfort and safety of the driver during mandated rest periods. The agencies believe that the override provisions adopted in the final rules are warranted because they prevent undesirable engine operation, provide for service, maintenance or inspections, or protect driver safety should a tractor not have an alternate power source, or an adequate one for extreme conditions.

The provisions are outlined in RIA Chapter 2.5.4.3 and in §1037.660(b) of the regulations.

14. Market Analyses

14.1. Use of Benefit-Cost Analysis

Organization: American Petroleum Institute, National Petrochemical and Refiners Association, and Western States Petroleum Association

EPA Failed to Assess the Consequences of Its Rule and Alternatives to Its Actions Rendering the Rulemakings Arbitrary and Capricious

Given EPA's interpretation that vehicle emissions standards trigger stationary source greenhouse gas permitting requirements, PSD Interpretive Rule, 75 Fed. Reg. at 17,019–20, EPA is required to consider the ramifications on stationary sources subject to those permitting requirements before promulgating the GHG Truck Rule. EPA has entirely failed to perform this duty—the proposed GHG Truck Rule contains no mention of its impacts on stationary sources.

[See p.10-12 of this comment summary for additional comments pertaining to EPA Failed to Assess the Consequences of Its Rule and Alternatives to Its Actions Rendering the Rulemakings Arbitrary and Capricious]

<u>Response</u>:

EPA's policy is to include as part of its baseline for analysis the effects of existing rulemakings. Rules that are not yet promulgated are not included in the analysis. Because this rule does not regulate stationary sources, the effects on stationary sources are not analyzed in this rule.

These are issues that EPA addressed in the Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, 75 FR 31514 (June 3, 2010) ("Tailoring Rule"). The comment on consideration of the economic impacts of the PSD permitting provisions fails to recognize that any analysis of such impacts would not aid EPA in determining what GHG standards to adopt in this rulemaking. Impacts on stationary source are not related to any of the issues EPA needs to consider and decide in determining the content of the GHG standards that will apply to heavy-duty manufacturers. Analyses of indirect impacts on stationary sources are not legally relevant to the standard setting issues under consideration in this rule. Moreover, because GHGs are already pollutants subject to regulation under the Clean Air Act as a result of prior EPA actions, this rule has no collateral impacts on stationary sources in any case.

14.2. Changes in Vehicle Attributes

Organizations Included in this Section:

American Trucking Associations, Inc

Heavy-Duty Fuel Efficiency Leadership Group

Organization: American Trucking Associations, Inc. (ATA)

OEM's will comply with the rule by selling more efficient tractors and engines. Shortfalls in meeting their targets can be supplemented with either early introduction, innovative technology, or advanced technology credits. The trucking industry is very diverse and vehicles are traditionally ordered with equipment tailored for specific applications. ATA and its member fleets remain concerned that certain equipment the industry has relied upon by the industry may no longer be manufactured and offered for sale due to their lower overall efficiency numbers. If such a scenario does in fact play out, fleets may be forced to purchase equipment that is, in fact, less efficient than the GEM model affords credit since the equipment is no longer properly paired with its specific work application. [EPA-HQ-OAR-2010-0162-2263.1, p.10]

This scenario is a real concern for the trucking industry. Fleets want to be assured that the vehicles they purchase are best-suited for their needs. Trucking customers are so specific with their truck orders that they would rather wait to get the exact truck they need than take what is available. In a worst-case scenario, a fleet may explore the newer, used truck market or extend their normal trade-in cycles. This situation has occurred recently with the elimination of cab-over tractors. Companies that were employing these tractors, in many cases to comply with vehicle length limitations, have been forced to extend the life of their existing tractors and forego vehicles with advanced emissions controls, or reconfigure to shorter trailers, resulting in more truck trips. Technologies that add additional weight to a truck and/or increase a company's capital costs without optimizing fuel consumption and GHG reductions will reduce the potential benefits of the rule. [EPA-HQ-OAR-2010-0162-2263.1, p.10]

Truck dealers have indicated that they will likely be placed in a position of taking delivery of more efficient trucks from OEM's to secure lower truck financing incentives or other concessions. [EPA-HQ-OAR-2010-0162-2263.1, pp.10-11]

Organization: Heavy-Duty Fuel Efficiency Leadership Group

Avoid Unintended Consequences: The rule should seek to avoid unintended consequences by building on existing programs, including the use of proven protocols. The rule should recognize current market structure. It should achieve significant short-term fuel efficiency improvements without restricting customer choice of product specifications to perform the actual work needed. [EPA-HQ-OAR-2010-0162-1620.1, pp.4-5]

Both Agencies have been clear about their commitment to avoid unintended consequences of the new standards, and the Leadership Group wants to recognize those efforts which are reflected in the content of the proposed rule. For the most part, the EPA/NHTSA proposal recognizes the current market structure and need for customer choice by creating separate engine and vehicle programs. The Leadership Group supports this approach as it builds on the success of existing programs such as EPA's SmartWay Program and the criteria emissions program for engines. [EPA-HQ-OAR-2010-0162-1620.1, p.5]

Response:

As the commenters note, the agencies have sought to build flexibilities into the rule to allow for both compliance and maintenance of the diversity of vehicles in the industry, using lessons learned from the SmartWay program, and stakeholder input. The Leadership Group comment recognizes the efforts that the agencies have made to reflect existing market structure and vehicle choice. The ATA comment expresses concern that the rule may limit choice or make some vehicles unobtainable.

As the ATA notes, there is a great deal of customization of vehicles in the trucking sector. The rule has no explicit effect on customization, except through requirements to meet the standards. Because of flexibilities such as averaging, banking, and trading, it should be possible to continue the diversity of vehicles in the industry. The standards for vocational vehicles, which regulate the chassis only and which are predicated on the only feature in common across the sector – tires –recognize the extraordinary diversity and need for utility across vocational vehicles. The agencies are also adopting provisions in the final rulemaking, such as the addition of a regulatory subcategory referred to as vocational tractors, to recognize a potential unintended consequence that may have existed in the proposal.

The rule has associated costs, as calculated in the RIA Chapter 9 and summarized in section VIII.B.1 of the preamble to the final rule, but the fuel savings will generally exceed those expenses. The net benefits calculation does not indicate that all vehicle buyers will have fuel savings that outweigh the additional costs, but we expect that the average buyer will experience net benefits, as shown in section VIII.D of the preamble to the final rule. These benefits are in addition to the benefits that motivate the rule, reduced GHG emissions and improved energy security.

Vehicles with lower fuel consumption should be marketable to consumers, because they will have lower operating costs. For most trucking companies, fuel costs are the highest business cost, outside of driver labor. Indeed, if consumers consider even a few years' worth of fuel savings in deciding what vehicles they will buy, the vehicles with increased fuel economy may be more attractive to them than vehicles with lower fuel economy. As a result, the agencies believe that few, if any, companies will extend the lives of older vehicles instead of buying new ones.

14.3. Pre-buy

Organization: BlueGreen Alliance

Complementary truck efficiency and financing programs should take into account trucking's unique market structure and accelerate the acquisition of cleaner vehicles by licensed motor carriers. These supportive measures should help minimize deferral of vehicle purchases in undercapitalized sectors such as in port trucking, which will create and sustain more quality jobs, maximize economic benefits to American vehicle and component manufacturers and expedite gains in fuel efficiency and pollution reduction. [EPA-HQ-OAR-2010-0162-2117.1, p.2]

Response:

The EPA SmartWay program serves as a strong complement to the proposed standards. SmartWay works with shippers and carriers to identify strategies that improve truck efficiency, and to provide incentives for truck carriers to adopt these strategies. SmartWay has established a number of innovative financing programs through the Agency's National Clean Diesel Campaign funded under the Diesel Emissions Reduction Act. SmartWay also provides information to assist carriers with finding private financing for fuel-saving technologies, tractors, and trailers through the SmartWay on-line finance center. Our rule has sought to take into consideration the diversity of the trucking industry and to maintain that diversity. The agencies have sought, as part of the rulemaking, to allow manufacturers to maintain existing vehicle qualities while improving their fuel economy. Although vehicles will become more expensive, the lower operating costs due to improved fuel economy are expected to offset these higher costs and thus reduce incentives for purchasers to defer new vehicle purchases. Indeed, purchasers may respond positively to reduced operating costs and buy more new trucks.

14.4. Effects due to not requiring advanced technologies

Organizations Included in this Section:

CALSTART

Hybrid Truck Action Group

Organization: CALSTART

We believe that greater fuel and emission reductions in the early years are possible. We understand why EPA has taken the deliberative approach it has to phase in the rule, but would encourage all actions possible to achieve earlier reductions from innovative technologies, fuels or approaches. We are particularly concerned about the unintended consequences that the rule could have on advanced technologies that provide emissions reductions beyond those required for compliance. If these technologies are not required or otherwise incentivized, the market may lose momentum and technology deployment may slow down. The new rule may leave achievable early reductions and fuel savings “on the table” and might not adequately spur innovative technologies, fuels or approaches. As an example, hybrid power systems are commercially available, providing real world GHG and fuel economy to vocational trucking fleets across the country and are increasingly available in the market. Hybrid-electric drive train systems in medium- and heavy-duty vehicles are already demonstrating fuel economy improvements of 20% to 50% in early commercial operations. Hydraulic-hybrid systems are in testing and pilot production as well, with promise for fuel economy, performance and low cost. These drive trains are now available from major manufacturers. Similarly, vehicles running on alternative fuels such as natural gas, biomethane, and renewable diesel fuels can yield significant well-to-wheels emissions benefits today and into the future. However, we are concerned that the benefits promised by these sorts of advanced technologies might be lost because of the fact that they are not strictly needed to “comply” with the rule. [EPA-HQ-OAR-2010-0162-2121, p.2]

Organization: Hybrid Truck Action Group (HTAG)

We believe that smart, aggressive regulations can be positive for U.S. industry and business and help drive innovation in new technologies, fuels and approaches. We also understand why EPA has taken the deliberative approach it has to a slow phase in of the rule. However, we have concerns that if not structured well, the new rule could slow advanced technology development and leave achievable early reductions and fuel savings “on the table.” We do not believe that is EPA/NHTSA’s intent, but we are particularly concerned about the unintended consequence of removing drivers for innovative approaches that may well not be needed in the near term for strict compliance purposes. [EPA-HQ-OAR-2010-0162-1817.1, p.2]

Hybrid power systems are a prime example. They are commercially available in early production today, providing real world GHG and fuel economy to vocational trucking fleets across the country and are increasingly available in the market. Hybrid-electric drive train systems in medium- and heavy-duty vehicles are already demonstrating fuel economy improvements of 20% to 50% in early commercial operations. Hydraulic-hybrid systems are in testing and pilot production as well, with promise for fuel economy, performance and low cost. These drive trains are now available from major manufacturers. However, we are concerned that the performance they provide – today – and their momentum to the market could be lost since they are not strictly needed to “comply” with the rule. [EPA-HQ-OAR-2010-0162-1817.1, p.2]

Response:

This rule will not slow incentives for adoption of advanced technologies; indeed, it increases them relative to the baseline, in which this rule is not in place. The innovative technologies mentioned in these comments will contribute to compliance with the standards should they be utilized. The rule provides strong incentives to accelerate use of advanced technologies. The agencies are providing, in the final rulemaking, a more straightforward mechanism than proposed to certify engines and vehicles using innovative technologies to further encourage their adoption. We also have added provisions in this final action to further encourage the development of advanced technologies and to promote early adoption of technologies through the 1.5 credit multiplier which is applicable to both early and advanced technology credits. Credits generated through utilization of advanced technologies also may be used across the entire heavy duty sector (both engines and vehicles). We therefore believe that this rule will not inadvertently slow down adoption of these new technologies.

EPA did not adopt more stringent standards at this time. We continue to conclude that the proposed standards and associated phase-in schedules represent the most stringent standards technically feasible giving consideration to the lead-time available to manufacturers to bring the necessary technologies to market and our own assessments of the efficacy of the technologies.

14.5. Market Failures

14.5.1. General Failures

Organizations Included in this Section:

Competitive Enterprise Institute
Ludlow, J.
National Truck Equipment Association
Institute for Policy Integrity

Organization: Competitive Enterprise Institute

In terms of its stated rationales (mitigate climate change and enhance U.S. energy security), the proposed GHG/fuel economy rule is an empty suit. [EPA-HQ-OAR-2010-0162-2418.1, p.3]

The proposed rule implies that truckers, like children, are incapable of discerning and/or pursuing their own best interest. [EPA-HQ-OAR-2010-0162-2418.1, p.3]

If the proposed rule will have no detectable effect on climate change or national security, what is the point? The new standards will save truckers a bundle of money, EPA and NHTSA contend. According to their calculations, the rule will compel industry to invest $7.7 billion in fuel-saving technologies, which will cut fuel consumption by 500 million barrels, which will save truckers $28 billion (assuming a 7% discount rate) or $42 billion (assuming a 3% discount rate). In the agencies' words, "the application of fuel-saving technologies in response to the proposed standards would, on average, yield private returns to truck owners of 140% to 420%." [EPA-HQ-OAR-2010-0162-2418.1, p.3]

Now, this should immediately raise a red flag. Trucking companies are in business to make money. As the agencies acknowledge, "Unlike in the light-duty vehicle market, the vast majority of vehicles in the medium- and heavy-duty truck market are purchased and operated by businesses with narrow profit margins, and for which fuel costs represent a substantial operating expense." Indeed, for many truckers, fuel is the single biggest operating expense. [EPA-HQ-OAR-2010-0162-2418.1, p.3]

[See p.3 of this comment summary for a pie chart showing Reference Case Total Truck Operating Cost Per Mile]

Clearly, nobody has a keener incentive to reduce fuel expenditures and make cost-effective investments in fuel-saving technology than people who haul freight for a living. If every dollar invested to improve fuel economy yields returns of 140% to 420%, why aren't truckers already making those investments? If the agencies' recommended package of fuel-saving technologies is such a great bargain, why do truckers need a regulation compelling them to buy it? The proposed rule implies that truckers, like children, are incapable of discerning and/or pursuing their own best interest. [EPA-HQ-OAR-2010-0162-2418.1, p.4]

The agencies' "potential hypotheses" neither demonstrate market failure nor persuasively explain the "paradox" of "under-investment." [EPA-HQ-OAR-2010-0162-2418.1, p.4]

EPA and NHTSA don't put things that way, of course. They offer five "potential hypotheses" drawn from economics literature to explain why trucking companies "under-invest" in fuel economy. None of these explanations provides solid evidence of "market failure." In fact, some suggest that truckers are just behaving like prudent buyers. Let's look at each in turn. [EPA-HQ-OAR-2010-0162-2418.1, p.4]

Organization: Ludlow, J.

First, the free market is already looking for ways to improve efficiency. The EPA admits in its own report that fuel efficiency for HD vehicles has improved at 1% per year for the last thirty years without fuel economy standards. The proposed regulations are supposedly in line with this market driven curve, so some say what is the problem with the proposed regulation if it follows the market trend? Regulation and bureaucracy stifle creativity and slow down the process of invention and finding solutions on which the free market depend. [EPA-HQ-OAR-2010-0162-1432-cp, p.1]

Second, the EPA recognizes that one size fits all MPG standards will not help because it will cause shipping companies to use more small trucks to complete the same work and thereby reduce efficiency. EPA realizes it must investigate and regulate based on the millions of variations and applications of HD vehicles across the fifty states. How is the EPA going to find and regulate all possible permutations and applications of HD vehicles? Does the EPA presume to be so omniscient that it will be able to do so effectively without destroying business activity in localized markets, i.e. ice roads in Alaska, city deliveries in Los Angeles, long haul trucking in the midwest, and school buses in Louisiana? Perhaps more public sector jobs will be created to study the infinite customizations that American businesses have adapted to their specific purposes, but it is unlikely that the proposed regulation will actually boost private sector growth. On the contrary, it is more likely to stifle ingenuity and force many out of business. [EPA-HQ-OAR-2010-0162-1432-cp, p.1]

Organization: National Truck Equipment Association (NTEA)

As the agencies move forward with these and future regulations it is important to keep in mind efficiency and what it means to the users of these commercial and vocational trucks. [EPA-HQ-OAR-2010-0162-1608.1, p.10]

The almost endless variety of truck chassis, engine, body and equipment combinations that are available in the marketplace exist for the sake of efficiency. The market structure made up of OEM's, equipment suppliers, body manufacturers and small business final stage manufacturers exists because it embodies the most efficient system to produce these well-defined trucks. [EPA-HQ-OAR-2010-0162-1608.1, p.10]

Anyone buying this type of trucks is doing so to accomplish a job – whether it is for public service (state, federal municipal) or business. They want the least expensive truck to buy and operate that will accomplish the specific tasks required of it. As such, they take great care in specifying the proper combination of attributes for their truck. The primary point here is that the truck must be able to accomplish its task. [EPA-HQ-OAR-2010-0162-1608.1, p.10]

The agencies need to be cautious of any unintended consequence that results in an end user needing to purchase a larger truck due to reduced engine capabilities to do the same task they were previously accomplishing with a smaller truck. [EPA-HQ-OAR-2010-0162-1608.1, p.10]

The marketplace has always demanded efficiency and has embraced technological change that reduces operating cost. It is our hope that these rules enhance this economic process and not hinder it. [EPA-HQ-OAR-2010-0162-1608.1, p.10]

Organization: Institute for Policy Integrity

Even though other alternatives might better maximize net benefits (see above), the proposed regulation is still cost-benefit justified. In particular, under most scenarios, social benefits alone outweigh costs, and in all scenarios social benefits plus private fuel savings completely swamp the technology burdens. The large, unrealized private fuel savings do raise questions about whether and how a market failure might have generated this so-called “energy efficiency gap.” Potential informational issues may partly explain this paradox and may also partly justify additional labeling requirements. The positional goods theory may also help explain part of the energy efficiency paradox. [EPA-HQ-OAR-2010-0162-1895.1, p.6]

As demonstrated in Tables VIII-24 and -25, the net present value of total monetized social benefits (carbon dioxide reductions and energy security impacts, minus accidents, congestion, and noise) outweighs the net present value of total calculated technology costs for all but the lowest of four possible values measuring the “social cost of carbon.” Even at that lowest social cost of carbon, total monetized and qualitative social benefits may possibly outweigh total technology costs, depending on the magnitude of the unquantified benefits: climate benefits from non-carbon dioxide reductions (especially HFCs) and other unquantified environmental, public health, and welfare benefits. Furthermore, it may be important that the costs per ton of carbon abated are significantly lower for certain vehicle classes (7 and 8) than for others (2b and 3), suggesting that social benefits alone may more easily justify requirements for certain vehicle categories. [EPA-HQ-OAR-2010-0162-1895.1, p.6]

Crucially, the private benefits of fuel savings (plus refueling savings) are enough to outweigh costs, for all vehicle classes and regardless of which scenario is used to calculate social benefits. However, consumers arguably already have the option to generate these benefits for themselves, by voluntarily selecting the more fuel-efficient vehicle models currently on the market. The failure of consumers to make choices that should save them money in the long run is called the “energy efficiency paradox.” To the extent that private benefits are necessary to justify the regulatory costs, this paradox requires some explanation. [EPA-HQ-OAR-2010-0162-1895.1, pp.6-7]

The agencies proffer a number of explanations for the failure of consumers in the heavy-duty vehicle sector to select more fuel-efficient models. The correctness of such explanations will inform the question of what regulatory response is most appropriate. Based on the information currently before the agencies, the most compelling economic concepts that help explain the energy efficiency paradox are informational issues and the positional goods effect. The agencies should then tailor their proposed rule in light of such explanations. [EPA-HQ-OAR-2010-0162-1895.1, p.7]

Response:

The motivations for this rule are to reduce greenhouse gas emissions and improve energy security, classic externalities. Though we would expect private markets to provide incentives for cost reduction, private markets are not expected to internalize externalities. In the final rule analysis, for all scenarios except that involving the lowest social cost of carbon, the external benefits continue to outweigh the technology costs, excluding the fuel savings. We agree that there may be other unquantified benefits not incorporated into the estimates provided here.

As discussed in Preamble section VIII.A., EPA recognizes the puzzle that, on the one hand, the truck industry has strong incentives in the absence of this rule to pursue cost-effective fuel-saving technologies; yet, on the other hand, we identify what appear to be many cost-effective fuel-saving technologies that are not widely adopted. We have not resolved this puzzle. Though the theoretical underpinnings of unregulated markets undoubtedly indicate strong incentives to save costs, a number of studies in a number of settings have found evidence of an "energy paradox" or "efficiency gap." Comments on this rule did not provide evidence indicating that the "gap" did not exist in this context.

Over the last 30 years the average annual improvement in fuel economy has been 0.09%, not 1%. See U. S. Department of Transportation, Federal Highway Administration, Highway Statistics 2008, Washington, DC, 2009, Table VM1 averaging annual performance for the years from 1979-2008.

The diversity of the truck industry has made development of these regulations especially challenging. We do not claim omniscience; instead, we have sought to provide rules that provide great choice while nevertheless achieving environmental outcomes. As the commenters note, we have not adopted one-size-fits-all rules. The rule provides a number of flexibilities, such as averaging, banking, and trading, to allow this diversity to continue.

As we discuss below, informational issues and the role of trucks as positional goods are possible sources of the apparent efficiency gap. At this time, though, we do not have sufficient evidence to support some hypotheses over others. (See further discussion below.) It is thus not necessarily desirable from a policy perspective to tailor the rule to those explanations. Labeling trucks is beyond the scope of the current rule, especially because it was not in the proposal, but we will consider it in the future.

14.5.2. **Market Failures: Information in Original Sales Market**

Organizations Included in this Section:

Competitive Enterprise Institute
Institute for Policy Integrity

Organization: Competitive Enterprise Institute

Inadequate or Unreliable Information in the Original Sales Market. One possible reason for the supposed under-investment is that fuel-economy information available in the heavy-duty (HD) sales market is "inadequate or unreliable." Quoting the National Academy of Sciences, EPA and NHTSA report that "Reliable, peer-reviewed data on fuel saving performance is available only for a few technologies in a few applications." Okay, then how do EPA and NHTSA know that investing in fuel economy will yield returns of 140% to 420%? And if EPA and NHTSA know this despite the dearth of reliable, peer-reviewed data, how come the industry with a bottom-line interest in such information doesn't know? The agencies do not address these obvious inconsistencies in their explanation. [EPA-HQ-OAR-2010-0162-2418.1, p.4]

EPA boasts that its SmartWay program provides "information on fuel-efficient, low-carbon technologies and operational practices to help accelerate their deployment." The program is a partnership between EPA and the freight goods industry, which includes "large, national trucking fleets." One might suppose that with all the information EPA is providing, semi-truck owners would exhibit the smallest gap between actual investment in fuel economy and what the agencies consider optimal. Yet that's where the gap appears to be largest. EPA and NHTSA estimate that mandating fuel-economy improvements will save semi-truck owners 18 times as much as vocational truck owners and nearly 30 times as much as HD pickup and van owners. Those with the most information are furthest away from the promised bonanza awaiting those who attain the proposed fuel-economy standards. [EPA-HQ-OAR-2010-0162-2418.1, p.4]

In short, the hypothesis fails to explain companies' alleged under-investment in fuel economy. [EPA-HQ-OAR-2010-0162-2418.1, p.4]

Organization: Institute for Policy Integrity

General evidence supports the efficacy of many new vehicle efficiency technologies, but much of the data has neither been duplicated by other researchers nor verified over a range of duty cycles, and the subset of data that has been peer-reviewed is applicable only to select technologies. Consumers may therefore remain skeptical of a technology's real-world performance, especially regarding the applicability to their particular vehicle model or use. The great diversity of vehicle types and operational purposes in the heavy-duty sector exacerbates this problem of the limited applicability and reliability of data. A consumer lacking reliable, applicable information may compare the known, irreversible, upfront purchase price of the new technology against an unknowable future stream of fuel savings, and choose to minimize the former by selecting a cheaper alternative instead of the one that promises more (but potentially illusory) efficiency. 50 [EPA-HQ-OAR-2010-0162-1895.1, p.8]

Individual consumers, as well as certain local government purchasers and even some small-scale business operations, may have limited capacity to experiment on their own and test out new technologies. Coordination problems and the diversity of vehicle types and uses prevent the pooling of resources to evaluate technologies. But most commercial operations and larger government entities could theoretically take the risk of experimenting with various new fuel-efficient technologies. If the technology proved successful, an early adopter could achieve a short-term favorable competitive advantage by reaping fuel savings. [EPA-HQ-OAR-2010-0162-1895.1, p.9]

However, experimentation to determine the success of fuel-saving technology is costly and risky. If a single actor does move first and demonstrate the success (or failure) of the new fuel-efficient technology, that information may be hard to conceal, allowing others to learn of the benefits of the technology. In other words, the first mover generates a positive externality, because the information from the technology test is now free and available for anyone else in the market to act on as well. (Companies may try to keep tests secret, but the widespread adoption of a successful technology might be visible simply by observing the company's fleet, though it could be difficult to tease out the effects of multiple technologies.) Because private firms cannot prevent their competitors from benefiting, businesses typically under-invest in non-excludable goods. Instead of a first-mover advantage, the first to investigate a new technology bears all the costs and risks of failure, and yet enjoys only a small portion of the benefits, since any comparative advantage from early adoption begins to evaporate as competitors follow suit for free. While firms could pool the costs of experimentation, such information sharing in highly competitive markets is improbable. [EPA-HQ-OAR-2010-0162-1895.1, p.9]

This market failure undermines the incentive to investigate and invest in fuel-efficient, cost-efficient technologies. As is typically the case with public goods and externalities, it is up to government to step in. One option for a government response would simply be to help supply the missing information through additional research and demonstration programs. However, as with labeling, a demonstration program might be inadequate to correct informational issues if consumers do not trust the government's results or deem them inapplicable to their particular vehicle or use. Alternatively, even if consumers were persuaded by a demonstration program, they might wait to adopt such technology until they have first tested its adaptability to their own vehicle type or operation. This will cause delays in achieving fuel savings, may result in additional costs to consumers, and will slow down the generation of the important greenhouse gas reductions, energy security improvements, and other social benefits. Thus, demonstration programs alone would be an inappropriate response to the informational issues underlying the energy gap and preventing the achievement of environmental objectives. [EPA-HQ-OAR-2010-0162-1895.1, p.9]

The agencies propose to circumvent these informational issues by mandating adoption of new technology. In the event that the benefits of new technology prove illusory, the government-created condition establishes the even playing field necessary for consumers to avoid competitive losses. At this stage, the government has set minimum fuel efficiency standards based on cost-effective, widely applicable, and relatively proven technological improvements. However, the agencies should also consider how a pilot project or demonstration programs could be useful going forward to encourage the continued adoption of even more advanced technologies. [EPA-HQ-OAR-2010-0162-1895.1, p.9]

Response:

EPA's estimates for both costs and effectiveness are documented in the RIA that accompanies this rule. They are based on the best available inputs, including consultations with affected industries. Technologies that will achieve these standards are in use, though not in universal use. As discussed in Preamble VIII.A., we do not understand why the industry has not acted more completely on this information, though we have heard anecdotally that purchasers are generally suspicious of claims of fuel savings.

SmartWay made great strides in helping industry identify effective technologies for semi-trucks and in providing incentives for their adoption, with an initial focus on large trucking fleets. Not only do large fleets provide the largest geographic coverage and account for a significant percent of miles driven, they are also among the most willing to try out new and emerging technologies. As a result of SmartWay and its contributions to the new truck standard, the hundreds of thousands of smaller trucking companies and independent owner-operators that also drive semi-trucks will now benefit from these technical advances in new truck designs. For this reason, EPA considers this rule complementary to the efforts of SmartWay: the rule sets standards that its experience with SmartWay indicates are feasible and cost-effective, and SmartWay will continue to reach out to the legacy fleet and pursue new technical and operational strategies beyond what the rule requires.

It is not clear what the best metric is for comparing the benefits of fuel economy improvements for different segments – for instance, total savings versus savings per mile -- because of their very different uses. For instance, as noted in Preamble Section VIII.E.4, some of the increase in cost savings for combination trucks is due to their much higher vehicle miles traveled than pickup and van owners. As we note, there is much we don't yet understand about technology adoption in this market. However, our understanding of this complex sector will continue to mature as EPA builds upon its programs that improve truck efficiency and reduce emissions.

Development of new technologies may have a public good aspect to it. Patent law provides a means for companies to make the public good a private one, and thus reduce the ability of other companies to "free ride" on the new technologies. It may be more difficult, however, for a company to keep private the effects of testing existing technologies, for the reasons stated in the comment. It seems plausible that testing new technologies has a public good aspect to it. As the comment notes, public goods are typically under-provided. The Preamble, Section VIII.A.1, includes discussion of this hypothesis: "Moreover, information has aspects of a public good, in that no single firm has the incentive to do the costly experimentation to determine whether or not particular technologies are cost-effective, while all firms benefit from the knowledge that would be gained from that experimentation. Similarly, if multiple firms must conduct the same tests to get the same information, costs could be reduced by some form of coordination of information gathering."

14.5.3. Information in the Resale Market

Organization: Competitive Enterprise Institute

Inadequate or Unreliable Information in the Secondary Resale Market. The agencies hypothesize that "the resale market may not reward the addition of fuel-saving technology to vehicles adequately to ensure their original purchase by new truck buyers," the main reason, again, being a presumed lack of "reliable information about the fuel economy that potential purchasers of used trucks will experience." This is odd. Would EPA and NHTSA say that the resale market does not reward the addition of technologies that enhance vehicle safety, performance, comfort, and amenities? That would obviously be incorrect, because people are willing to pay more for a better vehicle, whether it's new or used. [EPA-HQ-OAR-2010-0162-2418.1, pp.4-5]

Maybe fuel-saving technology doesn't add much to the price of used vehicles because its money-saving potential is unproven or over-rated. [EPA-HQ-OAR-2010-0162-2418.1, p.5]

Response:

EPA does not have evidence to support the implicit claim that the resale market for fuel economy in trucks must operate efficiently. Anecdotally, we have heard that buyers of used trucks do not trust information they receive from sellers about improved fuel economy for the specific vehicles. Indeed, even if the information provided by sellers is accurate, fuel economy depends on where and how a truck is driven, and what loads it carries; results from one driver, or even one trip, may not relate directly to results from another. Thus, providing detailed information on fuel consumption from one owner may not indicate the fuel economy a second owner will experience, even if both owners will benefit from the use of a fuel-saving technology relative to not having that technology.

14.5.4. Split incentives

Organization: Competitive Enterprise Institute

Split Incentives in the Medium- and Heavy-Duty Truck Industry. According to this hypothesis, the trucking industry under-invests in fuel economy because truck owners and operators face different incentives. Fuel purchases are made by operators, who have "strong incentives to economize on its use." In contrast, owners may place a higher priority on capital investment that "improves vehicles' durability or reduces their maintenance costs." That may be so. Still, it would not necessarily follow that owners under-invest in fuel economy. [EPA-HQ-OAR-2010-0162-2418.1, p.5]

There are tradeoffs — opportunity costs — in every investment decision. Whether it is smart to invest more or less in fuel economy relative to vehicle durability or any other competing interest depends on each firm's unique circumstances. EPA and NHTSA are in no position to divine an appropriate tradeoff for the industry as a whole, because the right tradeoff varies from firm to firm, and within each firm at different times. [EPA-HQ-OAR-2010-0162-2418.1, p.5]

Besides, just because truck operators make the actual fuel purchases does not mean that owners ignore fuel costs. An owner (or CEO of a publicly traded company) may delegate many purchasing decisions for many things to other people. He is nonetheless responsible for the firm's bottom line. The tradeoffs he makes between fuel economy and other investments inevitably show up in the bottom line. [EPA-HQ-OAR-2010-0162-2418.1, p.5]

Response:

EPA acknowledges that there are tradeoffs in investment decisions. This observation, however, does not explain why the benefits of additional fuel economy outweigh the costs, even when other truck attributes are held constant.

Split incentives show up in other examples of the "energy paradox." For instance, landlords may underinvest in insulation for apartments where renters pay for utilities. Renters may choose apartments based on monthly rent and not adequately think about utilities when making their decisions. If so, then landlords may not believe that they can recover the costs of better insulation or other energy-conserving methods, and will not install them, even if they are highly cost-effective.

Shareholders in a company often do not have full information about how a company operates, and whether it can be more efficient. Similarly, an owner may not have complete information about all operations in his/her company and may rely on other staff, who may know a lot about their particular area but not about all areas of the company.

In sum, split incentives are not inevitable, but they can exist and lead to suboptimal resource allocation.

14.5.5. Uncertainty about future cost savings

Organizations Included in this Section:

Competitive Enterprise Institute

Institute for Policy Integrity

Organization: Competitive Enterprise Institute

Uncertainty about Future Cost Savings. Another possible reason companies don't adopt fuel-saving technology as fast as EPA and NHTSA deem appropriate is "uncertainty about future fuel prices or truck maintenance costs." The agencies explain: [EPA-HQ-OAR-2010-0162-2418.1, p.5]

When purchasers have less than perfect foresight about future operating expenses, they may implicitly discount future savings in those costs due to uncertainty about potential returns from investments that reduce future costs. In contrast, the immediate costs of the fuel-saving or maintenance-reducing technologies are certain and immediate, and thus not subject to discounting. [EPA-HQ-OAR-2010-0162-2418.1, p.5]

Exactly! The costs of investment in fuel-saving technology are certain and immediate. In contrast, the payoff depends on unknown quantities — the future price of gasoline and, perhaps more importantly, the "lifetime, expected use, and reliability of the vehicle." Companies are just being prudent when they invest less in fuel economy than they would if EPA and NHTSA were guaranteeing a 420% return! As the agencies acknowledge, the proposed rule "requires purchasers to assume a greater level of risk than they would in its absence, even if the future fuel savings predicted by a risk-neutral calculation actually materialize." [EPA-HQ-OAR-2010-0162-2418.1, p.5]

Organization: Institute for Policy Integrity

50 The discounting of uncertain benefits may be magnified if businesses are risk-averse. Risk aversion may be particularly strong in the heavy-duty vehicle sector. See GreenBiz, "With Money on the Table, What's the Best Move for Green Trucking?" Jan. 19, 2010, available at http://www.greenbiz.com/blog/2010/01/19/money-table-whats-best-movegreen-trucking (citing the Rocky Mountain Institute's Mobility and Vehicle Efficiency Practice for the proposition that industry risk aversion and low profit margins are the primary obstacles to the trucking industry's adoption of more efficient technologies).

Response:

It is true that increased risk and uncertainty can lead to higher discount rates. However, risk aversion is costly to a business. By definition, risk aversion means that a person or company is willing to reduce expected profits in order to reduce the uncertainty surrounding those profits. Competition in an industry should reduce (not necessarily eliminate) the risk premia that firms are willing to pay, because, in the long run and on average, a risk-neutral competitor should outperform a risk-averse one. In addition, investing in fuel-saving technologies is a hedge against unexpectedly high energy prices; a cautious company may seek to avoid that risk as well as the risk of fuel-saving technologies that save less fuel than expected.

14.5.6. Adjustment & Transactions Costs

Organization: Competitive Enterprise Institute

Adjustment and Transactions Costs. The agencies opine that “truck owners and fleets may like to see how a new technology works in the field, when applied to their specific operations, before they adopt it.” Yes! Companies want real — road-tested — information about alternative investments. They’ll listen to what EPA and NHTSA have to say, but very likely take the agencies’ assessments with a grain of salt. After all, and meaning no disrespect, EPA and NHTSA are stakeholders, not honest brokers. Each has an organizational interest in exaggerating the benefits and understating the risks of fuel-economy mandates, because the agencies’ control over the private sector grows each time they promulgate a new standard or tighten an existing one. There is also more than a dollop of green ideology in the now decades-old fuel-economy campaign, and ideology is not usually a sound basis for making business decisions. [EPA-HQ-OAR-2010-0162-2418.1, pp.5-6]

Response:

Diffusion of new technologies is commonly a gradual process, but slow adoption can have significant opportunity costs. In a competitive market, early adopters of fuel-saving technologies can gain an advantage over others, by lowering their costs. Waiting for abundant evidence on the effectiveness of technologies can be costly.

Our experience with the SmartWay program has been that companies will listen to and benefit from agency advice if it is built upon a strong technical foundation. SmartWay assessed the strategies it promoted through a combination of testing and product verification, vehicle simulation modeling and analysis, peer-reviewed technical literature, and outreach to end users. EPA built upon this technical expertise and rigorous assessment approach in developing the new truck standards. As a result, key industry stakeholders including individual truck and engine manufacturers, manufacturer trade associations and the nation’s largest trucking organization have voiced support for this rule.

The motivation for this rule is reduction of greenhouse gas emissions and energy security, two externalities that private markets are unlikely to address as effectively as possible. These externalities are carefully explained and documented in the rulemaking documents. The rule documents are based on the best available technical information, as well as public input, and the information underlying the analyses is (with rare exception, such as confidential business information) made public.

14.5.7. Fuel economy underachievement due to other EPA rules

Organization: Competitive Enterprise Institute

All of which is to say, the market is not failing when businesses choose to be guided by real-world results rather than by agency forecasts. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

To their credit, the agencies acknowledge that "there may be no market failure" in the risk-aversion induced by adjustment and transition costs, which, unlike the promised payoffs from fuel-economy investments, "are typically immediate and undiscounted." [EPA-HQ-OAR-2010-0162-2418.1, p.6]

Alternative hypothesis: Truckers' under-investment in fuel saving technology is a consequence of EPA's ever-tightening diesel engine emission standards. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

As noted, trucking industry profit-margins are thin and fuel is the single biggest operating expense. Consequently, truckers, especially those who haul freight long distances in "combination tractors" (semis), have a strong incentive to purchase vehicles incorporating cost-effective improvements in fuel economy. Hence manufacturers should also have a strong incentive to produce such vehicles. Yet the average fuel economy of semis declined by 1.2% annually over the past decade, according to the Department of Energy's Transportation Energy Data Book. How can this be? [EPA-HQ-OAR-2010-0162-2418.1, p.6]

To some extent truckers may just behaving like prudent buyers, as discussed above. Before incurring the certain and immediate costs of the agency-approved fuel-efficiency technologies, they want to see results – how much fuel is actually saved and what are the long-term effects on truck reliability and maintenance costs. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

But considerable evidence suggests another, complementary explanation: EPA's emission-control standards for diesel trucks caused the very problem – stagnant or even declining fuel economy —that the agencies now propose to solve with more rules. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

What led me to this hypothesis was none other than EPA's year 2000 Regulatory Impact Analysis of its diesel-truck emission-control program. The RIA estimated that: [EPA-HQ-OAR-2010-0162-2418.1, p.6]

1. Engine manufacturers would have to spend $385 million on R&D over five years to comply with EPA's increasingly stringent particulate matter (PM) and nitrogen oxide (NOX) emission standards. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

2. Each of 11 major engine manufacturers would need to spend $7 million annually to deploy a “team of more than 21 engineers and 28 technicians to carry out advanced engine research.” [EPA-HQ-OAR-2010-0162-2418.1, p.6]

3. The requisite emission-control technologies would add as much as $7,000 to the cost of a new vehicle in model year 2007. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

4. The PM filter would reduce engine fuel efficiency by 1%. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

The implications are obvious. Thanks to EPA’s emission standards, over a five-year period, 539 engineers and technicians would spend all or much of their time developing emission-control technology rather than fuel-saving technology. Engine manufacturers would have $385 million less to spend for R&D of fuel-saving technology. Truckers would have $7,000 less per vehicle to spend on rigs with better fuel economy. Slow or non-existent improvement in heavy-truck fuel economy could thus be an opportunity cost of EPA’s PM and NOX regulations. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

EPA’s year 2000 RIA forecast that the 1% fuel-efficiency decline due to the PM filter would be “more than offset” by fuel-efficiency gains from other emission-control technologies. However, this don't worry, be happy assurance is not very reassuring. An RIA, after all, is a form of self-evaluation, a report card in which an agency grades itself. Grade inflation cannot be ruled out. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

Reports by the Government Accountability Office (GAO) and NERA Economic Consulting, as well as other information summarized below, suggest that EPA’s regulations, both directly and via their market impacts, held back heavy-truck fuel economy. [EPA-HQ-OAR-2010-0162-2418.1, p.6]

Response:

The comment assumes that investing in diesel emissions standards “crowds out” the truck industry’s ability to invest in additional fuel-saving technology: engineers who worked on reducing diesel emissions would not be available to work on fuel efficiency. If fuel efficiency improvements are cost-effective, though, then they are worthwhile investments even with the expenditures on reducing diesel emissions. Only if access to capital is significantly constrained would the industry consider these as alternative investments. The same principles apply for access to expertise: truck companies could hire additional engineers and technicians to work on either fuel efficiency or emissions reduction. In the absence of evidence of “crowding out” of investments in fuel economy, we are left with the puzzle of what appears to be a great deal of lack of adoption of cost-effective fuel-saving technology.

14.5.8. Positional Goods

Organization: Institute for Policy Integrity

A "positional good" is something whose value depends strongly on how it compares with the things owned by others. Smith might be relatively happy with her house's size if it matches the neighborhood's average size, but she might value the same house less if a mansion goes up next door: housing size is positional. By comparison, Smith might not care how many vacation days her neighbors have so long as she gets the amount she wants: vacation days are non-positional. [EPA-HQ-OAR-2010-0162-1895.1, pp.9-10]

Positionality and status matter for reasons that go beyond psychology, biological hardwiring, or envy—although those factors should not be ignored. Status can be "instrumental," in that higher status itself can create better consumption opportunities and access to better employment opportunities. "Conspicuous consumption" of positional goods thus becomes a signal for status: [EPA-HQ-OAR-2010-0162-1895.1, p.10]

When an individual's ability level cannot be observed directly, such observable components of his consumption bundle constitute a signal to others about his total income level, and on average, therefore, about his level of ability....[I]mperfect information about ability might create incentives for people to rearrange consumption patterns to favor observable goods. [EPA-HQ-OAR-2010-0162-1895.1, p.10]

In other words, theory predicts that more visible goods will be more positional, and that people will over-consume visible goods. Visibility depends not necessarily on physical visibility, but on whether "society has direct means to correctly assess the expenditure involved." [EPA-HQ-OAR-2010-0162-1895.1, p.10]

According to a recent U.S. survey on the visibility of 31 expenditure categories (from food to mobile phones), new or used motor vehicle purchases were the second most visible expenditure; related expenditures on gasoline/diesel, vehicle maintenance, and insurance were all substantially less visible. Surveys also consistently confirm that vehicles are highly positional goods, that people prefer a relative increase in a vehicle's value to an absolute increase, and that the more visible features of vehicles are more positional. [EPA-HQ-OAR-2010-0162-1895.1, p.10]

The more observable prestige features of vehicles include size, power, brand, and design. While all these traits have functional value (such as capacity, safety, and performance), they also all have relative value: consumers value size, power, and load capacity not just for their functional benefits, but for the status signal. As Bob Lutz, Vice Chairman of General Motors, has stated, "aspirational aspects overwhelm the functional differences" when customers choose vehicles. Importantly, many vehicle prestige features—especially larger size and increased performance—reduce fuel efficiency. And given the low visibility of gasoline expenditures and financial savings, which are typically considered non-positional, fuel efficiency is currently a relatively non-positional good. [EPA-HQ-OAR-2010-0162-1895.1, p.11]

In the heavy-duty truck context, the positional goods theory may have a limited but important application. Consumers may compete for prestigious traits on vehicles bought for personal transportation, including certain pickups, vans, mobile homes, and recreational vehicles. A similar effect may take place among some combination tractors owned by individual, independent contractors, who may not only compete for bragging rights among their peers, but may also compete for employment opportunities based on the relative size or power of their vehicle. Finally, the relative size and power of heavy-duty vehicles may be important to the branding of a commercial business: the more powerful the fleet, the more solid the brand may appear. [EPA-HQ-OAR-2010-0162-1895.1, p.11]

The problem with positional goods is that an increase in aggregate consumption does not necessarily increase consumer welfare. If Smith invests in a positional good to move up the status hierarchy, Jones will feel relatively worse off and so will match that investment to catch up. As a result, both consumers spend resources without actually improving their relative status. [EPA-HQ-OAR-2010-0162-1895.1, p.11]

The conspicuous consumption status competition is wasteful because consumers invest more in positional goods than they would if they were motivated purely by the goods' functional value, as consumers try to capture a status advantage that never materializes. In the end, positional goods do not produce the welfare that consumers expect, due to a negative externality caused by positionality: as soon as the second consumer also buys the larger vehicles, it reduces the value to the first consumer of her vehicle. [EPA-HQ-OAR-2010-0162-1895.1, p.11]

Because consumption decisions are made non-cooperatively but in fact alter the spending behavior of others, consumers get stuck on a "positional treadmill" that does not increase welfare. Yet if any individual opts out of this "expenditure arms race," it would only move that consumer backwards on the status hierarchy, which for most consumers is unacceptable. And given limited resources and limited market options, the over-consumption of positional goods results in under-consumption of non-positional goods (such as fuel efficiency). [EPA-HQ-OAR-2010-0162-1895.1, pp.11-12]

In short, a market failure blocks optimal investment in fuel efficiency. It can be especially hard for consumers to move themselves down the status scale voluntarily on visible, positional features like vehicle size and horsepower. Yet if consumers could maintain their relative economic and competitive position, they might be more willing to pay for non-positional goods. The proposed regulation is a cooperative solution that allows consumers to achieve what they could not in the non-cooperative open market: namely, an increase in fuel efficiency without losing position in the status hierarchy. Regulations similarly help consumers select fuel efficiency without falling behind in the size rankings, since with time the average fleet size will shift. Regulations also correct a supply-side problem, since theory predicts manufacturers will devote their research and development budget to status goods until government adjusts the incentives. Finally, with time and under new labeling requirements that could increase the visibility of fuel efficiency, it is possible fuel efficiency may emerge as an increasingly positional trait. Someday businesses could even compete for status as having the greenest fleet—but regulation may be necessary to jumpstart that effect, to overcome the initial hesitation to sacrifice current prestige goods for fuel efficiency. [EPA-HQ-OAR-2010-0162-1895.1, p.12]

Response:

The “positional goods” argument for the energy paradox in fuel economy may make more sense for personal vehicles than for commercial vehicles. For commercial vehicles, an attribute that costs money but does not contribute to functionality or cost reduction should, in theory, make a truck less cost-effective and therefore less competitive; the forces of competition should reduce the use of these attributes. This argument may not hold if “positionality” can have a positive effect on a business – e.g., by signaling status or prestige in how something is shipped. In addition, as the commenter notes, a segment of the truck market is, essentially, for personal vehicles, and the “positional goods” argument may play a role.

As with the other possible hypotheses for the appearance of the energy paradox, we acknowledge its possible contribution, but we are unable at this time to evaluate its magnitude in explaining the paradox.

14.6. Effects on Competitiveness

Organizations Included in this Section:

Cummins, Inc
Natural Resources Defense Council
New York State Department of Transportation and Environmental Conservation
New York State Energy Research and Development Authority

Organization: Cummins, Inc.

Avoid unintended consequences – The rule should recognize the commercial needs of the industry and preserve a level playing field and marketplace for heavy-duty (HD) engine and vehicle manufacturers. [EPA-HQ-OAR-2010-0162-1765.1, p.8]

Organization: Natural Resources Defense Council (NRDC)

Motor vehicle standards are also important for keeping and creating truck manufacturing jobs in the United States. Standards established in countries other than the U.S. would drive manufacturers in those countries to build cleaner, efficient trucks. In the face of higher fuel prices, caused by temporary or long-term shortages, American trucking companies may shift purchases to more efficient, foreign-made vehicles. To prevent that, U.S. manufacturers need the certainty provided by standards to invest in fuel-saving technologies. Japan has already established truck efficiency standards and the European Union is developing them. A lack of sufficiently strong U.S. standards could leave domestic manufacturers at a competitive disadvantage; conversely, U.S. manufacturers that lead in clean, efficient vehicle technology can develop a strong global position through exports. [EPA-HQ-OAR-2010-0162-1776.1, p.4]

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

Reducing fuel consumption of the heavy-duty engines and vehicles could also benefit Canadian, Mexican and other foreign trucking firms, if they utilize the new engine and related technologies as well. Our agencies recommend that these impacts be considered as part of an overall National Freight Plan that balances freight and environmental needs, especially important in light of projected increases in freight movement. [EPA-HQ-OAR-2010-0162-2047.1, p.3]

Response:

The analysis supporting this rule indicates that this rule will not only reduce greenhouse gas emissions and fuel consumption, but it will also in a short period of time reduce operating costs of vehicles sufficiently to outweigh up-front purchase costs. Much of the development, manufacturing, and use of the technologies expected to be used to meet the standards is expected to happen in the U.S. To the extent that these technologies reduce costs as expected, the companies that manufacture, install, and use these technologies are expected to gain a competitive advantage over those that do not adopt these technologies. This advantage is likely to be temporary, as others see the advantages of these technologies and move to adopt them.

The flexibilities built into the rulemaking are intended in part to allow continuation of the diversity of the trucking industry, and to allow truck manufacturers to apply the new technologies in a cost-effective fashion. It is possible that some segments may see greater improvements than others; in that sense, the rule may not maintain a strictly level playing field. To the extent that the rule encourages manufacturers who comply with the standards to develop cost-effective fuel-saving technologies, these manufacturers might experience advantages over those (for instance, in other countries) who do not face these standards. As these technologies demonstrate their effectiveness, though, even manufacturers not subject to the standards may switch to the cost-effective technologies.

14.7. Rebound

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

New York State commends the agencies' modeling effort for calculating a potential rebound effect. A rebound is likely to occur due to fuel savings achieved through the proposed measures. If moving freight by truck is to become cheaper and reduced fuel cost is passed on to customers, increased demand on truck freight could ensue and could cause a spike in truck traffic. New York State strongly recommends a consideration of strategies to prevent a shifting of slipping from rail to highway trucking services. New York State's Draft Climate Action Plan Interim Report presents policy options to shift freight to nonhighway modes. The potential trucking rebound would be counter to this option and would not align with the transportation goal of reducing congestion and increasing freight movement efficiencies. [EPA-HQ-OAR-2010-0162-2047.1, p.2]

Response:

he increase in overall truck VMT resulting from the rebound effect implicitly includes some component of mode shifting. Since there are differences in GHG emissions per ton of freight moved by rail compared to truck, any potential shifting of freight from one mode to the other could have GHG impacts. Although the total demand for freight transport is generally determined by economic activity, there is often the choice of shipping by either truck or by rail when freight is transported over land routes. This is because the United States has both an extensive highway network and an extensive rail network; these networks closely parallel each other and are often both viable choices for freight transport for many origin and destination pairs within the continent. If rates go down for one mode, there will be an increase in demand for that mode and some demand will be shifted from other modes. This “cross-price elasticity” is a measure of the percentage change in demand for shipping by another mode (e.g., rail) given a percentage change in the price of trucking. Aggregate estimates of cross-price elasticities also vary widely, and there is no general consensus on the most appropriate value to use for analytical purposes. The NAS report cites values ranging from 0.35 to 0.59.[72] Other reports provide significantly different cross-price elasticities, ranging from 0.1[73] to 2.0.[74]

---

[72] *See* 2010 NAS Report, Note **Error! Bookmark not defined.**. See also 2009 Cambridge Systematics, Inc., Draft Final Paper commissioned by the NAS in support of the medium-duty and heavy-duty report. Assessment of Fuel Economy Technologies for Medium and Heavy-duty Vehicles: Commissioned Paper on Indirect Costs and Alternative Approaches Docket ID: EPA-HQ-OAR-2010-0162-0009).

[73] Friedlaender, A. and Spady, R. (1980) A derived demand function for freight transportation, Review of Economics and Statistics, 62, pp. 432–441 (Docket ID: EPA-HQ-OAR-2010-0162-0004).

When considering intermodal shift, the most relevant kinds of shipments are those that are competitive between rail and truck modes. These trips include long-haul shipments greater than 500 miles, which weigh between 50,000 and 80,000 pounds (the legal road limit in many states). Special kinds of cargo like coal and short-haul deliveries are of less interest because they are generally not economically transferable between truck and rail modes, and they would not be expected to shift modes except under an extreme price change. However, the total volume of ton-miles that could potentially be subject to mode shifting has also not been studied extensively.

14.8. Sales impacts

Organization: Recreation Vehicle Industry Association (RVIA)

The basis for our jobs concerns rest with the fact that motorhomes are not commercial vehicles and though they do in fact share some common components with commercial trucks, they are discretionary purchases, whereas commercial trucks are not. Because of this basic difference, potential motorhome buyers are much more likely to defer or potentially abandon purchasing a motorhome due to economics. This was readily apparent during the recent recession when, as shown in the graph below, motorhome sales fell 39% from 2007 to 2008 and another 35% from 2008 to 2009 while sales for medium- and heavy duty trucks in total fell only 25% and 24%, respectively during the same period. [EPA-HQ-OAR-2010-0162-3300, p.2]

[See p.3 of this comment for a bar graph showing Motorhome Percent Decline in Sales]

This economic data clearly demonstrates that the purchasing mentality of the motorhome buyer is vastly different than that of a commercial business owner and that non-commercial vehicle sales are much more likely to be negatively impacted when economic pressure is applied. Notwithstanding the fact that Congress limited its mandate to address medium- and heavy-duty vehicle fuel consumption to commercial vehicles (and that NHTSA has similarly decided not to regulate motorhomes), if EPA intends to give further consideration to including motorhomes in its GHG regulation, it must assess the economic impact that is specific to non-commercial vehicles and it should not attempt to apply a cost-benefit assessment for commercial vehicles to personal use vehicles such as motorhomes. In conducting this assessment and in considering the economic damage that might be brought to bear on the tens of thousands persons working in the U.S. RV industry, EPA should be cognizant that, in 2009, motorhomes made up only about 1/3 of 1% of the total medium- and heavy-duty truck market in the U.S. [EPA-HQ-OAR-2010-0162-3300, p.3]

---

[74] Christidis and Leduc, "Longer and Heavier Vehicles for freight transport," European Commission Joint Research Center's Institute for Prospective Technology Studies, 2009 (Docket ID: EPA-HQ-OAR-2010-0162-0010).

The above concerns are true as well for the work trucks that will be purchased, not by commercial businesses, but by private individuals for towing RVs. 3 As with motorhomes, these purchases are discretionary and will be deferred or abandoned if the economics are such that other lifestyle options become financially more attractive . Given that towable RV production accounts for the overwhelming majority of U.S. RV industry jobs - some 90% plus of all RVs are towable - regulatory actions that cause private parties to defer or abandon purchasing tow vehicles (and the towable RVs that might otherwise be bought) could result in the loss of hundreds and possibly thousands of U.S. RV industry jobs, not unlike what occurred in 2008 and 2009. Consequently, when setting fuel consumption and CO2 standards for work trucks, EPA and NHTSA must assess the economics applicable to, not just some, but all stakeholders. EPA and NHTSA must consider and assess what will be the likely reaction by private individuals when the price of an RV tow vehicle increases by $1,411 simply due to this one regulation. Furthermore, per the recent Executive Order issued by President Obama, EPA and NHTSA must consider the impact of these cost increases not in isolation, but rather in conjunction with other environmental and safety regulatory requirements that are planned to take effect in the 2014 to 2018 timeframe. [EPA-HQ-OAR-2010-0162-3300, pp.4-5]

[See p.5 of this comment for examples of proposals]

To accomplish this, EPA and NHTSA must jointly compile a list of regulatory requirements that will go into effect in the 2014-2018 timeframe . Once compiled, EPA and NHTSA should place this list along with the accompanying aggregate cost assessment into the docket for public review. On the benefits side of the equation, EPA and NHTSA must take into consideration the fact that work trucks purchased primarily for RV towing will not see anywhere near the mileage accrued by commercial truck owners over the same compressed time period. Thus, the fuel savings benefits for this group of work truck owners will typically be far less than those realized by commercial businesses. The EPA and NHTSA cost-benefit analysis should be revised to reflect this reality. In doing so, you should meet not only with business owners, but also with private individuals to assess their likely reaction to varying price increase levels. It is our expectation that if work truck manufacturers are forced to impose a price increase on private individuals of several hundred dollars per model year, there will likely be a major drop in not only tow vehicle sales by noncommercial owners, but towable RV sales as well. [EPA-HQ-OAR-2010-0162-3300, pp.5-6]

EPA and NHTSA must meet with and talk to private citizens, not industry groups, about what level of price increase they will tolerate before they will defer or abandon the purchase of discretionary work trucks (e.g., pickups used for RV towing). [EPA-HQ-OAR-2010-0162-3300, p.12]

Per the Jan. 18, 2011, Executive Order, EPA and NHTSA must assess the implications of price increases not in isolation but rather in conjunction with other environmental and safety regulatory requirements that are planned to take effect in the 2014 to 2018 timeframe. EPA and NHTSA must compile a joint list of emissions, fuel economy and safety regulatory requirements that will go into effect in the 2014-2018 timeframe and submit this list along with the accompanying aggregate cost implications to the docket for public review and consideration. In carrying out recommendation #4 above, EPA and NHTSA should use these cost increases, not the numbers that are limited to this single rulemaking. [EPA-HQ-OAR-2010-0162-3300, p.12]

Response:

We recognize that demand for recreational vehicles is different than demand for commercial vehicles. Yet, like other personal vehicles as well as trucks, recreational vehicles emit greenhouse gases and use petroleum-based fuels that contribute to energy security concerns.

EPA has decided to finalize standards for these individual vehicle categories as we proposed. We have taken this decision reflecting that any individual vocational truck segment is likely to be a small contributor to overall fuel consumption and GHG emissions on its own. Absent regulations for the vast majority of vehicles in this segment, our program will fall short of its goals, and fail to achieve reductions in GHG emissions which are technically feasible and highly cost effective. Further since the proposal, the agencies have met with a number of tire manufacturers to better understand their expectations for product availability for the 2014 model year. Based on our review of the information shared, we are convinced that tires with rolling resistance consistent with our final vehicle standards and meeting the full range of other performance characteristics desired in the vehicle market, including the RV market, will be broadly available by the 2014 model year. See full discussion in Section II.D of the preamble to the final rule.

Sales losses in this sector in 2008 and 2009 were due to macroeconomic effects that reduced household income, not to this rulemaking. Thus, different market forces come into play. Though this rule is expected to increase the up-front costs of the vehicles, which would tend to reduce sales, it will reduce their operating costs, an attribute that consumers are likely to appreciate. How these two factors balance in terms of net sales depends on the relative emphasis that consumers put on up-front costs versus operating costs. In the light-duty vehicle market, the role of fuel economy in consumers' purchases is not well understood: some studies indicate high valuation, while others indicate undervaluation, of fuel savings when consumers choose vehicles.[75] We are unaware of any studies of the role of fuel economy in recreational vehicle purchases. To the extent that the same consumers who purchase in the light-duty market buy in the recreational vehicle market, it is difficult at best to predict how consumers will assess this tradeoff.

It should be noted that high fuel prices in and of themselves may reduce sales; improved fuel efficiency may mitigate some of that effect.

[75] Greene, David. "How Consumers Value Fuel Economy: A Literature Review." Office of Transportation and Air Quality, U.S. Environmental Protection Agency, Report EPA-420-R-10-008, 2010.

Total employment effects of this rule are now discussed in Preamble Section VIII.M and RIA Chapter 9.8. As discussed in those sections, we do not estimate effects on vehicle sales and thus do not estimate employment effects in that sector. Increased employment is likely to be associated with the addition of technologies to meet the standards. Employment in the refinery sector may be reduced due to reduced fuel demand, and fuel savings passed along to consumers or reinvested in the truck industry are likely to increase employment. Given the job creation as a result of the $1.2B (2009$) in fuel savings in 2014 and the possible employment increases in the manufacturing and parts sectors, we find it highly unlikely that there would be significant net job losses related to this policy. Given the current level of unemployment, net positive employment effects are possible, especially in the near term, due to the potential hiring of idle labor resources by the regulated sector to plan for and meet new requirements. In the future, when full employment is expected to return, any changes in employment levels in the regulated sector due to this program are mostly expected to be offset by changes in employment in other sectors.

Standard benefit-cost analysis methods indicate that the costs and benefits of this rule are only those affected by this rule, not those from other rules: the merits of this rule depend on its own effects. EPA's analysis of this rule takes into account regulations that have already been finalized. It does not take into account rules that have not been finalized, because the requirements of those rules are not known with certainty until they are final. The analysis disaggregates the effects of this rule for different sectors of the truck market, and the patterns of different truck operators and owners in those markets affect the values that are used in the analysis. See also section 4 of this response to comment document where we document additional steps taken in the rulemaking to assess impacts of other rules affecting the heavy duty vehicle and engine sector.

Our rulemaking process has been open to comment and input from private individuals as well as businesses.

15. Small Business Entities

15.1. Support Deferral

<u>Organizations Included in this Section:</u>

Autocar, LLC
National Truck Equipment Association (NTEA)
Recreation Vehicle Industry Association (RVIA)

Organization Autocar, LLC

Autocar supports the agencies' proposal to defer compliance with GHG emissions and fuel consumption standards for small vocational vehicle chassis manufacturers meeting the Small Business Administration (SBA) size criteria of a small business as defined in 13 CFR §121.201. [EPA-HQ-OAR-2010-0162-1617.1, p.3]

The agencies have properly determined that Autocar qualifies as a small business. EPA and NHTSA have also made the important observation that the ten chassis manufacturers which the agencies have identified as meeting the SBA size criterion for small businesses would comprise less than 0.5% of the total heavy-duty vocational vehicle market in the United States. Thus, the agencies have properly concluded that the deferral of standards for small chassis manufacturing companies such as Autocar "will have a negligible impacts on the GHG emissions and fuel consumption improvements from the proposed standards." In addition, Autocar also notes that because it only manufactures heavy-duty chassis and does not manufacture diesel engines, Autocar and similarly situated manufacturers will still purchase compliant engines from engine manufacturers, which will further reduce the GHG impact of the proposed deferral. [EPA-HQ-OAR-2010-0162-1617.1, pp.3-4]

Moreover, Autocar supports EPA and NHTSA's proposed deferral because such deferral recognizes that the ability of a manufacturer to successfully implement new technologies necessary to meet increased emissions standards is proportional to the size of a manufacturer's total annual production of vehicles. For small, privately-owned manufacturers such as Autocar, research and development costs to meet new and more stringent emissions standards pose a proportionally greater burden than the burden faced by the exponentially larger manufacturers that compete in Autocar's marketplace. Additionally, small manufacturers generally have fewer products over which to spread the costs of research, development and re-design work. [EPA-HQ-OAR-2010-0162-1617.1, p.4]

Finally, EPA and NHTSA's proposed deferral is appropriate because the Clean Air Act (CAA) generally affords EPA discretion to consider and adjust appropriate lead-time allowances for vehicle and engine manufacturers. Any regulations prescribed under 42 U.S.C. § 7521(a)(1) governing emissions standards for new motor vehicles or new motor vehicle engines "shall take effect after such period as the Administrator finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period." Indeed, the D.C. Circuit has recognized EPA's discretion to consider lead-times for manufacturers in a variety of circumstances similar to the small business deferral of the Proposed Regulations, and precedent for such EPA rules is well established. [EPA-HQ-OAR-2010-0162-1617.1, p.4]

Organization: National Truck Equipment Association (NTEA)

EPA and NHTSA are proposing to defer greenhouse gas emissions and fuel consumption standards from small vocational vehicle chassis manufacturers meeting the SBA size criteria of a small business as described in 13 CFR 121.201 (see 40 CFR 1036.150 and 1037.150). The agencies will instead consider appropriate GHG and fuel consumption standards for these entities as part of a future regulatory action. This includes both U.S.-based and foreign small volume heavy-duty truck and engine manufacturers. [EPA-HQ-OAR-2010-0162-1608.1, p.9]

The NTEA supports this proposed action. The number of small volume manufacturers affected by this section is limited and these companies produce products important to the marketplace. Smaller companies such as these have resources that are far more limited than larger chassis manufacturers with which to meet regulations that have never before been applied to their products – and in such a compressed time frame. [EPA-HQ-OAR-2010-0162-1608.1, p.9]

Organization: Recreation Vehicle Industry Association (RVIA)

RVIA supports the proposal to exempt small businesses from the requirements of the regulation and while we understand the need for small businesses to provide EPA and NHTSA a statement explaining how they qualify as a small business, there is no reason why small businesses should be required to submit the same statement year after year when nothing has changed. EPA and NHTSA should revise the reporting requirement so that small businesses are required to file a justification statement in advance of the new rules taking effect and then, and only if their small business status changes, should they be required to file a revised statement. EPA and NHTSA must be cognizant of the fact that 'small businesses' are resource-challenged and should not be burdened with unnecessarily frequent reporting requirements. At a minimum, EPA and NHTSA should reduce the frequency of the reporting requirement to every five years. [EPA-HQ-OAR-2010-0162-3300, p.10]

EPA and NHTSA should eliminate the requirement that small businesses be required to file small business entity status reports annually when this status has not changed. Only if a change in status occurs should a follow-up report be required. Furthermore, neither the initial report nor any follow-up reports should need to be filed with both agencies in this age of electronic dockets. There is no reason why the two agencies can't get together and come up with a common simplified filing procedure that eliminates the need to file the same report twice, once for EPA and once for NHTSA. [EPA-HQ-OAR-2010-0162-3300, p.13]

Response:

The agencies continue to believe that deferring the standards for small businesses at this time will have a negligible impact on the GHG emission reductions and fuel consumption reductions that the program would otherwise achieve. As pointed out in a number of comments, section 202 (a)(1) affords EPA considerable discretion in assessing needed lead time for standards, and that discretion supports EPA's decision here to take more time to regulate the smallest entities while it develops the initial regulatory program for the larger engine and vehicle manufacturers. Similarly, NHTSA believes that developing standards that are "appropriate, cost-effective, and technologically feasible" includes the authority to exclude certain manufacturers if their inclusion would work against these statutory factors. Therefore, the final rules include the small business exemption as proposed. The specific deferral provisions are discussed more detail in preamble Section II.

15.2. Do Not Support Deferral

Organizations Included in this Section:

Institute for Policy Integrity
Chew, Yuli
Daimler Trucks North America
Engine Manufacturers and Truck Manufacturers Associations
Volvo Group

Organization: Institute for Policy Integrity

Agencies Should Drop the Small Business Exemptions The agencies exempt small businesses from compliance, based on the assumption that—given the small businesses' low market share—an exemption will have only a "negligible impact" on emissions. However, this is not the proper framework for analysis and justification. An exemption should only be created where special administrative and compliance burdens cause costs to exceed benefits. The agencies have not explained why small businesses would face special compliance burdens or create special administrative problems for the government. Given that the agencies are worried about corporations taking advantage of the small business exemption to circumvent regulation, the agencies should at least rethink and should probably drop the small business exemptions. [EPA-HQ-OAR-2010-0162-1895.1, p.4]

Organization: Chew, Yuli

In the EPA-HQ-OAR-2009-0472 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule covering model year 2012 through 2016, EPA ruled that 'In the interest of establishing the small volume manufacturer provisions as narrowly as possible while still accomplishing the purpose of the provisions, EPA has decided to use a cut-point of 5,000 vehicles. In determining eligibility for SVM deferment, manufacturers must be aggregated according to the provisions of 40 CFR 86.1838-01(b)(3), EPA is deferring establishing CO2 standards for manufacturers with MY2008 or MY2009 sales of less than 5,000 vehicles.' [EPA-HQ-OAR-2010-0162-0558.1, p.1; this comment can also be found at section 17.b of this comment summary]

The environmental impact per vehicle from the medium and heavy duty vehicle is several times more that a light duty vehicle; it is very important that EPA limit this very loosened this definition for 'small manufacturer'. [EPA-HQ-OAR-2010-0162-0558.1, p.2; this comment can also be found at section 17.b of this comment summary]

Organization: Daimler Trucks North America

The Agencies Should Treat Small and Large Bus Manufacturers Identically Or Risk Creating An Unlevel Playing Field That Penalizes Small Volume Bus Sellers Associated With Otherwise Large Manufacturers. [EPA-HQ-OAR-2010-0162-1818.1, p.86]

The Flexibility Act requires the Agencies to either assess the impact of the Proposed Rule on small businesses, or certify that it will not impose a significant economic impact on a substantial number of small entities. The Agencies propose to meet this requirement by allowing a temporary deferral of the Proposed Rule in respect of small businesses as defined by the Small Business Administration (“SBA”). The Agencies indicate that an assessment of the deferral was undertaken with respect to specific products, including “small entities in several distinct categories of businesses for heavy-duty engines and vehicles: chassis manufacturers, combination tractor manufacturers, and alternative fuel manufacturers” (NPRM page 412/673). [EPA-HQ-OAR-2010-0162-1818.1, p.86]

DBNA manufactures and distributes heavy-duty city transit buses and heavy-duty coaches. These products will be covered by the Proposed Rule as “heavy heavy-duty vocational vehicles.” The markets for DBNA products have relatively low annual sales and production volumes, a small number of market participants, and the size and corporate structure of participants varies. While some companies, including DBNA, are not small entities or part of larger corporate organizations, some may be. This may result in the deferral being applied to a limited number of market participants. [EPA-HQ-OAR-2010-0162-1818.1, p.86]

DBNA opposes the exemption for Small Business for the following reasons. [EPA-HQ-OAR-2010-0162-1818.1, p.86]

• All North American Motorcoach OEMs and 3 out of 5 transit bus OEMs will likely qualify as Small Businesses according to employment numbers. This would create an inequitable competitive landscape and would give rise to unfair technical and financial advantages for Small Businesses. [EPA-HQ-OAR-2010-0162-1818.1, p.86]

• The North American Bus Market (motorcoach and Transit) is less than 7,000 units annually with market shares ranging from 6% to 27%. If those builders who qualify as small business do not have to abide by the new regulations it would defeat the purpose of the new requirements. [EPA-HQ-OAR-2010-0162-1818.1, p.86]

• It may be possible for some OEMs to reorganize themselves into smaller operating units to get around the regulations. [EPA-HQ-OAR-2010-0162-1818.1, p.86]

As a result, the Agencies should review markets that include vehicle manufacturers that certify as small businesses, and formulate a process to ensure distortions do not occur. While the Flexibility Act requires the Agencies ensure the Proposed Rule does not impose a significant economic impact on a substantial number of small entities, the new rule should not provide some manufacturers with a competitive advantage. If one or more manufacturers in the heavy-duty transit bus market certifies as a small business, the Agencies should determine if the temporary deferral should be extended to other manufacturers to ensure all participants are operating on a level playing field. [EPA-HQ-OAR-2010-0162-1818.1, p.87]

The Agencies could create certain market distortions through their Small Business Exemption. [EPA-HQ-OAR-2010-0162-1818.1, p.108]

In regard to vehicles built by small businesses, the Agencies state that the production of these companies is small. Moreover, the Agencies believe that deferring the standards for these companies at this time would have a negligible impact on the GHG emission reductions and fuel consumption reductions that the program would otherwise achieve. [EPA-HQ-OAR-2010-0162-1818.1, p.108]

The Agencies request comment on their assumption that the impact of these exemptions for small businesses will be small and further whether it will be possible to circumvent the regulations by creating new small businesses to displace existing manufacturers.(75 Fed. Reg. 74167) Daimler agrees that the impact on GHG emissions would be negligible and does not think the exemption would provide an opportunity for circumvention. However, the exemption does create a competitive disadvantage in certain niche markets, now and in the future as standards become more stringent. See our comments in the bus section above. [EPA-HQ-OAR-2010-0162-1818.1, p.109]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The proposed 'small business' exemption should not apply to any manufacturer that has a significant share of any particular segment of the HD vehicle market. In that regard, it is important to note that the HD vehicle market is much smaller than the light-duty vehicle market. The total Class 8 vehicle market in 2009 amounted to 88,863 vehicles. Particular segments within that overall market, obviously, are much smaller. [EPA-HQ-OAR-2010-0162-1940.1, pp.29-30]

Significant certification and compliance burdens will be placed on OEMs that will have to comply with the Proposed GHG/FE Standards, burdens that exempted OEMs will not face. For example, in the case of certain vocational vehicles, OEMs that are subject to the GHG/FE regulations may be required to offer only tires with low rolling resistance, while exempted OEMs would not have to. Since tires represent a significant cost of operation, those types of regulatory burdens would create a competitive disadvantage for the 'larger' OEMs due to the added costs of compliance and certification, which costs must be absorbed by the OEMs or passed along to customers. That would most likely result in unfair market share gains by exempted OEMs, especially since many of the vehicle segments at issue (e.g., refuse haulers and transit buses) are sold to municipalities that often have strict specifications for vehicle components (including tires) and that make purchasing decisions driven largely by cost considerations. [EPA-HQ-OAR-2010-0162-1940.1, p.30]

Accordingly, to mitigate those adverse market effects, the Agencies should not provide a small business exemption in any market segments where a 'small business' has a significant share of the particular HD vehicle market segment. [EPA-HQ-OAR-2010-0162-1940.1, p.30]

Organization: Volvo Group

Volvo Group opposes the Agencies proposal to exempt Small Businesses from these regulations. The agencies ask for comments on their assumption that the impact of these exemptions of small business will be small and on whether there is a possibility to game the system by spinning off divisions into smaller companies to take advantage of the exemption. [EPA-HQ-OAR-2010-0162-1812.2, p.15]

While Volvo Group appreciates that it may be necessary to provide certain small-volume manufacturers with flexibility, the approach proposed by EPA and NHTSA is not based on sufficient analysis and understanding of the various industries regulated by the proposal. As such, Volvo Group is concerned that the exemption provided for small businesses will exempt a substantial portion of the regulated industry and place regulated manufacturers at a significant competitive disadvantage. In fact, it appears from the preamble to the proposal that the Agencies are adopting the Small Business Administration (SBA) definition of a small business, and implementing an exemption based on that overly-broad definition, in part to avoid having to undertake the analysis required by the Regulatory Flexibility Act (RFA) and Small Business Regulatory Enforcement Fairness Act (SBREFA). Indeed, the preamble states that the Agencies are proposing to defer standards for manufacturers meeting the SBA definition of small business "due to the short lead time to develop this proposal, the extremely small fuel savings and emissions contribution of these entities, and the potential need to develop a program that would be structured differently for them (which would require more time." 75 FR 74152, 74358 [EPA-HQ-OAR-2010-0162-1812.2, p.15]

Adopting this definition to expedite the rulemaking process, and without a true understanding of the potential consequences of exempting large quantities of manufacturers, however, would result in an arbitrary, capricious and unreasonable regulation. EPA and NHTSA, for instance, fail to account in their analysis for the thousands of individual secondary manufacturers and body builders who are overwhelmingly small businesses and fall under this exemption. Many types of heavy-duty vehicles, like buses and motorcoaches, are currently primarily built and offered for sale by secondary manufacturers who purchase rolling chassis and powertrain components from other manufacturers, finishing the final vehicle by building the remaining body and vehicle superstructure. If this exemption is allowed to stand, it is very likely that these secondary vehicle manufacturers could expand their product offerings resulting in many more uncertified vehicles being offered than the Agencies account for. It is also possible that large regulated companies could sell vehicles through exempted secondary manufacturers in order to avoid regulation resulting in very large competitive advantage for those companies. [EPA-HQ-OAR-2010-0162-1812.2, p.16]

The DRIA (Chapter 10) discusses the specific companies that EPA expects to exempt and gives percentage estimates of current market share for those companies. The EPA includes Autocar in a group of 10 companies that are estimated to have less than 0.5% of the heavy-duty combination tractor market. Autocar produces primarily Low Cab Over Engine (LCOE) heavy-duty vocational chassis and 'yard jockey'-type tractors. [EPA-HQ-OAR-2010-0162-1812.2, p.16]

Data from R.L. Polk & Co. indicate that the overall Class 8 market in 2007 had 155,000 units. Of those, 108,000 units were combination tractors. There is no further breakout that recognizes yard-jockeys as a type of tractor, so the Autocar market share estimate of less than a half percent (of the HD combination tractor market) is possibly correct, but it is also extremely misleading, since it does not include the majority of Autocar's production, the LCOE straight trucks. [EPA-HQ-OAR-2010-0162-1812.2, p.16]

In the market for their core product- LCOE chassis- Autocar carries a 30% share of the market, second only to Mack Truck's 45% share. In fact, in the core markets for Autocar and other manufacturers that may otherwise qualify as small businesses under the proposal, they are dominant players. [EPA-HQ-OAR-2010-0162-1812.2, p.16]

Given the complex secondary manufacturing processes involved in the LCOE vocational market segment, exemption from standards would result in a significant competitive advantage for these companies. Non-exempt manufacturers and their customers will face substantially more paperwork, tracking and administrative burden when purchasing a vehicle as it goes through the body builder and other secondary manufacturing processes than will be required for an exempted company, especially in view of the requirements placed on secondary manufacturers by this rule (see subsequent comments on 40 CFR § 1037.620 – Shipment of Incomplete Vehicles to Secondary Vehicle Manufacturers). In fact, some body-builders might choose to avoid doing business with a certified truck OEM just to avoid the effort of understanding and complying with this rule. The exempted company will have a great deal more flexibility to deliver custom products quickly and more cost effectively and these custom products are the heart of the LCOE vocational segment. [EPA-HQ-OAR-2010-0162-1812.2, p.16]

Exempted companies also will not need to engineer and produce product changes required by the regulations. As a result of the factors, this exemption can put a large corporate company with a wider variety of products like Mack at a serious and unfair competitive disadvantage. [EPA-HQ-OAR-2010-0162-1812.2, p.16]

In addition, corporate divisions can be sold off, effectively avoiding regulation and hindering technological development. [EPA-HQ-OAR-2010-0162-1812.2, p.17]

Autocar was formerly a Volvo Group vehicle platform that was required by the United States Department of Justice to be sold when Volvo Group acquired Mack Trucks. The United States' position, at least in other important contexts, therefore, is that Autocar is a major competitor. If the exemption is maintained as proposed, other companies could spin-off smaller divisions to qualify for exemption. To qualify for the exemption, large companies would have to sell off the divisions and cede any controlling interests. However, the previously noted competitive advantage would increase the selling price and profit for the selling company. A large corporation would be able to sell off a potentially underperforming division, earn more profit from the sale, and the resulting small company would be a competitor with a distinct competitive advantage in a segment in which the original corporation would no longer have a presence. Or, as noted above, small divisions could be spun off as secondary manufacturers who work in close conjunction with the original manufacturer to avoid regulation. [EPA-HQ-OAR-2010-0162-1812.2, p.17]

Given the small volume and fragmented nature of the various market segments in heavy-duty vehicles, this process would drive large corporations substantially out of a large portion of the heavy-duty market and possibly the entire U.S. market. This would leave the heavy-duty market populated by small, manufacturers whose products are not subject to the proposed regulations. This trend would seriously curtail the research and technological advancement that large corporations provide, effectively eliminating much of the benefit of the regulation and being counter-productive to the stated goals of the Agencies. [EPA-HQ-OAR-2010-0162-1812.2, p.17]

In the event the Agencies do not remove the exemption, Volvo Group proposes providing a similar exemption for all low-cab-forward class 8 vehicles in order to offset this unfair competitive advantage. [EPA-HQ-OAR-2010-0162-1812.2, p.17]

In addition, EPA's adoption of the SBA definition setting a 1,000-employee threshold for qualifying as small businesses in the heavy-duty truck industry is too high for certain components of that industry, such as bus manufacturers. It also is not an appropriate gauge for purposes of determining whether a manufacturer is truly small. Rather than adopting SBA's definition, EPA and NHTSA should develop a metric, such as annual sales or annual production, that takes into consideration factors such as automation or heavy reliance on purchased components and sub assemblies – which can allow a manufacturer to produce substantial quantities with fewer employees. Indeed, in almost every other context in which both EPA and NHTSA have provided relief to smaller manufacturers, the Agencies have relied on sales or production volumes rather than employee numbers. See, e.g. 40 CFR §86.001-1(e) (setting special EPA certification procedures for small volume manufacturers of light-duty vehicles, trucks and heavy-duty engines); 49 CFR Part 579 (setting thresholds based on annual production for purposes of exempting manufacturers from NHTSA defect reporting requirements). [EPA-HQ-OAR-2010-0162-1812.2, p.17]

Finally, if EPA and NHTSA proceed with the SBA definition, the Agencies must better define the standards that small businesses must meet for purposes of demonstrating that they qualify as small businesses. As proposed, the regulations provide that manufacturers must provide a notification or correspondence to EPA, or NHTSA that "must include a description of the manufacturer's qualification as a small business" (in case of EPA), or "explain[ ] how they qualify as a small business as defined by the SBA…" (in the case of NHTSA). The requirements should spell out in greater detail what manufacturers must demonstrate, including requirements related to affiliation with other companies, and limitations on companies that attempt to spin-off entities for purposes of qualifying as small businesses. Finally, manufacturers should not be considered exempt unless and until EPA and NHTSA have made a formal determination as to their status as a small business. [EPA-HQ-OAR-2010-0162-1812.2, pp.17-18]

Volvo Group recognizes that small-volume manufacturers may need additional time to accommodate new engines, due to resource constraints, and proposes additional flexibility for small manufacturers, as also discussed below. [EPA-HQ-OAR-2010-0162-1812.2, p.21]

Volvo Group recognizes that the reasonable transition period defined above likely will not provide sufficient flexibility for small-volume manufacturers. Due to their size, these entities do not have the resources to commit to product design and development, and thus are challenged to design products that can accommodate new engines and technologies as quickly as larger manufacturers. These challenges are compounded by the fact that small-volume manufacturers may not be the highest priority for engine and parts manufacturers. Furthermore, because their volumes are low, according small-volume manufacturers additional time to transition to new standards should not present a significant impact to the environment. For these reasons, Volvo Group supports the inclusion of additional flexibility for small-volume manufacturers for purposes of enforcing the stockpiling prohibition. To prevent abuse, small-volume manufacturers should be limited to those with U.S. sales of 2,500 vehicles or less, and the reasonable transition period for these entities should extend through the third quarter of the year in which new standards take effect. [EPA-HQ-OAR-2010-0162-1812.2, pp.21-22]

In addition to providing insufficient protection for original manufacturers from the acts or omissions of secondary manufacturers, EPA's proposal fails to address how or if the Agency intends the small business exemption to apply to these entities. For instance, are secondary manufacturers that do not have substantial control over the design and assembly of emission controls – and thus cannot qualify as certificate holders – eligible for this exemption? If so, they would not be required to follow the original manufacturer's instructions with respect to certified vehicles. The original manufacturer, however, would have no way of knowing whether their failure to complete assembly of a vehicle to a certified configuration was an exempted act or a violation. This creates substantial uncertainty for original manufacturers and, given the number of secondary manufacturers that likely would qualify for the exemption, threatens to gut the regulation. Alternatively, if EPA intends to not exempt secondary manufacturers from the regulation, it should specifically state this in the regulation. The absence of such language will create substantial uncertainty for all regulated parties. [EPA-HQ-OAR-2010-0162-1812.2, p.29]

With respect to secondary manufacturers that have substantial control over the design and assembly of emission controls, and thus are eligible to certify vehicles, application of the small business exemption creates additional uncertainty. If such manufacturers qualify for the exemption, are they thus exempt from the certification requirements and in turn can avoid compliance entirely in circumstances where they can demonstrate such control? Such an outcome would create incentive for both original and secondary manufacturers to place substantial control over the design and assembly of emissions control with the secondary manufacturer. For instance, secondary manufacturers of vocational vehicles, for which compliance is determined solely through tire usage, could assume responsibility of tire selection for incomplete vehicles and thus gain substantial control. Not only would such an outcome undermine implementation of the standard, it also would put the few secondary manufacturers who do not qualify for the exemption at a substantial disadvantage as they would be forced to go through the certification process. [EPA-HQ-OAR-2010-0162-1812.2, p.29]

Response:

For the tractor and vocational vehicle categories and for engines, the agencies identified a small number of manufacturers that would appear to qualify as small businesses under the SBA size criterion, which were estimated to comprise a negligible percentage of the U.S. market.[76] Therefore, the agencies believed that deferring the standards for these companies at this time would have a negligible impact on the GHG emission reductions and fuel consumption reductions that the program would otherwise achieve. The agencies proposed to consider appropriate GHG emissions and fuel consumption standards for these entities as part of a future regulatory action.

The Institute for Policy Integrity (IPI) commented that the small business exemption proposed in the NPRM was based on the improper framework of whether the exemption would have a negligible impact, and did not adequately explain why the regulation of small businesses would face special compliance and administrative burdens. As noted above, small businesses make up a very small percentage of the market and are estimated to have a negligible impact on the emissions and fuel consumption goals of this program. For this first rulemaking, the application of technologies may be cost-prohibitive and infeasible for many small manufacturers. For example, the development of aerodynamic technologies for combination tractors requires significant costs associated with the research and development costs and the correlation of the manufacturer's method with the agencies' reference aerodynamic method. The short lead time to develop this proposal, the extremely small fuel savings and emissions contribution of these entities, and the potential need to develop a program that would be structured differently for them (which would require more time), all led to the determination that the inclusion of small businesses would not be appropriate at this time.

IPI also argued that the only proper basis for this exclusion would be if the agencies could explain how these burdens create costs that exceeded the benefits of regulation. While the agencies disagree that the only analysis should be of cost versus benefits, the agencies believe that much greater benefits will be achieved for initiating the program earlier with the exclusion of small businesses than for delaying the start of the program so that small business effects could be fully analyzed, enabling small businesses to be included in the initial program.

Volvo, Daimler, and EMA stated that by exempting small businesses based on the definition from SBA, the rules would create a competitive advantage for small businesses over larger entities. They commented that the exemption should not apply to market segments where a small business has a significant share of a particular HD market. The two examples provided in the comments applied to refuse haulers and buses, which fall into the vocational vehicle category. As adopted, vocational vehicle standards were premised solely on the use of low rolling resistance tires. The agencies have reviewed the availability of tires for both refuse haulers and buses and found that nearly all offerings tested met the tire rolling resistance target used to set the vocational vehicle standards; therefore, the agencies do not foresee any competitive advantage for small businesses that certify vocational chassis. In addition, EPA

[76] Two heavy-duty combination tractor and ten chassis manufacturers each comprising less than 0.5 percent of the total tractor and vocational market based on Polk Registration Data from 2003 through 2007, and three engine manufacturing entities based on company information included in Hoover's, comprising less than 0.1 percent of the total heavy-duty engine sales in the United States based on 2009 and 2010 EPA certification information.

developed the wide range of flexibilities in the primary program with large manufacturers in mind. Averaging, credit banking, and credit transfers, along with the opportunity to generate credits such as early, innovative and advanced technology credits, will provide full-line manufacturers with sufficient flexibility to transition to the new standards. Smaller volume manufacturers have less ability to use some of these flexibilities due to their narrow product lines. For example, averaging and credit transfers are less helpful to such manufacturers. Finally, if all manufacturers were allowed to use the small business provision, the stringency of the overall program would be significantly reduced and EPA would forego emissions reductions that are feasible and cost effective during the early years of the program.

Volvo argued that the exempted businesses could expand their product offerings or sell vehicles on behalf of larger entities, thereby inappropriately increasing the scope of the exemption. The agencies continue to believe that the benefits of this exemption approach outweigh the risks of adverse consequences. The agencies anticipate that the gain a manufacturer might achieve by restructuring its practices and products to circumvent the standards (which for vocational vehicles simply means installing low rolling resistance tires) in the first few years of this program will be outweighed by the costs, particularly as small businesses anticipate their potential inclusion in the next rulemaking. For example, the agencies would expect additional costs for a spin-off company would include the creation of dealer and parts distribution networks.

Volvo also commented that the agencies should spell out the requirements for the exemption in greater detail. The agencies agree that this may help to clarify the process. As suggested by Volvo, the agencies will consider affiliations to other companies and evidence of spin-offs for the purpose of circumventing the standards in determining whether a business qualifies as a small entity for this exemption. Each declaration must be submitted in writing to EPA as prescribed in Section V of the preamble, and a manufacturer would not be considered exempt until EPA and NHTSA have made a formal determination as to their status in writing. As the agencies gain more experience with this exemption, these clarifications may be codified in the regulatory text of a future rulemaking.

Volvo further commented that the agencies were adopting a definition of “small business” in order to avoid doing a Small Business Regulatory Enforcement Fairness Act (SBREFA) and Regulatory Flexibility Act (RFA) analysis. The agencies proposed and are finalizing a definition of small business which the Small Business Administration codified at 13 CFR 121.201, as authorized under the Small Business Act. Similar provisions have been used by EPA in past rulemakings, such as in the Nonroad Spark-Ignition Engine and Equipment Final Rule (see 73 FR 59034, October 8, 2008, at 59286). The agencies would like to reiterate that they have decided not to include small businesses at this time due to the factors described above. The discussion on an RFA analysis is laid out in Section IX(4) of the preamble.

Volvo also commented about the ability and requirements of secondary manufacturers to obtain the small business exemption. The agencies have clarified in the final rulemaking that secondary manufacturers may obtain a small business exemption, as stated in §1037.620.

The agencies continue to believe that deferring the standards for companies meeting the small business definition will have a negligible impact on the GHG emission reductions and fuel consumption reductions that the program would otherwise achieve. Therefore, the final rules include the small business exemption as proposed. The specific deferral provisions are discussed more detail in Section II of the preamble.

The agencies will consider appropriate GHG emissions and fuel consumption standards for these entities as part of a future regulatory action.

16. Flexibilities

Organizations Included in this Section:

American Automotive Policy Council
American Council for an Energy-Efficient Economy
Eaton Corporation
Engine Manufacturers and Truck Manufacturers Associations
Ford Motor Company
Motor & Equipment Manufacturers Association
Navistar, Inc.

Organization: American Automotive Policy Council

Given that this is the first ever greenhouse gas and fuel consumption rule for medium- and heavy duty engines and vehicles, we support the flexibilities noted as a means to address the inherent new program uncertainties and ensure a successful program. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The function of flexibility mechanisms is to allow maximum savings at reduced cost. The proposed rule sets out stringency requirements that in most cases challenge the industry, not to improve technology, but only to adopt technologies that are readily available. In these circumstances, flexibility mechanisms will simply allow some vehicles that could easily be upgraded to remain inefficient and promote the use of advanced technologies to offset the high fuel consumption of these lagging vehicles, rather than to achieve additional fuel savings. The proposed flexibilities would be better justified if the stringency of the standards were increased, as discussed previously. [EPA-HQ-OAR-2010-0162-1894.1, p.23]

Organization: Eaton Corporation

Eaton strongly supports the Agencies decision to include several regulatory flexibility provisions in the proposed rule. Several of these provisions are critical to providing the OEMs with alternative compliance pathways while incentivizing the early introduction of advanced and innovative technologies and rewarding over-compliance with the rule’s GHG and fuel efficiency standards. [EPA-HQ-OAR-2010-0162-1649.1, p.3]

Organization: Engine Manufacturers and Truck Manufacturers Associations

General Flexibility Provision Issues EMA and TMA strongly support the inclusion of flexibility provisions, such as ABT, early credits, and advanced and innovative technology credits, in the final rule. The flexibility that those provisions allow will enable engine and truck manufacturers to continue providing commercial vehicles that are built to their customers' precise specifications. However, there are a number of instances where the proposed flexibility provisions are written too narrowly to achieve their intended purpose. To make those provisions workable and effective, the Agencies, at a minimum, must modify the flexibility provisions as outlined in the following discussion. [EPA-HQ-OAR-2010-0162-1940.1, pp.8-9]

Organization: Ford Motor Company (Ford)

Ford supports the range of flexible compliance mechanisms included in the proposal and believes that these mechanisms will be key to the management of our fleet as the new requirements are phased-in. Ford urges the agencies to consider additional compliance flexibilities as detailed in the AAPC comments and the individual feedback provided in the attachment. [EPA-HQ-OAR-2010-0162-1761.1, p.2]

Organization: Motor & Equipment Manufacturers Association (MEMA)

The agencies' considerations for applying flexibility provisions in the form of credits are supported by MEMA and we encourage their application. MEMA believes that these credits/flexibilities are absolutely necessary not only to help various advanced technologies penetrate the marketplace, but also to encourage continuous innovation and improvements. [EPA-HQ-OAR-2010-0162-1752.1, p.2]

Organization: Navistar, Inc.

For instance, Navistar is encouraged by the Agencies' efforts to provide program flexibilities. We firmly believe that compliance flexibility breeds technology innovation and achieves overall environmental goals in a timely, efficient, and cost effective manner. [EPA-HQ-OAR-2010-0162-1871.1, p.1]

Navistar strongly supports the current flexibilities built into the proposed rule, but EPA must expand them. Even from EPA's perspective, the "very aggressive" timing of the proposed standards is only possible with substantial flexibilities. In short, the proposed standards are only "technologically feasible" with the flexibility built into the rules, including all of the proposed flexibilities and others as set out in this comment. Furthermore, the proposed standards are only "technologically feasible" if all of the engine manufacturers are able to use existing technologies to meet the new GHG standards. [EPA-HQ-OAR-2010-0162-1871.1, p.5]

Response:

For each of the heavy-duty vehicle and heavy-duty engine categories for which we are adopting respective standards, EPA and NHTSA are also finalizing provisions designed to give manufacturers a degree of flexibility in complying with the standards. These final provisions have enabled the agencies to consider overall standards that are more stringent and that will become effective sooner than we could consider with a more rigid program, one in which all of a manufacturer's similar vehicles or engines would be required to achieve the same emissions or fuel consumption levels, and at the same time. We believe that incorporating carefully structured regulatory flexibility provisions into the overall program is an important way to achieve each agency's goals for the program.

NHTSA and EPA are adopting flexibility provisions which are essentially identical to each other in structure and function. For combination tractor and vocational vehicle categories and for heavy-duty engines, we are finalizing four primary types of flexibility: averaging, banking, and trading (ABT) provisions; early credits; advanced technology credits (including hybrid powertrains); and innovative technology credit provisions. The ABT provisions are patterned on existing EPA ABT programs and will allow a vehicle manufacturer to reduce CO_2 emission and fuel consumption levels further than the level of the standard for one or more vehicles to generate ABT credits. For HD pickups and vans, we are adopting a fleet averaging system very similar to the light-duty GHG and CAFE fleet averaging system. EPA is also adopting a provision where engine manufacturers have the opportunity to generate CO_2 credits for very low N_2O emissions.

The agencies offer a variety of ABT and additional flexibilities to provide additional incentives to use existing technologies and deploy these technologies in a growing number of applications. The agencies also offer credit incentives to spur technological research and application. Flexibilities such as the Innovative Technology Credit program, provide an opportunity for manufacturers to develop and offer technologies whose effects are not represented in the agencies' current regulatory test cycles or predictive models. These credits are not limited to currently existing technologies but may be awarded to any new technology and additional test procedure that captures that technologies affect.

Organization: Institute for Policy Integrity

Although the proposed regulations fulfill EPA's legal duty under Section 202 of the Clean Air Act with respect to most heavy-duty vehicles, the program does not reach an efficient level of greenhouse gas reductions in the transportation sector. The proposal does not create a uniform regulatory framework applicable to all mobile sources and does not effectively maximize social welfare or minimize costs. In April 2009, Policy Integrity submitted a rulemaking petition to EPA requesting the creation of a comprehensive cap-and-trade system under Section 211 of the CAA for vehicle fuel used in all mobile sources. A cap-and-trade rulemaking would be more effective at addressing greenhouse gas emissions of all mobile sources, including sources such as off-road vehicles and marine vessels, which are not currently covered. It would also allow EPA to regulate emissions at the source of fuel sale, manufacture, and import rather than requiring piecemeal command-and-control regulation of various vehicle sectors. The details and statutory authority for such a program are more clearly outlined in Policy Integrity's petition, available online. [EPA-HQ-OAR-2010-0162-1895.1, pp.13-14]

Response:

The actions that EPA is taking today are not intended to specifically respond to the 2009 IPI petition. The agency will consider the comments provided by IPI in the context of our ongoing review of the aforementioned petition.

16.1. Averaging, Banking, and Trading (ABT)

16.1.1. Credit Life

Organizations Included in this Section:

Daimler Trucks North America
Center for Biological Diversity
Cummins
Navistar, Inc.

Organization: Daimler Trucks North America

How credits are treated in the next phase of the GHG regulatory program should be handled when the Agencies propose the next phase so that we can understand the full impact of whatever approach the Agencies take at that time. This rule should not specify how credit balances will be treated in subsequent rules. [EPA-HQ-OAR-2010-0162-1818.1, p.58]

EPA and NHTSA propose to allow manufacturers no more than three model years after the shortfall was incurred to reconcile GHG deficits in ABT programs. We agree that the proposed timeframe is reasonable for manufacturers to reconcile deficits. [EPA-HQ-OAR-2010-0162-1818.1, p.34]

Organization: Center for Biological Diversity

Deficit “carry-back” credits must be removed. As proposed, manufacturers who fail to comply with the standards for up to three years could earn credits if they exceed the standards in the following year, and use these credits to avoid penalties for having failed to comply in the preceding years. “Carry-back” credits, however, undermine the purpose of the Agencies’ efforts not only because they would incentivize delays in investment and technological innovation and thus undercut EPCA’s and EISA’s intent, but also because the benefits of avoiding the emission of a ton of greenhouse gases today exceed the benefits of avoiding the release of the same ton several years from now. In fact, the Proposed Rule already recognizes this fact but fails to apply it. As the Proposed Rule notes, GHGs remain in the atmosphere for decades and, in the case of CO2, for millennia: “As a substantial portion of CO2 emitted into the atmosphere is not removed by natural processes for millennia, each unit of CO2 not emitted into the atmosphere avoids essentially permanent climate change on centennial time scales.” As a consequence, remedial efforts get more expensive the longer they are delayed: 'The SCC increases over time because future emissions are expected to produce larger incremental damages as physical and economic systems become more stressed as the magnitude of climate change increases.” Even disregarding the potential of triggering catastrophic events and assuming arguendo that the SCC grows by no more than a linear 3% per annum as the Agencies assume, it is undoubtedly vastly less costly to remove a given ton of carbon in Year 1 rather than in Year 4, when it has wrought that much more damage.50 Moreover, as the Agencies have acknowledged elsewhere, “voluntary non-compliance is impermissible for the GHG standards proposed under the CAA.” In sum, deficit “carry back” credits are bad economic and environmental policy as well as in violation of EPCA, EISA and the CAA. [EPA-HQ-OAR-2010-0162-2506.1, p.12]

Lastly, while over-compliance “carry forward” credits (i.e., the ability to apply credits for over-compliance in Year 1 to remedy compliance failures in Year 1+n) are commendable within limits because they indeed incentivize early technological investment and innovation, and initially accelerate the rate of removal of GHGs from the atmosphere, allowing such “carry forward” credits for more than a year or two is excessive. Long “carry forward” periods simply remove the incentive to incorporate newly developed technology into the nation’s vehicle fleet and, after the initial spurt, stagnate rather than drive progress. These detriments could be balanced against the evident benefits of limited “carry forward” credits by selecting a short application period. Moreover, no such credits should be allowed unless a manufacturer can demonstrate additionality and quantify and verify the amount by which its performance actually exceeds the standard.

Organization: Cummins, Inc

Cummins opposes placing expiration dates on credits (see § 1036.740(b), § 1037.740(b) and § 86.1865-12(k)(6)) for any of the regulatory categories as it could stifle innovation, especially in the later years of the program, if manufacturers do not foresee an opportunity to use credits that could be generated. [EPA-HQ-OAR-2010-0162-1765.1, p.14]

Organization: Navistar, Inc.

As noted above, Navistar strongly supports an ABT program for GHG emissions and fuel consumption. Navistar has made a number of comments regarding the necessity of improving the flexibility of the Agencies' ABT programs and, thus, creating a better structure for complying, in the limited lead time provided, with the new stringent GHG emission and fuel consumption standards. Consistent with expanding flexibility, the Agencies must also revise the 5-year credit expiration date limit with respect to heavy-duty pickup trucks and vans. There should be no artificial expiration date for earned credits. [EPA-HQ-OAR-2010-0162-1871.1, p.60]

Response:

Under previous ABT programs for other rulemakings, EPA and NHTSA have allowed manufacturers to carry forward credit deficits for a set period of time – if a manufacturer cannot meet an applicable standard in a given model year, it may make up its shortfall by overcomplying in a subsequent year. In the NPRM the agencies proposed to allow manufacturers of engines, tractors, HD pickups and vans, and vocational vehicles to carry forward deficits for up to three years before reconciling the shortfall, but sought comments on alternative approaches for reconciling deficits. DTNA supported the three year period and stated that it was sufficient for reconciling deficits. The agencies have therefore included in the final rule the proposed 3 year reconciliation period. However, the agencies' respective credit programs require manufacturers to use credits to offset a shortfall before credits may be banked or traded for additional model years. This restriction reduces the chance of manufacturers passing forward deficits before reconciling shortfalls and exhausting those credits before reconciling past deficits.

In response to CBD's comment about the carry-back and carry-forward provisions, these provisions have enabled the agencies to consider overall standards that are more stringent and that will become effective sooner than we could consider with a more rigid program, one in which all of a manufacturer's similar vehicles or engines would be required to achieve the same emissions or fuel consumption levels, and at the same time. [77] We believe that incorporating

[77] NHTSA notes that it has greater flexibility in the HD program to include consideration of credits and other flexibilities in determining appropriate and feasible levels of stringency than it does in the light-duty CAFE program. *Cf.* 49 U.S.C. 32902(h), which applies to light-duty CAFE but not heavy-duty fuel efficiency under 49 U.S.C. 32902(k).

carefully structured regulatory flexibility provisions into the overall program is an important way to achieve each agency's goals for the program. The agencies are sympathetic to the Center for Biological Diversity's concern that allowing credit carry forward and the ability to reconcile a past deficit within our ABT program may delay or stagnate compliance with the HD GHG standards. Without ABT provisions (and other related flexibilities), however, standards would typically have to be numerically less stringent since the numerical standard would have to be adjusted to accommodate issues of feasibility and available lead time. A deficit for not meeting the standards is only allowed to accrue for up to three years before such a deficit must be rectified. Further, any credits earned in the interim must first be used to rectify the deficit before it may be used for any averaging or trading purpose. The agencies are also equipped with various compliance penalties that greatly reduce the appeal of not rectifying a deficit. Were we not to provide for some degree of limited deficit carry-forward as proposed, we would have to either set less stringent standards or a slower phase-in, with adequate conservatism built in to make the standards feasible across this diverse industry sector. Deficit carry-forward works with this diversity, such that some manufacturers may accrue a deficit and others not, rather than all manufacturers working toward a slower phase-in. These flexibilities, taken together, provide a method for reducing HD GHG emissions in an accelerated time frame. When examined in the context of the impact of these reductions over the lifetime of the vehicles, the very long residence time of CO2 emissions in the atmosphere, and the increase in SCC over time discussed by commenters, this acceleration of GHG reductions can have significant beneficial impacts.

For the heavy-duty pickup and van category, the agencies proposed a 5-year credit life provision, as adopted in the light-duty vehicle program. Navistar requested that the agencies drop the 5-year credit expiration date proposed for the heavy-duty pickup and van category and not specify an expiration date for earned credits. The agencies disagree. The 5-year credit life is substantial, and allows credits earned early in the phase-in to be held and used without discounting throughout the phase-in period. We do not see how extending the life of credits can assist manufacturers in dealing with lead time issues under these rules since generated credits would already be available in all model years covered by the standards.

For engines, vocational vehicles and tractors, EPA also proposed that CO_2 credits generated during this first phase of the HD National Program could not be used for later phases of standards, but NHTSA did not expressly specify the potential expiration of fuel consumption credits. DTNA and Cummins requested that the agencies' surplus credits not expire. DTNA suggested that the agencies drop any reference to credit expiration until the next rulemaking, at which time the agencies would have a better understanding of actual credit balances and what kind of lifespan for credits might be necessary or appropriate. DTNA argued that in some of EPA's past programs, EPA had delayed a final decision about credit expiration until development of the subsequent rule when, EPA had a better understanding of associated credit balances, along with the stringency of the standards being proposed for future model years. EPA had proposed to limit the lifespan of credits earned to the first phase of standards in the interest of ensuring a level playing field before the next phase begins. Upon further consideration, the agencies recognize that this is a new program and it is unknown whether any manufacturers will have credit surpluses by the end of the first phase of standards, much less whether some manufacturers will have significantly larger credit surpluses that might create an unlevel playing field going into the next phase. The agencies are adopting a 5-year credit life provision, as adopted in the light-duty vehicle program and proposed and adopted for the HD pickup trucks and vans. Consistent with past EPA practice, the agencies will address credit life in any follow-on rulemaking. Note, however, that manufacturers have no property right in these credits, so no issues of deprivation of property arise if later rules choose not to recognize those credits. See 69 FR at 39001-002 (June 29, 2004).

16.1.2. **ABT Reporting**

Organizations Included in this Section:

Cummins, Inc.
Daimler Trucks North America

Organization: Cummins, Inc.

Manufacturers should not be required to track in what kind of vehicles engines are installed if the engines do not participate in ABT

The Agencies propose in § 1036.230(b) that for engines that are certified to both vocational and tractor standards, manufacturers will be required to identify the type of vehicle in which each engine is installed. The Agencies should clarify that this is only required for engines that participate in ABT, as it is not otherwise necessary. [EPA-HQ-OAR-2010-0162-1765.1, p.14]

Organization: Daimler Trucks North America

In §1036.230 (b), EPA describes requirements for reporting sales volume information for engine families that are certified as both a tractor and vocational engine. Specifically the language requires that manufacturers must split the family into two separate subfamilies and that the manufacturer must identify the type of vehicle in which each engine is installed. We agree that this requirement is appropriate when an ABT program involves the subject engine family. However, for an engine family that certified both as a vocational and tractor but is not part of an ABT program there is no reason to require such tracking. Therefore we recommend that EPA include clarifying language that excludes such engine families from this requirement. [EPA-HQ-OAR-2010-0162-1818.1, p.34]

Response:

The commenter has suggested some confusion in the language of the proposed HD GHG rule and the agencies have modified the regulatory text accordingly. EPA has clarified in §1036.230(b) that if an engine family is certified for use in both vocational vehicles and tractors, then the tracking of the type of vehicle that the engine is installed in is only required if the manufacturer is participating in the ABT program.

Organization: American Automotive Policy Council

AAPC believes that it is unreasonable for the agency to limit the time provided for a manufacturer to correct a mistake which erroneously decreases the balance of emission credits [§ 1037.730(f)(2)], but to provide no limitation for cases where an error increases the balance of emission credits [§ 1037.730(f)(3)]. We recommend that both parties be permitted to correct errors for the period of time which average, banking, and trading flexibilities could be applied to the model year in question. [EPA-HQ-OAR-2010-0162-1762.1, p.24]

AAPC believes that it is unreasonable to potentially disallow a correction if an erroneous negative balance of emission credits is reported. Given the severe potential penalties associated with a negative balance of emission credits, manufacturers should be provided the same opportunity for correction as in the case of an error which decreased the balance of emission credits, but did not result in a negative balance. AAPC recommends striking the sentence "If you report a negative balance of emission credits, we may disallow corrections under this paragraph (f)(2)." from subparagraph (f)(2) of § 1037.730. [EPA-HQ-OAR-2010-0162-1762.1, p.24]

Response:

The commenter has requested that the Agency consider a fundamental policy change to the ABT program that would be inconsistent with the existing criteria pollutant program. Consistent with Agency policy for the existing criteria pollutant program, the date for final reports will remain fixed at 270 days. Additionally, changes that have a positive impact that are realized after the due date for the final report will not be included in the credit balance calculation. This approach is both consistent with existing Agency policy and is protective of the environment. This approach also continues to facilitate a level playing field for ABT accounting between manufacturers by allowing for a clear cut-off date that everyone in the industry will be responsible for meeting rather than alternate reporting end dates due to late updates from individual manufacturers.

Organization: Green Truck Association (GTA)

We encourage the agencies to modify the averaging, banking and trading system such that entities installing fuel saving components after the chassis has been completed be recognized and rewarded. Technology and alternative fuels should be on a level playing field. The intermediate and final stage manufacturers and alterers should be allowed appropriate incremental credits for the incremental improvements in fuel efficiency and greenhouse gas reduction they can demonstrate over and above the OEM certified truck. [EPA-HQ-OAR-2010-0162-1596.1, p.4]

Response:

The agency welcomes innovation and the use of advanced technology to achieve greater greenhouse gas emission reductions and improved fuel consumption performance. To that end, the Agency has provided for additional incentive for the use of Advanced Technology Credits, as well as Innovative Technology Credits which have the intent of providing an additional incentive for those market participants that choose to innovate to achieve reductions beyond those technologies that the agency identifies as readily available. The advanced technologies include hybrid systems, as well as engines equipped with Rankine cycle strategies, all electric vehicles, and fuel cell vehicles. For those technologies which offer improvements and benefits that are not currently reflected by or included in the existing test cycles or as an input to the GEM, manufacturers may choose to obtain innovative technology credits. Should a manufacturer choose to certify using either of these options, they are free to do so whether they are the original equipment manufacturer or a secondary manufacturer. Any certificate holder will need to meet the obligations associated with certification to obtain credits.

Organization: Navistar, Inc.

EPA proposes that in the event of credit shortfalls, vehicle or engine certificates are “void.” These provisions must be revised and clarified to avoid due process violations and underground nullification of the ABT program. For instance, EPA proposes that the vehicle certificate “is void” – not simply “voidable” – for a vehicle family if there are insufficient credits for that model year. Although EPA probably means that the certificate is voidable upon the initial shortfall and becomes void after EPA’s finding that the shortfall was not corrected, this is not clear from the language in the proposed provisions. The actual regulations should be clear on this point, or the ABT program will be undermined as a practical matter. [EPA-HQ-OAR-2010-0162-1871.1, p.20]

In addition, the Proposed GHG Rule fails to make clear that certificates cannot become void by operation of law but only by EPA action issuing such a finding. If EPA intended that certificates would become void without EPA action, then the provisions also must be revised to avoid due process violations and underground nullification of the ABT program. EPA action is required, and the regulations must make clear the form of such findings and on what criteria/facts EPA will base its findings. This problem is not remedied by EPA proposing to incorporate the definition of the term “void” from part 1068, which appears to contemplate action by EPA. Any final rule must make clear that EPA action is required to void a certificate. [EPA-HQ-OAR-2010-0162-1871.1, pp.20-21]

The substantial defects in this proposed regulatory regime are demonstrated by a comparison with the provisions governing year-end credit shortfalls. In a situation where a manufacturer faces a shortfall for an engine or vehicle family in the first year, does this provision render a vehicle legally inoperable? Can a manufacturer sell or deliver vehicles covered by that certificate? Can dealers sell those vehicles? Does a manufacturer have to assume its certificates are void or can it expect EPA to make that determination? Can a manufacturer request a hearing if EPA makes a determination? Can this vehicle be legally resold with a void or voidable certificate? Must the certificate status be disclosed by the manufacturer to customers? Must it be disclosed by the current owner to purchasers? These are just some of the unanswered questions that arise. Each of these questions carries very substantial legal and commercial consequences. [EPA-HQ-OAR-2010-0162-1871.1, p.21]

Navistar recognizes that EPA has used this concept elsewhere in mobile source regulations; however, it is unworkable in this context and will discourage the use of the ABT program itself. Shortfalls should be addressed with limits or conditions on certifications going forward. A backward looking provision will unlawfully punish third parties, such as fleets needing these vehicles for revenue generating service. [EPA-HQ-OAR-2010-0162-1871.1, 21]

In both the engine and vehicle proposed standards, reports are to include projected and actual production volumes. However, projected volumes may well need to be recalculated numerous times during the year to account for changes in market activity. This reporting requirement should be limited to only the initial production volume projection included in the application for certification, rather than encompassing production volume projection updates throughout the year. Retention of records for eight years is also overly burdensome. Record retention requirements should comport with the general federal statute of limitations, i.e., five years. 28 U.S.C. § 2462. [EPA-HQ-OAR-2010-0162-1871.1, p.21]

Response:

The Agency appreciates the concerns broached with the request to limit the number of reports provided to the Agency. The Agency views the pre-model year report as a tool that helps to ensure the manufacturer is projecting compliance or a plan for compliance as it begins production for each model year. The Agency also views the end of year report as a way to reconcile the planned performance for the model year with the actual report. Given potential participation in ABT and processing time for generating a reconciled report that is completely accurate, the Agency provides for a final report beyond the end of year report as an opportunity for the manufacturer to ensure the accuracy of the data reported to the Agency in the end of year report. The Agency requires that the manufacturer keep the records required in the regulations for at least eight years after the due date for the end-of-year report. The manufacturer may not use emission credits for any vehicles if all the records required under this section are not kept. Therefore, these records must be kept to continue to bank valid credits. These records may be stored in any format and on any media, as long as they can be promptly sent to us as organized, written records in English if we ask for them. These records readily available as the Agency may review them at any time. Record retention is a critical tool for ensuring a level playing field between participants in this program so information submitted to the Agency may be validated. As discussed on 40 CFR 1036.745, the agency may void certificates for which sufficient credits do not exist by the deadline for submitting final reports.

16.1.3. Credit Fungibility

Organizations Included in this Section:

American Trucking Associations, Inc.
Autocar, LLC
Center for Biological Diversity
Cummins, Inc.
Daimler Trucks North America
Engine Manufacturers and Truck Manufacturers Associations
Ford Motor Company
National Automobile Dealers Association
Natural Gas Vehicle Interests
National Truck Equipment Association
Natural Resources Defense Council
Navistar, Inc.
New York State Department of Transportation and Environmental Conservation
New York State Energy Research and Development Authority
Odyne
Oshkosh Corporation
Plass, B.
Union of Concerned Scientists
Volvo Group

Organization: American Trucking Associations, Inc. (ATA)

OEM's use of Average Banking & Trading (ABT) credits is rather restrictive. Given that credits are restricted to averaging sets. ATA believes that credits should be used within a vehicle gross vehicle weight rating category, including across vocational vehicles and tractors, and separately within an engine's primary intended service class. For further clarification, ATA supports the trading of ABT credits within weight classes such as Class 8 (heavy-heavy), Classes 4-7 (medium-heavy), and Classes 2b-3 (light-heavy). The agencies should build flexibility into the rule to assist OEM's in achieving their GHG and fuel consumption goals regardless of what path OEM's must take to get there. [EPA-HQ-OAR-2010-0162-2263.1, p.15]

Organization: Autocar, LLC

The separation between the engine and vehicle programs should remain consistent throughout the Proposed Regulations. With regard to utilization of credits, if credits are allowed to be fungible across engines and vehicles, then the regulatory structure proposed by EPA and NHTSA would be severely compromised. This could disrupt existing market structures and disadvantage vocational manufacturers to larger more integrated companies that could use their broader product range and vehicle improvement opportunities to create an unlevel playing field. The result would be detrimental to small businesses, such as Autocar, and contrary to Presidential and Congressional initiatives to support small businesses and advance their roles in the development of green technology and jobs. [EPA-HQ-OAR-2010-0162-1617.1, p.2]

The trading of credits between engines and vehicles and broadly across classes should not be allowed in the base program or the advanced and innovative technology programs. While it is important to have provisions that incentivize technologies, broad credit fungibility could have severe unintended consequences. As proposed, there seems to be the right limitations in the regulation for the base credit and innovative technology programs, but the advanced technology program needs to be aligned with them to provide similar restrictions and limitations. [EPA-HQ-OAR-2010-0162-1617.1, pp.2-3]

The Proposed Regulations credit the use of hybrid technology as a technology that can reduce emissions and fuel consumption. 2 Hybrid-powered refuse vehicles derive environmental benefit through energy recovery and engine use reduction, thus further supporting separate engine and vehicle credits. However, hybrid technology is currently available in a limited supply to the refuse industry. Credits should also be made available to chassis manufacturers for installing compressed natural gas (CNG) and liquefied natural gas (LNG) engines in their vehicles. CNG and LNG engines are proven to emit 60-90% less smog-producing pollutants and 30-40% less greenhouse gas emissions than gasoline or diesel engines. [EPA-HQ-OAR-2010-0162-1617.1, p.3]

/2/ As currently designed for use in refuse vehicles, hybrid technology captures normally-wasted energy from braking, converting that energy into available power to accelerate or drive the vehicle, thus reducing fuel consumption and emissions. Of note, the dynamometer testing methodologies required in order to earn “advanced technology” credits for incorporating hybrid power trains do not accommodate the braking, load and terrain factors that are integral to measuring the gains derived from hybrid refuse vehicles. The dyno testing will not demonstrate actual improvements in CO_2 emissions and fuel consumption. [EPA-HQ-OAR-2010-0162-1617.1, p.3]

Organization: Center for Biological Diversity

Because it offers manufacturers various credits, averaging, banking and trading, and the option to pay penalties rather than comply with the proposed standards, the resulting rulemaking will likely increase emissions and decrease fuel efficiency of HD Vehicles. This is especially true since the Agencies correctly note that the costs of the efficiency improvements mandated by the rulemaking are already so low, and in fact cost negative, that cost concerns should not drive further allowances; thus, the Agencies themselves conclude that averaging, trading and banking should be permitted only if they achieve a “net reduction in emissions and fuel use.” We fully concur. [EPA-HQ-OAR-2010-0162-2506.1, p.11]

We also note that the Agencies appear to use credits as a substitute for appropriate technology-forcing standards. For example, in proposing credits for improving trailer fuel efficiency, the Agencies state that these credits are designed to act as “incentives … to advance new, clean technologies, or [the application of] existing technologies earlier than they would otherwise” be implemented. Again, the Agencies misperceive their statutory mandate, which requires them to set aggressive standards that force technological innovation and early technology adoption, rather than accommodate the opportunity for industry to simply keep doing business as usual. In the case of trailer fuel efficiency measures, this substitution is especially ill conceived, since the technologies at issue already exist. While credits for the application of technologies still in the research phase may be appropriate, they should not be employed as a cover for the Agencies’ failure to appropriately weigh the statutory factors to implement maximum fuel efficiency standards. [EPA-HQ-OAR-2010-0162-2506.1, p.11]

Organization: Cummins Inc.

Cummins considers ABT to be an important and necessary part of any regulatory program. ABT encourages earlier implementation of new technologies, allows manufacturers flexibility in planning their investments and managing product costs and provides relief on technical and leadtime issues. We support the inclusion of ABT provisions in this rulemaking. As described below, we agree with many aspects of the proposed ABT program for GHG/FC and recommend changes that make the program more cost-effective without sacrificing the sought after environmental benefits. [EPA-HQ-OAR-2010-0162-1765.1, pp.10-11]

The Agencies are proposing that credits may not be averaged, banked or traded across the regulatory categories of engines, vehicles and HD pickups and vans (see 75 FR 74250 – 74254). Cummins strongly supports these restrictions. Flow of credits between engines and vehicles is problematic for a variety of reasons. [EPA-HQ-OAR-2010-0162-1765.1, p.11]

First, if credits can be exchanged between engines and vehicles, then there is a de facto complete vehicle standard. The vehicle manufacturer, not EPA or NHTSA, becomes the de facto regulator of the manufacturer supplying the engines. [EPA-HQ-OAR-2010-0162-1765.1, p.11]

Second, engines would no longer have a clear standard as their compliance would be interrelated with those improvements made on vehicles. This would introduce a great deal of uncertainty that would restrict investment in engine technology development. Suppliers could also be negatively affected as they would struggle to plan in the absence of certainty about the coming engine technologies to be deployed broadly in the market. [EPA-HQ-OAR-2010-0162-1765.1, p.11]

Third, engines would depend on vehicle improvements for their compliance, leading to a much higher compliance bar for vehicles. By relying on existing protocols, the Agencies have a great deal of confidence in the engine program for GHG/FC. Engines will be tested accurately, and a variety of established measures will ensure compliance to the standards on a wide range of vehicles. However, if improvements on the engine do not have to be made because of reductions achieved on the vehicle, then a more thorough and tough vehicle compliance and enforcement program would need to be developed and implemented. It also raises the question about what requirements would fall to the end-user since they could change these vehicle attributes that the engine is relying on for its compliance. [EPA-HQ-OAR-2010-0162-1765.1, p.11]

Next, there are major implementation issues. Engine and vehicle credits are not equal because of the differences in the rigor and accuracy of testing, certification and enforcement. Additionally, the proposed regulation includes dissimilar methods for accounting for engine and vehicle performance that do not allow for a one-to-one comparison. For a ton of carbon dioxide (CO2) from the engine to “equal” a ton of CO2 from the vehicle, the emissions must be accurately and consistently measured, and compliance must be verified in a common way with equal integrity. [EPA-HQ-OAR-2010-0162-1765.1, p.11]

And finally, it raises fairness concerns. Competitive issues in the market are magnified if credits can flow between engines and vehicles as some companies only make engines, others only make vehicles and some manufacture both. Even for those that make both, companies do not have homogeneous engine and vehicle offerings, potentially providing some manufacturers with a competitive advantage. [EPA-HQ-OAR-2010-0162-1765.1, p.12]

In conclusion, Cummins agrees with the reasons given by the Agencies in the Preamble for proposing boundaries between engine and vehicle credits and strongly urges the Agencies to maintain those boundaries in the final rule.

For engines, the Agencies propose that credits be restricted for use within the separate diesel engine subcategories of light heavy-duty (LHD), medium heavy-duty (MHD) and heavy heavy-duty (HHD) (see 75 FR 74251 – 74252). This aligns with the restrictions that currently exist for criteria pollutant credits. Cummins strongly supports restricting credits from moving across LHD, MHD and HHD boundaries as it recognizes the differences in useful life among those subcategories and maintains a level playing field for manufacturers without product offerings in all the subcategories. Maintaining these boundaries on credits also promotes technology development in each of the subcategories, rather than allowing a manufacturer to focus development efforts in one area at the expense of another. [EPA-HQ-OAR-2010-0162-1765.1, p.12]

EPA proposes in § 1036.740(a) to restrict credit usage between tractor and vocational subcategories in an intended service class, e.g., no credits exchange between MHD tractor engines and MHD vocational engines. Tractor engines and vocational engines within the same primary intended service class share the same useful life and may in fact share the same GHG/FC and criteria pollutants emission control technologies. Cummins therefore proposes that credits be allowed to be exchanged between tractor engines and vocational engines in the same subcategory, e.g., HHD tractor engines and HHD vocational engines should be in the same averaging set. If the Agencies have concerns about differences in the GHG/FC standards or customer use patterns between tractor engines and vocational engines, it may be appropriate to consider applying a conversion factor when exchanging credits, such as a multiplier that is based on the ratio of the tractor and vocational standards. [EPA-HQ-OAR-2010-0162-1765.1, p.12]

Cummins recommends modifying § 1036.740(a) to allow credits to be exchanged between tractor engines and vocational engines within a service class which would also fix the misalignment between EPA and NHTSA on the engine ABT subcategories. [EPA-HQ-OAR-2010-0162-1765.1, p.13]

Cummins urges the Agencies to work with their counterparts in Canada to ensure that any GHG/FC program that they may consider and adopt is fully aligned and harmonized with the HD National Program. As a result of this harmonization, the ABT program should base the calculation of credits on production volumes from both countries to simplify the gathering of location information. [EPA-HQ-OAR-2010-0162-1765.1, p.14]

Organization: Daimler Trucks North America

The Agencies' Program Would Be Better If It Allowed The Use Of A Real Engine In GEM Or Allowed Credit Trading Between Engines And Vehicles. [EPA-HQ-OAR-2010-0162-1818.1, p.13]

The Agencies have created two parallel programs for HDEs and HDVs. The engine program credits manufacturers for engine-only CO2 or fuel consumption savings but not for full powertrain savings nor for savings due to (for example) more efficient engine accessories. The vehicle program credits manufacturers only for vehicle technologies such as aerodynamics and speed limiters but not for powertrain savings nor for engine accessories, engine cooling strategies, transmission shift strategies, nor a host of other technologies that involve engine and vehicle systems integration. Rather, the Agencies' model, GEM, assumes preselected fuel maps and powertrain characteristics. So, if engine and vehicle manufacturers invest in technologies to improve the efficiency of engine accessories, powertrains, cooling, etc., or if engine manufacturers optimize their engines' fuel maps to improve efficiency over drive cycles like the EPA's, the manufacturers cannot get CO2 or FE credits for such improvements. See our further discussion and suggestions relating to this issue in the GEM section below. [EPA-HQ-OAR-2010-0162-1818.1, p.13]

As the Agencies note on 75 Fed. Reg. 74159 that engine characteristics are the "dominant determinant" of criteria pollutant emissions, and therefore the EPA regulates criteria pollutants through engine regulations. The Agencies later note that GHGs and fuel consumption are best controlled through "a focus on the entire vehicle." (Re.: 75 Fed. Reg. 74169.) Because that is true, the Agencies' regulation should focus on the entire vehicle but not create artificial divisions between vehicle components. One example is the entire-vehicle approach of setting a full-vehicle CO2 emission standard, then allowing manufacturers to determine how to reach the standards – following EPA policy of "technology neutrality," i.e., setting standards but allowing manufacturers to meet those standards through a variety of technologies. [EPA-HQ-OAR-2010-0162-1818.1, p.13]

The Agencies requested feedback regarding fungibility of credits generated by all sources in manufacturers' ABT programs. We support ABT programs in general since they are a practical method to balance emissions from products that by nature will not always be equal in GHG emissions performance. We also support significant flexibility. As explained below all GHG credits generated under the program should be tradable (except across weight classes and with appropriate adjustments for equivalency) to offset any deficits generated under the program. Given the unique nature of the heavy truck and engine market, there is no real probability of credit trading creating a competitive disadvantage to any of the players in the market. All OEMs would benefit from the flexibility of unrestricted trading. [EPA-HQ-OAR-2010-0162-1818.1, p.57]

On page 75 Fed. Reg. 74170 et seq., the Agencies say that they will restrict credit trading to be only within averaging sub-categories. In early discussions with the EPA, we in the EMA suggested that credits should not be traded across service classes (meaning no trading from heavy heavy-duty to medium heavy-duty, etc.). The reason we suggested this is to keep a level playing field, meaning that manufacturers with a greater market share in a uniquely credit-generating service class should not benefit relative to other manufacturers simply by virtue of their sales portfolio. But the Agencies took our suggestion to an extreme in restricting credit trading only to regulatory sub-categories. Daimler objects to such a limited use of credits as the Agencies now propose. [EPA-HQ-OAR-2010-0162-1818.1, p.57]

In many cases, trading between categories will be necessary if AB&T is to be of any value. In some regulatory sub-categories, manufacturers will have only one model of vehicle. For example, in Class 7 low roof day cabs, DTNA only has the M2. In turn, if the M2 over-achieves the aerodynamic standard (meaning has low Cd), DTNA will have no incentive to improve the M2's other components still further. Or, if the M2 very much under-achieves, DTNA will not be able to meet the standards without developing new technologies, which is not possible given the lack of lead time for the Agencies' program. [EPA-HQ-OAR-2010-0162-1818.1, p.57]

Accordingly, we recommend a structure that allows trading of credits within service classes, across averaging sub-categories. In other words, a credit gained in heavy heavy-duty vocational could be used in any heavy heavy-duty tractor sub-category, but not in any medium heavy-duty category, and so on. This flexibility would apply to engine credits, vehicle credits, and innovative technology credits. [EPA-HQ-OAR-2010-0162-1818.1, p.57]

In summary, at a minimum, as reflected in the EMA / TMA comments, the Agencies' rule should allow trading within service classes and between vehicle types (vocational vehicles and tractors), both for engine and vehicle credits. All industry participants desire this amount of flexibility. [EPA-HQ-OAR-2010-0162-1818.1, pp.57-58]

EPA requested comment on the extent to which a difference - or unexpected difference - in the marginal costs of compliance per gallon of fuel saved or ton of GHG reduced across categories or subcategories, combined with provisions for averaging and trading across categories or subcategories, can allow manufacturers to achieve the same overall reduction in fuel use and emissions at lower cost. Regardless of the possibility that various flexibility scenarios may have similarly cost effective emissions reduction outcomes, we discourage the agency from allowing ABT across weight classes. Certain manufacturers with a wide product range (like Daimler) would be positioned to take advantage of such flexibilities and to gain commercial advantage over manufacturers whose product range is narrower. We do not believe, however, that it is EPA's intent to create rules that lead to such imbalances or have negative impacts on intra-industry competition. [EPA-HQ-OAR-2010-0162-1818.1, p.58]

In addition to the flexibility described above, the program could be further improved by allowing CO2 or FE credit trading between engines and vehicles. This would allow manufacturers to choose to invest limited development in the most cost-effective technologies, be they engine or vehicle, and then transfer credits to the area of more cost-inefficient development. Thus, manufacturers could achieve the Agencies' goals while optimizing costs to best benefit customers and the US economy. [EPA-HQ-OAR-2010-0162-1818.1, p.58]

Daimler strongly recommends that Averaging, Banking, and Trading be allowed within vehicle-types (ex. credits carried over from class 2b over to class 3). [EPA-HQ-OAR-2010-0162-1818.1, p.110]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The commercial vehicle marketplace allows operators to purchase vehicles that are built to their precise specifications to suit their unique operational needs. Due to the wide variety of ways in which commercial vehicles are used, not all applications can deploy or benefit from every available fuel efficiency technology. Accordingly, the HD program is structured so that manufacturers have some flexibility to provide vehicles that are customized to suit a particular customer's specific operational needs. A crucial aspect of that flexibility is the proposed averaging, banking, and trading ('ABT') provisions that are patterned on existing EPA ABT programs. ABT allows a manufacturer to reduce CO2 emissions below the level of the standard to generate credits, and to use the generated credits to offset higher emissions levels in other similar engines or vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.6]

The ABT provisions and innovative technology credit provisions also restrict the exchange of credits to within an averaging set. That restriction greatly inhibits a manufacturer's ability to use the credits to address market fluctuations that are outside its control, and thereby greatly reduces the flexibility that ABT provisions are intended to provide. For example, if the line-haul market is depressed during a given year, a manufacturer may find that it can make up that deficit by selling more low-roof tractors to customers with regional hauling operations. However, that market shift may eliminate the manufacturer's ability to generate credits using its aerodynamic high-roof sleeper cab tractors, and may even create a credit deficit if customers demand more of the less aerodynamic low-roof tractors. Therefore, to create a more workable and effective program, the Agencies should allow credit exchanges within an engine's primary intended service class (i.e., the light heavy-duty, medium heavy-duty, and heavy heavy-duty classes), including between engines certified for use in vocational vehicles and those certified for combination tractors. Similarly, the Agencies should allow credit exchanges within a vehicle's weight classification (i.e., GVWRs less than 19,500 lbs., GVWRs from 19,500 to 33,000 lbs., and GVWRs greater than 33,000 lbs.), including between vocational vehicle and combination tractors. Those necessary enhancements will help assure that there is a practical and workable ABT program, and help ensure that the GHG/FE standards are feasible. [EPA-HQ-OAR-2010-0162-1940.1, p.9]

Organization: Ford Motor Company (Ford)

Compliance planning is a complex, coordinated process that considers many factors including vehicle freshening cadence, manufacturability and credit management. The availability of vehicle and engine averaging, banking and trading (ABT) and other such credit provisions are an important part of a manufacturer's plan to comply with the regulations, and manufacturers rely on the precedent ABT rules and credit provisions in their planning process. [EPA-HQ-OAR-2010-0162-1761.1, p.4]

In the section 205 explanation of the Clean Air Act, it states that the standards for averaging, banking, and trading of emissions standards for heavy duty trucks is left up to the discretion of EPA, except for NOx. In addition, there is precedent in the EPA regulations for eligible Otto-cycle applications to transfer emissions credits between engine and vehicle-based ABT programs (40 CFR 86.1817-05(0)), through the use of conversion factors. Consistent with past practices of allowing such flexibility when new standards were set for criteria pollutants, Ford requests that the agencies consider adopting a similar allowance for greenhouse gas and fuel consumption emission credit transfers. [EPA-HQ-OAR-2010-0162-1761.1, p.4]

The following equation is recognized by EPA and CARB as a means of generating factors to convert between chassis (g/mile) and engine based (g/bhp-hr) test results and was used to develop factors for the current EPA MOVES inventory model.

Conversion Factor = fuel density / (vehicle fuel economy x engine brake specific fuel consumption)

The most recent conversion factors (for 1996 MY) that can be used to trade engine-generated credits on a vehicle level were developed for EPA models. These conversion factors are shown in the following table: [EPA-HQ-OAR-2010-0162-1761.1, p.4]

[The table can be found on page 2 of the comment.]

Confirmation of Factors - Methodology

Ford gathered internal data from more recent model years to determine conversion factors and compare to the values listed above. The gasoline and diesel analyses calculated values that were reasonably close to the EPA values; within 1% for gas and 3% for diesel. Ford is confident that the most recent EPA conversion factors (1996 MY) are reasonable to use as a mechanism to allow transfer of credits between HD engines and vehicles. [EPA-HQ-OAR-2010-0162-1761.1, p.5]

Calculations for Credit Generation - Generic Examples

For reference purposes, we have also included examples of how credits could be generated and transferred between different averaging sets.

Case 1: Gasoline Class 28 vehicle converting chassis-dynamometer based credits to an engine-dynamometer certified application.

Assumptions:

Tested Fuel Economy =16 mpg =555 g CO2/mile

Fuel Economy Obligation = 15 mpg = 592 g CO2/mile

Class 28 gasoline conversion factor =1.096 bhp-hr/mile

Credits Generated Per Vehicle =592 - 555 =37 g/mile

Credits Converted to g/bhp-hr = 37 g/mile * (1/1.096) mile/bhp-hr =33.8 g/bhp-hr credit

Case 2: Diesel Class 4 engine converting engine-dynamometer based credits to a chassis-dynamometer certified application.

Assumptions:

Tested CO_2 Level = 550 g/bhp-hr

CO_2 Obligation = 600 g/bhp-hr

Class 4 diesel conversion factor = 1.458 bhp-hr/mile

Credits Generated Per Engine = 600 - 550 = 50 g/bhp-hr

Credits Converted to g/mile =50 g/bhp-hr * 1.458 bhp-hr/mile =72.9 g/mile credit

Program flexibilities provide manufacturers with options to best manage their fleets while achieving equivalent greenhouse gas reduction goals and fuel consumption improvements. Ford believes that due to the limited products (van and truck) offered under this proposed rule, as well as the program start date of 2014 MY, additional program f1exibilities are needed. [EPA-HQ-OAR-2010-0162-1761.1, p.5]

Organization: National Automobile Dealers Association (NADA)

NADA/ATD support separate minimum standards for vehicles and engines, so long as manufacturers involved in both engine and vehicle manufacturing are free to use credits generated by “over performing” in one area to off-set compliance obligations in another. Moreover, “over performance” credits generated in one vehicle class or category should be available for application to any other. Providing OEMs with such flexibility will maximize compliance and economic efficiencies, providing the marketplace with the most efficiently produced compliant vehicles and engines. Since a gallon of fuel is a gallon of fuel and a gram of GHGs is a gram of GHGs, what matters most is the performance outcome, less how compliance is achieved. [EPA-HQ-OAR-2010-0162-2705, pp.9-10]

As noted above, the rule should provide OEMs with adequate credit incentives designed to assist with overcoming the numerous obstacles restricting the adoption of new technologies and alternate fuels.[EPA-HQ-OAR-2010-0162-2705, p.10]

Organization: Natural Gas Vehicle Interests

As proposed, the HD Rule's ABT program follows the example of the current HD criteria pollutant ABT program and does not allow the trading of credits either between sectors (engine v. vehicle) or between engine subcategories (LHD, MHD, etc.). However, the agencies recognize that GHGs present a different set of circumstances, and seek comment on: [EPA-HQ-OAR-2010-0162-2119.1, p.8]

potential alternative approaches in which fewer restrictions are placed on the use of credits for averaging, banking, and trading. Particularly, the agencies request comment on removing prohibitions on averaging and trading between some or all regulatory categories in this proposal, and on removing restrictions between some or all regulatory subcategories that are within the same regulatory category. 75 FR 74250. [EPA-HQ-OAR-2010-0162-2119.1, p.8]

The Natural Gas Vehicle Interests agree that several of the considerations underlying these sort of restrictions in the criteria pollutant ABT program are not present here. For example, because GHGs are globally dispersed and have no local impact, there is no risk that trading will create pollutant "hot spots"; the HD Rule acknowledges that "opportunities for greater flexibility may exist in light of the fact that greenhouse gases are a global pollutant for which local consequences are related to global, not local or regional atmospheric concentrations." 75 FR 74251. [EPA-HQ-OAR-2010-0162-2119.1, p.9]

Specifically, engine and truck manufacturers have commonly expressed to us a concern that some manufacturers with a wide range of product offerings spanning a number of regulatory categories would be able to use the ABT program provisions to generate credits in regulatory class markets where they face less competition and then use those credits to compete unfairly in other regulatory categories where they face greater competition. 75 FR 74251. [EPA-HQ-OAR-2010-0162-2119.1, p.9]

While those restrictions do make sense in the scenario presented, for small manufacturers the situation is reversed, and their inherent disadvantages vis-a-vis larger manufacturers argue for loosening restrictions on them. Compared to diesel engine manufacturers, NGV manufacturers have very limited product lines and very small volumes. For example, Westport is the largest manufacturer of heavy-duty natural gas engines, and has just two products and annual sales of a few thousand units; in contrast, hundreds of thousands of heavy-duty diesel engines – in more than a dozen configurations -- are sold every year. [EPA-HQ-OAR-2010-0162-2119.1, p.9]

Because they face both significant compliance costs (see p. 6, above) and the competitive disadvantages of fewer (and more expensive) products, smaller volumes, and much longer product-development time, it makes sense to relax the proposed trading restrictions for NG engine manufacturers. With more expensive products and smaller volumes, compared to diesel manufacturers NG engine manufacturers will be at a disadvantage in passing on their costs. [EPA-HQ-OAR-2010-0162-2119.1, p.9]

Yet another feature of the proposed regulations that adversely affects NG engine manufacturers can be partially solved by removing restrictions on their trading options. Because the GEM model for computing FC and CO2 vehicle performance uses only an industry standard diesel engine at the vehicle level, vehicle manufacturers derive no FC or CO2 credit benefits from building and selling a NG vehicle. Not only is there no benefit, but there is an affirmative obstacle because existing natural gas tanks may not be compatible with the aerodynamic packages contemplated for diesel trucks (for example, it may cost NG manufacturers somewhere on the order of $2 million to develop new, smaller-diameter LNG tanks to fit under standard vehicle fairings). For a vehicle and engine manufacturer, at least one of those units will be able to derive credits generating benefits. But in the case of Westport, vehicle manufacturers are always a 3rd party. [EPA-HQ-OAR-2010-0162-2119.1, p[.9-10]

We are asking EPA to recognize this problem and work with us to address it; in addition to the possibility of trading credits between NG engine and NG vehicle manufacturers, the solution may include adding a natural gas engine option to GEM or exempting HD natural gas vehicles from certain vehicle requirements. [EPA-HQ-OAR-2010-0162-2119.1, p.10]

Freer trading of credits for NGV manufacturers fits with the agencies' own thinking, i.e., "The agencies are evaluating the possibility of placing fewer restrictions on averaging and trading because increasing the flexibility offered to manufacturers to average, bank, and trade credits across regulatory subcategories and categories could potentially significantly reduce the overall cost of the program." 75 FR 74251. [EPA-HQ-OAR-2010-0162-2119.1, p.10]

The Natural Gas Vehicle Interests thus propose that NGV manufacturers be able to trade credits they generate across all engine subcategories, as well as to vehicle manufacturers. This ability would not only help reduce compliance costs, but because NGV manufacturers represent such a tiny fraction of the overall medium- and heavy-duty market (approximately 1%) it would neither tilt the playing field nor threaten the integrity of the emissions reductions/fuel economy gains in any particular category or subcategory. At a minimum, NG engine manufacturers should be allowed to trade internally across their own product lines, even when those products are not within the same FCL. [EPA-HQ-OAR-2010-0162-2119.1, p.10]

Organization: National Truck Equipment Association (NTEA)

The NTEA supports ABT credits for the use of alternative fuels, advanced and innovative technologies. The credits should be fungible across vehicle categories and should be made available to the entity responsible for the installation of the advanced or innovative technology or the conversion to an alternative fuel. [EPA-HQ-OAR-2010-0162-1608.1, p.9]

Organization: Natural Resources Defense Council (NRDC)

In general, NRDC supports provisions that provide manufacturers greater flexibility in compliance as long as it does not undermine the technology-forcing or the emissions benefits of the program. [EPA-HQ-OAR-2010-0162-1776.1, p.10]

We support the availability of the Averaging, Banking and Trading (ABT) credit provisions. We also strongly support the agencies' proposal to "restrict the use of averaging to limited sets of vehicles and engines expected to have similar emission or fuel consumption characteristics." (75 Fed. Reg. at 74170) In other words, we support the proposal to limit ABT to within regulatory subcategories. We agree that heavy-duty pickups and vans could comply under a fleet averaging system that allows averaging across vehicles in that category. [EPA-HQ-OAR-2010-0162-1776.1, pp.10-11]

Organization: Navistar, Inc.

EPA also absolutely must promulgate a final rule that better supports the use of an averaging banking and trading ("ABT") program for and across both the engine and truck standards. To be meaningful and achieve their full potential for manufacturers and the environment, the programs must be sufficiently flexible. As proposed, the engine and vehicle standards only allow a narrow exchange of emissions credits. 32 The proposed standards improperly restrict credit exchanges within averaging sets, essentially engine weight classification and vehicle type. EPA also proposes that credits cannot be used for future standards, meaning standards that might be adopted by future rulemakings. That too is flawed. [EPA-HQ-OAR-2010-0162-1871.1, p.16]

Only a more flexible scheme will realize full potential for innovation at a manageable cost, especially during the introductory years of this program. Credit exchanges, that is averaging and trading, must be allowed not only within engine or vehicle families, but with complete flexibility, even between vehicles and engines in the same way as light duty credits may be traded between cars and trucks. The record is bereft of facts that support this distinction between light- and heavy-duty. The record is bereft of facts that support this distinction between light- and heavy-duty. Restrictions within an ABT program such as those in the proposed rule will erode the very benefits the ABT program seeks to achieve and, thus, eliminate the feasibility assistance the program is supposed to provide under EPA's analysis. Similarly, as noted above, the credits, including innovative and advanced technology credits, should be applicable to the alternative standard. [EPA-HQ-OAR-2010-0162-1871.1, p.16]

EPA requested comment as to whether the costs of compliance would be reduced if there were greater flexibilities. There is absolutely no doubt that greater flexibility will result in lower costs and less flexibility will result in higher costs. A manufacturer with a large variety of engines and vehicles must be able to plan to control the timing of development costs among its engine and vehicle families. Greater restrictions will force manufacturers to incur development costs in a much tighter timeframe, because they will have to make significant expenditures across all families at once. These artificial restrictions would result in a greater need for engineering time, testing capacity, and development expenses. They also limit the ability of manufacturers to learn and adapt technologies across applications and vehicle engine types, and they limit quality control and could drive up warranty costs. This was an adverse impact EPA acknowledged and stated that it wanted to avoid, but the Proposed GHG Rule does not adequately address this impact. [EPA-HQ-OAR-2010-0162-1871.1, pp.16-17]

The bottom line is that these problems further reinforce that the abbreviated time frame proposed by EPA is improper on the facts as well as the law, especially in light of the potentially severe consequence of any credit shortfalls. These consequences are discussed further below in Part III.E. As noted, these serious consequences, coupled with the restrictions on the use of credits, would translate to a practical nullification of the usefulness of using the ABT program to help make the proposed standards feasible. [EPA-HQ-OAR-2010-0162-1871.1, p.17]

EPA bases its restrictions on credit usage on the differences in regulatory useful life and the potential for impacts on the competitive marketplace. As for the concern over regulatory useful life, EPA states that it wants to avoid credits from longer useful life categories “flooding” categories with shorter useful life. EPA’s concern has no basis in fact and is not supported by the record. EPA rejected similar concerns when it allowed cross-service class credit use in the 2007 Rule. There is no rational reason to come to the opposite conclusion here. If exchanges (averaging or trading) between categories or service classes were allowed only to address a deficit in the category or service class receiving the credit, this would address EPA’s concern while also allowing flexibility. An absolute prohibition on using credits across useful life categories is arbitrary. [EPA-HQ-OAR-2010-0162-1871.1, pp.17-18]

The Agencies’ second stated reason for imposing restrictions on credit use – to prevent impacts in the competitive marketplace – has no merit. Certainly there are no facts in the record demonstrating that the benefits or tight restrictions will exceed their costs. Restrictions on the ability to use credits create rather than resolve market distortions and reduce the ability to innovate by looking at the vehicle as a whole. EPA says that restrictions “would help prevent a competitive advantage due solely to the regulatory structure” against non-integrated manufacturers. The opposite is true. The speculative competitive advantage that might result would come from the business structure chosen by the manufacturer, not the regulatory structure. [EPA-HQ-OAR-2010-0162-1871.1, p.18]

Integrated manufacturers have certain resulting engineering flexibility and control abilities, and that business structure also promotes innovation by allowing the manufacturers to address whole vehicle performance; however, integrated manufacturers also have certain risks in terms of capital requirements and loss of business flexibility. A non-integrated manufacturer has chosen a business model that has different business risks but also potential limitations, because it must work with vehicle manufacturers to optimally address fuel economy issues and to balance engine and vehicle performance. EPA should not impose a financial penalty on other manufacturers, and an environmental penalty on the world, by protecting an engine manufacturer that chooses not to work closely with vehicle manufacturer. In real life, Navistar’s experience shows that engine manufacturers and their vehicle customers can and do work together cooperatively. The current proposal means integrated manufacturers have reduced incentives to take full advantage of their capabilities. [EPA-HQ-OAR-2010-0162-1871.1, p.18]

A restrictive approach imposes significant policy costs as well. EPA and NHTSA state that they desire and intend to move toward a total vehicle approach after 2017. The NAS Report analyzes the advantages and disadvantages of a total vehicle approach versus a separate engine and vehicle approach. The advantages of a divided approach were essentially administrative – e.g., the utilization of the current engine certification process, the relatively small number of manufacturers, and the relatively small administrative burden. The advantages of the total vehicle approach, however, were compelling, including the fact that such an approach captures the bulk of potential improvements in drivetrain, hybrids, tires, aerodynamics, vehicle accessories, component integration, and improved design. Failing to adopt a total vehicle approach here will guarantee potential improvements will be missed. EPA's final rule should encourage non-integrated manufacturers to work closely with their customers to integrate engines into vehicles in a way that maximizes GHG reductions and fuel efficiency. [EPA-HQ-OAR-2010-0162-1871.1, pp.18-19]

EPA also requested comment on its finding that one of the usual justifications for limiting credit flexibility is absent here.46 That is, flexibilities may in some instances isolate emissions to a particular geographic area if sufficient restrictions are not in place, such as concerns with "hotspots" developing around certain older sources. Because the driving concern with GHGs is global in its impact, not local or regional, there are no such "hotspot" concerns. We agree. There is no reason here to restrict flexibility, and that it is the only rational approach. [EPA-HQ-OAR-2010-0162-1871.1, p.9]

Comparison with the LD rules also supports maximum flexibility. The LD rules do not contain equivalent restrictions, even allowing trading credits between passenger vehicle and light-truck classes, and EPA correctly found that this flexibility would improve emissions and fuel economy performance. A similar analysis, which the NPRM arbitrarily does not undertake, would show the same improvements in the heavy-duty sector. Indeed, the reason given for the difference in flexibility is that LD manufacturers "offer diverse product lines and there is not as much disparity among useful lives." As to the former, the facts are to the contrary. EPA, NHTSA, and NAS all have acknowledged that the heavy-duty sector is more, not less, diverse in product lines than the LD sector. As to the latter, any difference in useful life should be accounted for in credit calculations. [EPA-HQ-OAR-2010-0162-1871.1, pp.19-20]

For all these reasons, the ABT program must be as flexible as possible to maximize opportunities, compensate for the lack of lead time, and achieve the feasibility requirements set forth by the CAA and EISA. [EPA-HQ-OAR-2010-0162-1871.1, p.20]

32 EPA has proposed utilizing CO2 equivalent credits to meet the proposed standards for N20 and/or CH4 for heavy-duty engines. See NPRM at 74,207, 74,210-211. Navistar supports this proposal as it maximizes compliance flexibility. [EPA-HQ-OAR-2010-0162-1871.1, p.16]

Organization: New York State Department of Transportation and Environmental Conservation and the New York State Energy Research and Development Authority

New York State supports the decision by NHTSA and EPA, discussed on page 74170 of the proposal, to limit averaging, banking and trading credits within sets of vehicles and engines expected to have similar emission or fuel consumption characteristics. [EPA-HQ-OAR-2010-0162-2047.1, p.5]

Organization: Odyne Systems, LLC

EPA Vol. 75 No. 229 pg. 74257: EPA and NHTSA propose that credits generated using innovative technologies be restricted within the subcategory where the credit was generated. The agencies request comments whether credits generated using innovative technologies should be fungible across vehicle and engine categories. [EPA-HQ-OAR-2010-0162-1853.1, p.13]

Odyne: The use of credits across vehicle and engine categories would increase the value of the credit, providing greater incentives to develop innovative solutions. As stated previously, allow providers of hybrid solutions that are installed in the intermediate or final stage the ability to earn credits and trade them with other manufacturers or chassis OEMs. If unlimited trading is a major concern, then allow hybrid manufacturers the ability to trade credits from the first 10,000 systems (or some other limit) shipped per year. [EPA-HQ-OAR-2010-0162-1853.1, p.13]

Organization: Oshkosh Corporation

NPRM states that: “the agencies propose to restrict the use of averaging to limited sets of vehicles and engines expected to have similar emission or fuel consumption characteristics. For example, averaging would be allowed among Class 7 low-roof day cab vehicles, but not among those vehicles and Class 8 sleeper cabs or vocational vehicles. Also we propose that credits generated by vehicles not be applicable to engine compliance, and vice versa.” [EPA-HQ-OAR-2010-0162-1591.1, p.2]

Oshkosh Corporation Response: We agree with this approach. If credits are allowed to be fungible across vehicle models or between engines and vehicles, then the regulatory structure proposed by the agencies would be severely compromised. As an example if credits can be traded across vehicle classes; manufacturer “A” who produces integrated products could gain credits from aerodynamic improvements on their tractor which would allow them to sell vocational vehicles without the more efficient tires. Manufacturer “B” who does not produce as broad of a range of vehicles (and a similar argument can be made for engines) would not have the tractor improvement opportunities. This will require them to always install the lower rolling resistance tires with less aggressive and less capable tread. Obviously this would put “B” at an unfair competitive disadvantage. This could disrupt existing market structure and disadvantage vocational manufacturers to larger more integrated companies that could use their broader product range and vehicle improvement opportunities to create an unlevel playing field. [EPA-HQ-OAR-2010-0162-1591.1, p.2]

Organization: Plass, B.

Regarding the averaging, banking, and trading portion of this propose rule, the prohibitions on averaging and trading between regulatory categories should not be removed. As outlined in the proposed rule, removing that restriction would result in unfair advantages to large manufacturers that manufacture many classes of engines. Additionally, the overarching goal of this entire scheme of regulation is to ultimately reduce green house gas emissions and improve fuel efficiency for all vehicles. By restricting averaging and trading between classes of engines, that goal is furthered because it requires innovation across a broad spectrum of engine types. The current average and trading program appears to promote a system of innovation, rather than simply shifting. Averaging and trading have proven to be helpful tools in regulating pollutants, particularly in helping to offset the costs to manufacturers. It should certainly be included in this scheme and costs to manufacturers should be weighed heavily. However, the ultimate goal of reducing pollution and fair competition between engine manufacturers should also be seriously considered. [EPA-HQ-OAR-2010-0162-1324-cp, p.1]

Organization: Union of Concerned Scientists (UCS)

We support inclusion of flexibility provisions in the proposed standards, but believe they should be designed to maintain fuel saving and emission reduction benefits as well as the application of cost-effective technology across all vehicle categories. The standards as proposed are readily achievable with off-the-shelf technology. Allowing credits to be tradable across classes and engine and vehicle compliance categories could undermine technology improvements in other applications. In addition, manufacturers with a broad product portfolio of engines and vehicles would be better positioned to take advantage of credits while other manufacturers with a limited product portfolio may not be able to use them. The agencies acknowledge the potential impact of fungible credits on the competitive marketplace in their justification for limiting ABT credit trading to within a compliance category (75 FR 74189). We strongly support limiting innovative technology and ABT credit trading to within the vehicle or engine compliance category to avoid these impacts. [EPA-HQ-OAR-2010-0162-1764.1, p.6]

Organization: Volvo Group

Volvo Group believes that vehicle credit trading only within regulatory sub-categories is too limiting. Trading should be possible across regulatory sub-categories, but restricted to only within vehicle weight classes. [EPA-HQ-OAR-2010-0162-1812.2, p.30]

This provides some of the flexibility needed to serve the requirements in the market and avoids penalizing manufacturers based on their product mix. As an example, low roof Class 8 daycabs are highly influenced by tractors used in vocational applications that cannot utilize aero devices. Trading across a vehicle class would mitigate the potential for product-mix penalties by allowing use of credits generated by credit producing aerodynamic high roof tractors. Volvo Group believes that credits should be exchangeable within a weight class, and that weight classes should replace the averaging sets for purposes of credit exchanges. Thus, credits could be exchanged across all Class 8 tractors and vocational vehicles. In the case of medium duty, the currently proposed vocational GVWR weight divisions would be acceptable (at or below 19,500 lbs., above 19,500 but below 33,000 lbs, and above 33000 lbs.). [EPA-HQ-OAR-2010-0162-1812.2, p.30]

The proposed language allows engine credit generation based on the engine's certified emission level relative to the family certification limit (FCL). The definition of FCL only references CO2. It is unclear whether credits could be generated for emissions of CH4 and N2O below the 'emissions cap' that is proposed. Volvo Group proposes that credits may be generated based on N2O and CH4 emission levels and that N2O and CH4 emission deficits may be credit consumers. [EPA-HQ-OAR-2010-0162-1812.2, p.30]

In addition, the regulation should allow for trading of engine credits between highway and vocational engines within the same class. This is necessary to accommodate variability in volume between product lines. In addition, natural gas engines should be considered as in the same averaging set as diesel engines. [EPA-HQ-OAR-2010-0162-1812.2, p.30]

The Agencies' preamble does not include discussion of how engine families certified above the NOx emissions limits (i.e. NOx credit consuming engine families) are to be treated with respect to their eligibility for generating CO2 credits. It is common knowledge that there is a conventional trade-off between fuel efficiency and NOx emissions level where in general a reduction in NOx level via engine timing map changes is accompanied by an increase in fuel consumption and CO2 emissions. Consequently, an engine family that is calibrated at a NOx level higher than the NOx emissions standard (a credit user) has correspondingly lower CO2 emissions than if it had been certified at the NOx standard. The ability to certify the NOx consuming family is a result of having generated NOx credits from an engine family that was certified at a NOx level lower than the standard and which had presumably generated higher CO2 emissions than had the engine been calibrated at the NOx standard. Given that the overall NOx emissions and CO2 emissions between the NOx credit generating and NOx credit consuming engines are offsetting, if not balanced, it is inappropriate to permit the low CO2 emitting NOx credit consuming family to generate CO2 credits that would permit yet another engine family having CO2 levels higher than the standard. To avoid this possibility, the Agencies must prohibit engine families that are NOx credit consumers from generating CO2 credits unless the NOx credits they are consuming are generated by engine families of the same or newer model year and that are also certified to GHG standards. [EPA-HQ-OAR-2010-0162-1812.2, p.30]

Response:

Many commenters, including Union of Concerned Scientist (UCS), NY Department of Transportation, Natural Resources Defense Council, Oshkosh, Autocar, and a public citizen requested that the agencies maintain the restrictions as proposed in the NPRM. On the other hand, several commenters, including EMA/TMA, Cummins, Volvo, and ATA, requested that the agencies maintain the proposed restrictions of averaging credits between the engine and vehicle categories, but reduce the restrictions on credit averaging across vehicle subcategories or engine subcategories or averaging sets within similar vehicle and engine weight classes (LHD, MHD and HHD). Finally, several commenters, including Ford, DTNA NADA, NTEA Natural Gas Interests, Navistar, and Odyne requested that the agencies reduce the proposed restrictions even further by allowing credit averaging between vehicle categories and engine categories.

Based on comments received, the agencies continue to believe that the ABT program developed by the agencies increases and accelerates the technological feasibility of the GHG and fuel consumption standards by providing manufacturers flexibility in implementing new technologies in a way that may be more consistent with their business practices and cost considerations. In response to the comments submitted by CBD, the agencies disagree with CBD's statements that the ABT program will adversely affect the fuel efficiency and GHG emission goals of this regulation. This joint final rule requires vehicle and engine manufacturers to meet increasingly more stringent emission and fuel consumption standards which will result in emission reductions and fuel consumption savings. Manufacturers will not have the option of not meeting the standards. The ABT program simply provides each manufacture the flexibility to meet these standards based upon their individual products and implementation plans.

CBD also argued that including any opportunities for manufacturers to earn credits in the final rule would violate NHTSA's statutory mandate to implement a program designed to achieve the maximum feasible improvement. NHTSA strongly believes that creating credit flexibilities for manufacturers for this first phase of the HD National Program is fully consistent with the agency's obligation to develop a fuel efficiency improvement program designed to achieve the maximum feasible improvement. EISA gives NHTSA broad authority to develop "compliance and enforcement protocols" that are "appropriate, cost-effective, and technologically feasible," and the agency believes that compliance flexibilities such as the opportunity to earn and use credits to meet the standards are a reasonable and appropriate interpretation of that authority, along with the other compliance and enforcement provisions developed for this final rule. Unlike in NHTSA's light-duty program, where the agency is restricted from considering the availability of credits in determining the maximum feasible level of stringency for the fuel economy standards,[78] in this HD National Program, NHTSA and EPA have based the levels of stringency in part on our assumptions of available flexibilities that have been built into the program to incentivize over-compliance in some respects, to balance out potential under-compliance in others. By assuming the use of credits for compliance, the agencies were able to set the fuel consumption/GHG standards at more stringent levels than would otherwise have been feasible. The ABT flexibilities also allow more flexibility to meet standards in earlier model years, and so to commence the GHG program as early as MY 2014. Greater improvements in fuel efficiency will occur under more stringent standards; manufacturers will simply have greater flexibility to determine where and how to make those improvements than they would have without credit options.

For the most part, the agencies believe that the proposed restrictions on credit use are appropriate. We believe that the use of credits beyond designated averaging sets could create an advantage that currently does not exist in the market for large integrated manufacturers. For example, a manufacturer that produces both engines and heavy-duty highway vehicles could mix credits across engine and vehicle categories to gain an advantage over competitors that are not integrated. Limiting credit ABT to within each engine averaging set and not allowing it between engines and vehicles will help prevent a competitive advantage due solely to the regulatory structure. Similarly, large volume manufacturers of engines could shift credits between heavy heavy-duty diesel engines and light heavy-duty diesel engines to gain an advantage in one subcategory over other manufacturers that may not have multiple engine offerings over several regulatory engine subcategories. Finally, relating credits between averaging sets would be problematic because of the diversity of applications involved. This diversity creates large differences in the real world conditions that impact lifetime emissions -- such as actual operating life, load cycles, and maintenance practices. In lieu of conducting extensive and burdensome real world tracking of these parameters, along with corrective measures to provide some assurance of parity between credits earned and credits redeemed, averaging sets provide a reasonable amount of confidence that typical engines or vehicles within each set have comparable enough real world experience to make such follow-up activity unnecessary.

However, after reviewing the comments, the agencies have determined that some additional flexibilities will help to reduce manufacturing costs further and encourage technology implementation without creating an unfair advantage for manufactures with larger product portfolios including engines and vehicles. Therefore, the agencies have decided to allow credit averaging within and across vocational vehicle and tractor subcategories within the same weight class groups, as well as credit averaging across the same weight class vocational and tractor engine groups. This conforms to the restrictions on ABT in EPA's criteria pollutant engine regulations, and EPA believes that this consistency is appropriate. This added flexibility beyond what was proposed in the NPRM will not be extended to the HD pickup truck and van category because this group of vehicles is comprised of only one subcategory and is not broken down like the other categories and corresponding subcategories into different weight classes. In essence,

[78] 49 U.S.C. 32902(h).

the HD pickup truck and van category is one large averaging set that will remain as proposed. Vehicle manufacturers, large and small, will be able to average and trade credits generated within larger averaging sets across subcategories within similar vehicle weight classes.

The agencies disagree with Navistar's argument that there is no evidence in the record to support restrictions on averaging across categories and across weight classes. The agencies have repeatedly stated their desire to avoid changing the dynamics of the marketplace. We also agree with Cummins' comments to the rule, "if credits can be exchanged between engines and vehicles, then there is a de facto complete vehicle standard… [t]he vehicle manufacturer, not EPA or NHTSA, becomes the de facto regulator of the manufacturer supplying the engines." Cummins states further, "engines would no longer have a clear standard as their compliance would be interrelated with those improvements made on vehicles, engines would depend on vehicle improvements for their compliance, leading to a much higher compliance bar for vehicles," and "[c]ompetitive issues in the market are magnified if credits can flow between engines and vehicles" as a large portion of manufacturers are not integrated and, for those that may be integrated, their engine and vehicle offerings are not homogenous (with respect to emissions compliance) which could create a competitive advantage to those manufacturers able to capitalize on improvements in one category to raise compliance in the other over non-integrated manufacturers.

The agencies have considered Cummins' comment requesting the agencies to allow engine manufacturers to pool their U.S. and Canadian sales volumes and have decided not to allow sales volumes of vehicles or engines exported outside of the United States to be included in the averaging, banking and trading volumes for manufacturers. This is consistent with EPA's existing policy for criteria pollutant emissions. The Agencies have made no estimate of the sales mix or technical needs of vehicles and engines sold in the Canadian market. Therefore, we can't conclude with confidence that the inclusion of Canadian sales volumes would not lead to a dilution of the emissions standard. For example, if higher fuel taxes in Canada were to mean that Canadian trucks already included the technologies considered in this regulation, those compliant vehicles would dilute the overall reduction expected of the program. We do understand that harmonized test procedures and aligned emission standards can be beneficial to the industry and public in general. We are therefore continuing to work with Environment Canada and Transport Canada to seek such harmonization, If we determine in the future that the inclusion of export volumes is likely to lead to equal or greater environmental benefits, we may reconsider the decision taken here.

The agencies also considered Volvo's comment which stated that engine manufacturers should not be allowed to earn CO_2 credits on engines which are NOx credit users. While the Agencies recognize that NOx credit using engines are likely to have lower than average CO_2 emission rates while NOx credit generating engines would be expected to have higher than average CO_2 emission rates, we do not believe it is necessary to preclude CO_2 credit generation from NOx credit using engines. We fully expect those CO_2 credits will be necessary to offset the CO_2 deficits that would be expected from the NOx credit generating engines. In short, we expect these effects to balance each other through the ABT program. We recognize that banked NOx credits for years prior to the start of this GHG program would not have this balancing characteristic, however we do not expect engine manufacturers to have significant NOx credit balances by the 2014 engine model year given their current credit balances and our understanding of the manufacturers NOx compliance plans. Hence, we do not believe it is necessary to add additional complexity to the program to deal with the small possibility of an issue relating to existing NOx credit balances.

We understand the comments from natural gas vehicle interests on trading restrictions to actually pertain to restrictions on *averaging* between engine and vehicle averaging sets, based on the context the commenters provide. We address the core of these concerns in the discussion above. Small manufacturers with very limited product offerings such as those in the NGV sector are more likely to be hurt than helped by a removal of averaging restrictions, because they have few products to average between compared to their larger competitors. We agree that preferential dropping of restrictions only for small manufacturers would directionally help these manufacturers, but, again, without a diversity of products to average between, could only be of marginal help. It would also introduce a new complexity, in that companies below whatever small/large cutpoint is established would enjoy an advantage over any competitors just above the cutpoint who do not qualify. Likewise, dropping restrictions just for manufacturers in the NGV sector would create an unfair situation, as we remain unconvinced by the reasoning provided in comments that such a change is needed to actually level the playing field.

We agree that NGVs and NGV engines may be more expensive and require longer development times, but do not believe that these are differences warranting special ABT program treatment, or that NGVs cannot meet the standards without such treatment. Nor do we see how relaxing averaging restrictions can help mitigate or offset these disadvantages. On the contrary, we note that the inherent advantages of NGVs over petroleum-fuel vehicles in meeting the new fuel consumption and GHG standards provides a potential for generating a positive credit balance, and there are no restrictions in the program on trading (that is, selling) these credits to other manufacturers needing these credits, only on the averaging sets the purchasing manufacturer may use them for. The need to maintain these restrictions is explained in the above discussion.

16.2. Early, Advanced Technology, and Innovative Credit Provisions

Organizations Included in this Section:

Truck Renting and Leasing Association
Allison Transmission
American Automotive Policy Council
American Council for an Energy-Efficient Economy
American Trucking Associations, Inc.
ArvinMeritor, Inc.
Bendix

CALSTART
Center for Biological Diversity
Cummins Inc.
Daimler Trucks North America
Union of Concerned Scientists
MEMA
Eaton Corporation
Edison Electric Institute
Engine Manufacturers and Truck Manufacturers Associations
Florida Power & Light Co.
Green Truck Association
Heavy-Duty Fuel Efficiency Leadership Group
Honeywell
Hybrid Truck Action Group
Institute for Policy Integrity
International Council on Clean Transportation
NADA
NTEA
Natural Resources Defense Council
Navistar, Inc.
Odyne Systems, LLC
Oshkosh Corporation
Parker Hannifin Corporation
Robert Bosch LLC
Union of Concerned Scientists
Volvo Group
Eaton Corporation
National Association of Clean Air Agencies

Organization: Truck Renting and Leasing Association (TRALA)

The regulations should promote the development and adoption of emerging, advanced fuel efficient technologies and include mechanisms to subsequently ensure that such technologies are reflected in the applicable standards [EPA-HQ-OAR-2010-0162-1816.1, p.4]

The regulations should encourage the development of emerging, fuel efficiency technologies, instead of inadvertently precluding the same by, for example, using rigid and formulaic modeling assumptions and methodologies. Furthermore, the regulations should include mechanisms to ensure that such technologies are subsequently reflected in the applicable standards. 5 [EPA-HQ-OAR-2010-0162-1816.1, p.4]

The agencies acknowledge that this sector is 'complex' (75 Fed. Reg. at 74156, 74160). We agree. In moving forward with models and test metrics related to fuel consumption and emission standards, the agencies should ensure that enough flexibility is built into relevant models and metrics to accommodate, and not disadvantage, emerging engine, transmission and related technologies. The fuel efficiency benefits of hybrids, for example, do not appear to be captured by the regulations. [EPA-HQ-OAR-2010-0162-1816.1, p.4]

EPA and NHTSA should include regulatory mechanisms that not only promote advanced fuel efficient technologies, but that also subsequently require their importation into the program with minimal additional regulatory effort. [EPA-HQ-OAR-2010-0162-1816.1, p.5]

/5/ With respect to the Proposed Standards for Class 2b-8 vocational vehicles, EPA and NHTSA state that the 'agencies intend to monitor the development of and production feasibility of new vehicle-related GHG and fuel consumption reduction improving technologies and consider including these technologies in future rulemakings' (75 Fed. Reg. at 74166). We agree with these sentiments but would feel comfortable if this flexibility was built into the regulatory program now instead of deferring the matter to potential future rulemakings. [EPA-HQ-OAR-2010-0162-1816.1, p.4]

Organization: Allison Transmission

The Proposed Rules specify ' A to B' testing for hybrids; EPA is to certify vehicles on the basis of chassis testing where essentially identical hybrid and non-hybrid vehicles are run on the same testing cycles. Engine dynamometer evaluation is to occur through the use of the Heavy-duty Federal Test Procedure cycle. While this approach has some connection to the overall approach to the proposed rule, the crediting of hybrid vehicles stands in stark contrast to the approach taken to non-hybrid vehicles, in which compliance is based on existing engine certification protocols and limited inputs into the GEM. The testing burdens placed on hybrids appear in relation to non-hybrid vehicles to be excessive and may create substantial additional hurdles to the adoption of hybrids in the MD/HD vehicle segment beyond the considerable economic hurdles these vehicles currently face. [EPA-HQ-OAR-2010-0162-2735.1, p.36]

Hybrid purchasers are generally 'first adopters' who are willing to assume overcosts versus conventional technology. For wider adoption of the technology in the MD/HD sector, however, overcosts need to be minimized and the prospects for eventual technology 'pay back' enhanced. Given this situation, EPA should seek to minimize the regulatory burden on hybrid technology and recognize that direct head-to-head competition between hybrid and non-hybrid technology in the commercial vehicle sector now decidedly favors non-hybrid alternatives. [EPA-HQ-OAR-2010-0162-2735.1, p.36]

The economics of hybrids within the commercial marketplace versus the LDV market are entirely different and EPA and NHTSA should not seek to draw broad conclusions based on that experience. Hybrid adopters in the MD/HD vehicle classes are forced by the commercial nature of their vehicles - and by the existence of external competition in the marketplace - to weigh overcosts differently from individuals assessing what family vehicle to purchase. Therefore, EPA and NHTSA should examine whether modeling could be an acceptable substitute for hybrid crediting, at least in the limited timeframe of the proposed rule. [EPA-HQ-OAR-2010-0162-2735.1, p.36]

Altogether, EPA and NHTSA should more directly recognize the obvious conclusion from the current operation of hybrids in many different vehicle types: there are significant to substantial FE and GHG emission benefits associated with the technology. EPA's and NHTSA's rulemaking efforts should not impose greater barriers to the adoption of hybrids than to the integration of other conventional technology that is projected to occur as a result of a final FE/GHG rule. [EPA-HQ-OAR-2010-0162-2735.1, p.36]

EPA and NHTSA have proposed to provide innovative technology credits based on a program included within the LDV final rule. Allison is supportive of this concept as described in the preamble Suitable credits could help to further the development and introduction of new technology into the marketplace. [EPA-HQ-OAR-2010-0162-2735.1, p.41]

As EPA and NHTSA have recognized, however, it is important that real world testing of the new technology be accomplished before crediting is allowed. The agencies have further indicated that to address complex interactions between MD/HD vehicles and the potential to reduce fuel consumption 'may require a more sophisticated approach to vehicle testing than we are proposing for the largest heavy-duty vehicles.,,78 It would also appear that with respect to testing protocols, innovative technologies would not face the barriers mentioned with respect to utilizing engine-only and computer modeling. That is, dynamometer tests could be employed and similar 'A to B' testing for hybrids could help to accurately establish the actual emission/FE benefits. Although it appears from the discussion that this is the case, Allison would request that in the agencies response to comments it be confirmed that test procedures and duty cycles in the innovative technologies program are not constrained to use the duty cycles that are in the main regulation. [EPA-HQ-OAR-2010-0162-2735.1, p.41]

It is also important that in any A to B testing protocol, the configuration utilized to represent the vehicle which forms the basis of the comparison (i.e., the 'A' vehicle) must include vehicle systems of the current model year. This is vital to ensure that the correct level of technology advancement is considered in the comparison testing that is performed with respect to the new technology vehicle (i.e., the 'B' vehicle). The A vehicle system would consist of all vehicle components that impact fuel efficiency and emissions. These components would include hardware, computers, software, and calibrations as offered in the OEM databook. Such an approach would be consistent with the overall goal of the innovative technology credit program to provide incentives for the development and adoption of technology that provides benefits over and beyond that currently employed in the vehicle fleet. By maintaining stringent standards for the A vehicle, EPA and NHTSA can eliminate any potential for 'gaming' the system and developing GHG and FE estimates that will not be realized when and if the new technology is deployed. [EPA-HQ-OAR-2010-0162-2735.1, p.42]

Finally, Allison is supportive of requirements that data submissions for the innovative technology program be subject to a public evaluation process where there is an opportunity for comment. EPA and NHTSA have correctly recognized that transparency is an important element in the process of assessing and evaluating the effect of new technologies. A public review and comment process will not only likely serve to strengthen the applications that EPA may receive for credits, but also increase public confidence in any resulting credits granted to innovative technologies and systems. [EPA-HQ-OAR-2010-0162-2735.1, p.42]

Organization: American Automotive Policy Council

The lack of inputs other than tire rolling resistance provide no regulatory incentive for manufacturers to implement even well-established technologies identified in the NPRM that provide real world CO2 and fuel consumption benefits such as weight reduction, aerodynamic improvements, transmission improvements, powertrain matching, reduced accessory loads, etc. Additionally, inputs to the GEM model allowed for Class 7-8 Tractors that could be applied to Vocational Vehicles in a straightforward manner such as wheel weight reduction, speed limiting, and engine idle shutdown systems are not allowed as inputs for vocational vehicles. The Tire rolling resistance-only approach also offers manufacturers no way to balance potential application-specific tire functional performance requirements with the fleet average rolling resistance requirement other than sales restrictions. [EPA-HQ-OAR-2010-0162-1762.1, p.20]

AAPC recommends that EPA and NHTSA allow for and specify the methodologies and data requirements necessary for determination of credits for technologies other than low rolling resistance tires for Class 2b-8 vocational chassis compliance. Alternatively, these methodologies could be addressed in a subsequent guidance document in advance of the 2013 model year along with a statement of intent to publish such guidance in the Preamble to the final rule. [EPA-HQ-OAR-2010-0162-1762.1, p.20]

AAPC supports EPA and NHTSA's efforts to provide incentives for early introduction of technologies to reduce GHG and fuel consumption. However, the requirement that vehicles introduced in 2013 MY must not only meet the proposed 2014 MY standards, but exceed them in order to generate any credits is not sufficient incentive and does not provide credits commensurate with the reduction in GHG emissions and fuel consumption from the unregulated baseline case. Given the limited opportunities within a manufacturer's product cycle to update these vehicles and the desire to align product actions with multiple regulatory requirements, opportunities for pulling ahead GHG and fuel consumption reducing technologies would likely be pursued if incentives commensurate with the emission reductions achieved were made available. The agencies also requested comment on ways the early credit opportunities can be tailored to provide incentives for early introduction of GHG and fuel consumption reducing technologies and protect against unanticipated windfalls. AAPC believes both goals can be achieved through the promulgation of voluntary 2013 MY standards that are more stringent than the unregulated baseline emissions, but less stringent than the 2014 MY standards for CO2 and fuel consumption. To assure only reasonable levels of credits, the standards would be determined by effectively extending the phase-in ramp-up backwards by one year. [EPA-HQ-OAR-2010-0162-1762.1, p.7]

AAPC recommends that credits for early introduction of GHG and fuel consumption technologies for Class 2b-3 vans and pick-up trucks be determined based on an optional 2013 MY standard. For vehicles with compression ignition engines, AAPC recommends a gram/mile Alternate CO2 target of [0.0480 x WF] + 370. For vehicles with spark ignition engines, AAPC recommends a g/mile Alternate CO2 target of [0.0484 x WF] + 373. The corresponding functions in terms of fuel consumption should also be adopted. This approach would provide an appropriate incentive for manufactures to certify early to the GHG and fuel consumption requirements. [EPA-HQ-OAR-2010-0162-1762.1, p.7]

AAPC supports the concept of credits for off-cycle GHG reductions and fuel economy improvements. There is potential for the development of new, innovative technologies that may offer little or no benefit in fuel economy testing, but may offer a significant benefit in the real world for the consumer. Such technologies should be encouraged, but manufacturers will have little incentive to pursue them if the only available metric is standard FTP and highway testing. It is appropriate for EPA and NHTSA to develop a credit program that accounts for the benefits of such technologies and rewards manufacturers accordingly. [EPA-HQ-OAR-2010-0162-1762.1, p.17]

While the concept is laudable, AAPC respectfully suggests that the implementation details need more work. The NPRM appears to contemplate a somewhat nebulous process in which manufacturer data submissions are evaluated on a case-by-case basis and subjected to 'public evaluation,' including an opportunity for public comment. This approach presents a number of problems: [EPA-HQ-OAR-2010-0162-1762.1, p.17]

First, it offers very little guidance or certainty to manufacturers in terms of the nature and amount of data necessary to get approval for credits. Before investing significant resources in the development and testing of new technologies, manufacturers need to have a better idea of how much data to generate, how the data will be evaluated, and what it ultimately takes to get approval for credits. A loosely-defined process will not give manufacturers confidence that their efforts will be rewarded. [EPA-HQ-OAR-2010-0162-1762.1, p.17]

Second, the rules need to ensure that when manufacturers do generate serious proposals for off-cycle credits, the agencies will devote the necessary resources to evaluate and act on those proposals in a timely way. Under the NPRM, the process for agency evaluation of such proposals lacks definition and timelines. In the absence of a better-defined process, these matters could become low-priority items at the agencies. [EPA-HQ-OAR-2010-0162-1762.1, pp.17-18]

Third, the inclusion of a 'public evaluation' process is problematic for several reasons: a) it is time-consuming; b) it potentially involves the public in the review of sensitive information that may be proprietary and business-confidential; and c) it is unnecessary, because the evaluation of proposed off-cycle credits should be primarily a technical exercise. The key question before the agencies will be whether or not a given technology actually delivers real-world benefits, and if so how to translate those benefits into credits. This is a task best carried out by an agency with technical expertise, not by members of the public. [EPA-HQ-OAR-2010-0162-1762.1, p.18]

Fourth, a more well-defined process will provide greater assurances to all manufacturers of consistency and a 'level playing field' when agencies evaluate proposals from different manufacturers. [EPA-HQ-OAR-2010-0162-1762.1, p.18]

The AAPC requests EPA and NHTSA to specify in greater detail the methodologies and data requirements needed for the evaluation of credits for technologies not represented in the greenhouse gas test procedures. We understand that it is probably appropriate to avoid excessive rigidity in the development of such procedures, and that certification staff should be able to exercise discretion in appropriate circumstances. Nevertheless, the regulations should set forth the basic principles the agencies will follow in evaluating data and determining whether or not the approval of credits is warranted. AAPC believes it would be helpful for the agencies to identify one or more drive cycles that manufacturers may use to evaluate off-cycle emissions. We recommend that the agencies allow the use of cycles identified in SAE J2711 'Recommended Practice for Measuring Fuel Economy and Emissions of Hybrid-Electric and Conventional Heavy-Duty Vehicles.' This procedure includes four different vehicle drive cycles: [EPA-HQ-OAR-2010-0162-1762.1, p.18]

1. Manhattan Driving Cycle - represents lower speed operation (i.e. transit bus operation in city service) [EPA-HQ-OAR-2010-0162-1762.1, p.18]

2. UDDS Driving Cycle (for heavy-duty vehicles, not the same as the UDDS we use for light-duty) - mimics higher speed operation of trucks and buses under freeway and non-freeway operation [EPA-HQ-OAR-2010-0162-1762.1, p.18]

3. Orange County Cycle - represents mid-speed heavy-duty vehicle operation [EPA-HQ-OAR-2010-0162-1762.1, p.18]

4. Central Business District (CBD) cycle - (a “sawtooth” driving pattern which includes 14 repetitions of an idle, acceleration, 20 mph cruise, and deceleration cycle) [EPA-HQ-OAR-2010-0162-1762.1, p.18]

The use of other test cycles such as repeated highway cycles or the engine-based World Harmonized Cycle (or other methodologies altogether) for data generation may also be appropriate. The cycles and methodologies initially identified by EPA need not comprise an exclusive list, but they would at least give manufacturers a solid starting point for evaluating new technologies. [EPA-HQ-OAR-2010-0162-1762.1, p.18]

AAPC recommends that EPA and NHTSA further elaborate on the data requirements necessary for determination of credits for technologies not represented in the GHG test procedures in the final rule. Alternatively, these methodologies could be addressed in a subsequent guidance document in advance of the 2013 model year along with a statement of intent to publish such guidance in the preamble to the HD GHG final rule. [EPA-HQ-OAR-2010-0162-1762.1, p.18]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

A crucial measure of the success of this rule will be how well it does in drawing advanced efficiency technologies into the market. Indeed, stakeholders' letters of support cited a common set of principles for the regulatory program that include "[i]ncentives leading to the early introduction of advanced technologies" (p.74156). The proposed program should be strengthened in this area, particularly with regard to advanced transmissions, hybrid drive trains and other technologies especially important to the refuse trucks, delivery vans, utility trucks, and school buses in the "vocational" category. Companies investing in these technologies should be given a well-defined, straightforward way of claiming credit for doing so. Demanding standards for vehicles that can take advantage of these technologies will be the best incentive to acquire them as soon as their value has been demonstrated. [EPA-HQ-OAR-2010-0162-1894.1, p.3]

ACEEE promotes flexibility provisions that are effective and preserve or increase fuel savings and GHG emissions reductions. Given the weakness of the standards proposed for the vocational truck category, it is improbable that flexibility provisions would be useful or necessary there. Credit multipliers, whether for advanced technologies or early credits, are especially to be avoided, because they lessen the total emissions reductions from the program by allowing a greater increase in the emissions of other vehicles than they offset. [EPA-HQ-OAR-2010-0162-1894.1, p.23]

Recommendation (innovative technology credits): Specify allowable protocols for attributing fuel savings and GOG reductions to advanced transmissions and, to the extent possible, other efficiency technologies. [EPA-HQ-OAR-2010-0162-1894.1, p.24]

Credits are also available for 'innovative' technologies if savings from these technologies can be demonstrated to the satisfaction of the agencies. In the case of advanced transmissions, both the chassis test and the post-transmission power pack options should be available for demonstrating benefits, and the final rule should state this explicitly. [EPA-HQ-OAR-2010-0162-1894.1, p.24]

For innovative technology credits more generally, the agencies should provide extensive guidance on eligible technologies, pre-approved test protocols, and suitable test cycles. Doing so would give manufacturers the certainty that they could gain credits for these technologies in a well-defined and straightforward fashion, reducing risk and expense and thereby helping to simulate technology development and adoption. Increasing the stringency of the standards will add to the value of innovative and advanced technology credits. [EPA-HQ-OAR-2010-0162-1894.1, p.24]

An alternative means of increasing the value of innovative technology credits would be to permit them to be applied to any compliance category, regardless of where they were generated. The agencies have proposed not to allow this (p.74189), however, and they should not allow it in the final rule. Especially in this first phase of the program, when several of the standards are lacking in stringency and there are uncertainties about how, and how many, innovative technology credits will be generated, it is important to ensure some progress in each category of engine and vehicle. Allowing these credits to be applied across compliance categories could result in certain categories' achieving no fuel savings or GHG emissions reduction, despite the availability of cost-effective options for doing so. It could also give unfair advantage to certain manufacturers that have a broader range of products, as the agencies note. [EPA-HQ-OAR-2010-0162-1894.1, pp.24-25]

Organization: American Trucking Associations, Inc. (ATA)

Hybrid technology application in the trucking sector continues to make positive strides. Continued incentives through federal legislation and efforts such as the 21st Century Truck Partnership Program are helping manufacturers advance hybrid research and deployment of hybrid vehicles. This rule can also serve an important role in further advancing hybrid market penetration rates. More specifically, the rule seeks comment on whether a 1.5 credit multiplier is appropriate for Advanced Technology Credits such as hybrid powertrain designs. ATA not only agrees that a credit multiplier is appropriate, but recommends that a multiplier of 2.0 be used by the agencies. Short-term incentives to OEM’s to increase the introduction and sale of hybrid-platform vehicles will assist in driving down their price, help achieve the goals set out under the rule, and promote the advantages of this green-technology path. [EPA-HQ-OAR-2010-0162-2263.1, p.14]

Organization: ArvinMeritor, Inc.

Inclusion of “advanced technology credits” and “innovative technology credits” provide much needed flexibility to OEMs for utilizing technologies and products that are either not factored into the simulation validation program or may not be in high-volume production. Advanced technology credits are applied to products and technologies either not yet in production or on a steep product-development curve. The agencies specifically cited hybrid drivetrains, fuel cells, and alternative fuel vehicles as specific examples of this category. ArvinMeritor applauds the agencies' efforts to encourage the use of such advanced technologies by (1) providing 50 percent bonus credits for fuel and/or emissions savings; and (2) allowing such credits to be utilized in other regulatory categories. (Such swapping of credits among regulatory categories is generally not permitted). [EPA-HQ-OAR-2010-0162-1605.1, p.2]

Innovative technology credits are applied to technology that exists today. Like advanced technologies, however, the products here are either on the cusp of market introduction, represent very low production volumes, or are not factored into the simulation analysis that serves as the basis for vehicle certification. Since these products and technologies are presumed not to be as far reaching as "advanced technologies", they do not carry the 50 percent bonus credit, nor are the credits transferable among different regulatory categories. [EPA-HQ-OAR-2010-0162-1605.1, pp.2-3]

In both cases, the agencies are providing OEMs with much needed "flexibility" in achieving the regulated limits. These technologies are somewhat like "wild cards," in that they may be applied to specific vehicle categories that are struggling to meet the regulations. In addition, the innovative technology credits compensate somewhat for the fact that only a limited number of input parameters into the GEM simulation program are permitted. These credits provide a means to utilize and take credit for a much broader range of attractive, fuel-efficient technologies. [EPA-HQ-OAR-2010-0162-1605.1, p.3]

Advanced Technology Credits and Innovative Technology Credits As noted, the "advanced technology credits" and "innovative technology credits" are viewed as an effective "wild card" for consideration of technologies and systems not evaluated in the GEM simulation program. We have several inputs on these credits. [EPA-HQ-OAR-2010-0162-1605.1, p.7]

Clarification of Definitions – We recommend that definitions of "advanced technology" and "innovative technology" be clarified in the final regulations. Conversations with industry organizations and OEM representatives confirm that the distinction between these two items is not well understood. Specific examples of "advanced technologies" were listed in the proposed regulation. It is unclear whether those items were intended to be the complete list of allowable advanced technologies, or if other technologies not yet identified or fully developed will also be eligible for this category. This is a key issue because, as the regulations currently read, only "advanced technologies" receive the 50 percent bonus credit for both emissions and fuel savings. Additionally, only advanced technology credits may be transferred from one regulatory category to another. [EPA-HQ-OAR-2010-0162-1605.1, p.7]

"Bonus Credits" and Credit Transfer for Innovative Technologies – With regard to innovative technologies, we recommend that the agencies (1) apply the 50 percent bonus credits and; (2) allow the transfer of credits between regulatory categories, both of which currently apply only to advanced technologies. Such a change would clearly encourage greater use of "innovative technologies," and move the industry to improved fuel efficiency and emission performance levels. The anticipated higher volumes may result in reduced costs of these technologies which in turn will make them even more attractive. [EPA-HQ-OAR-2010-0162-1605.1, pp.7-8]

“Minimum Improvement Threshold” for Innovative Technologies – There has been some discussion that a “minimum improvement threshold” will be imposed on innovative technology credits. For example, the regulations could potentially stipulate that only technologies that offer greater than 2 percent fuel efficiency improvement would qualify for credits. ArvinMeritor is strongly opposed to any such minimum level. The industry itself will regulate this. Technologies that offer only fractions of a percent improvement will not be given serious consideration by OEMs as it wouldn’t be worth the time, effort and financial commitment. On the other hand, even a 1 percent or 2 percent improvement in fuel efficiency would be considered worthwhile by most OEMs. We recommend that the agencies steer clear of imposing a minimum improvement level and let the industry self-regulate this aspect for the aforementioned reasons. [EPA-HQ-OAR-2010-0162-1605.1, p.8]

Mechanism for certifying “advanced” or “innovative” technologies – During discussions with members of EPA, ArvinMeritor gained some insight as to how these credits would be certified. Although not specified in the proposed regulation, the anticipated approach would require the supplier of a technology to compile a presentation justifying the use of the technology, including analysis, lab test data, and fleet test results. This technical package would be presented to OEMs, who would include the technical data in the appropriate vehicle certification package for submission to the agencies. This process will potentially result in some redundant activity in the situation where a supplier may be selling a particular technology to multiple OEMs. [EPA-HQ-OAR-2010-0162-1605.1, p.8]

A better approach would be for the agencies to provide a means for suppliers to submit technical justification directly to the agencies. Successful review of the data would lead to some type of provisional certification for the technology. This evaluation process would need to be conducted only once, even if multiple OEMs eventually include the technology in their vehicle certification packages. [EPA-HQ-OAR-2010-0162-1605.1, p.8]

Even if the agencies do not formally “certify” the technology, this process would at least familiarize the agencies with the technology in question, thereby facilitating ultimate acceptance when OEMs submit the technology as part of their vehicle-certification package. [EPA-HQ-OAR-2010-0162-1605.1, p.8]

Summary of Recommendations –Advanced and Innovative Technology Credits

- Clarify the definitions of “advanced technologies” and “innovative technologies.” [EPA-HQ-OAR-2010-0162-1605.1, p.8]

- Make the “benefits” of innovative technologies the same as for advanced technologies to stimulate greater usage of the innovative technologies. Specifically, allow the “bonus” credits and movement of credits to other regulatory categories applicable to innovative technologies. [EPA-HQ-OAR-2010-0162-1605.1, p.9]

- Do not impose a minimum “threshold of improvement” for innovative technologies. The industry and respective business case of each technology will self-regulate on this issue. [EPA-HQ-OAR-2010-0162-1605.1, p.9]

- Consider creating a process whereby suppliers of innovative or advanced technologies may either get formal certification of the technologies directly through the agencies or have the opportunity to familiarize the agencies with the technology in question. This will streamline the acceptance of such technologies during the OEM certification process and avoid some redundancy if a technology is used by multiple OEMs. [EPA-HQ-OAR-2010-0162-1605.1, p.9]

- Advanced and Innovative Technology Credits - Consider a continuation of bonus credits for both advanced and innovative technologies as a means of encouraging continual improvement and accelerating the industry acceptance of new technologies. Also, allow both advanced and innovative technology credits to be transferred between regulatory categories. [EPA-HQ-OAR-2010-0162-1605.1, p.10]

Organization: Bendix Commercial Vehicle Systems LLC (Bendix)

The agencies’ considerations for applying flexibility provisions in the form of credits, are supported by Bendix and we encourage their application. Bendix believes that these credits/flexibilities are absolutely necessary not only to help various advanced technologies penetrate the marketplace, but also to encourage continuous innovation and improvements. The NHTSA and EPA specifically requested comment in the NPRM about the suggested 1.5 multiplier.1 Bendix supports the 1.5 multiplier and urges the agencies to incorporate it into the final rule. The credit provided from advanced and innovative technologies is the primary impetus (appropriately so) to integrate these technologies onto vehicles. The end result is real-world impact on reducing commercial vehicle fuel consumption and emissions. [EPA-HQ-OAR-2010-0162-1888.1, p.2]

Advanced Technologies Listed for Credit should be Expanded The NPRM proposes that the following technologies be made eligible for credit: Hybrid Powertrains (designs that include energy storage systems); Rankine Cycle Engines (waste heat recovery); All-Electric Vehicles; and, Fuel Cell Vehicles. The agencies acknowledged in the NPRM, that their proposal would create “additional opportunities for manufacturers to reduce their GHG emissions and fuel consumption” and that those opportunities would “provide additional incentives for manufacturers to innovate and to develop new strategies and cleaner technologies.” Bendix fully supports the agencies’ approach and their inclusion of these proposed technologies. [EPA-HQ-OAR-2010-0162-1888.1, p.2]

Bendix supports the agencies' inclusion of innovative technology credits. There are many technologies that contribute measurably to vehicle fuel efficiency and emissions output that may not be appropriately credited in the existing engine test cycle(s). The challenges, of course, are quantifying those contributions and obtaining the credit. The NPRM considers an "innovative technology," to be "those [technologies] that are newly introduced in one or more vehicle models or engines, but that are not yet widely implemented in the heavy-duty fleet. This could include known technologies not yet widely utilized in a particular subcategory." [EPA-HQ-OAR-2010-0162-1888.1, p.6]

At the same time, however, Bendix strongly believes that there are other opportunities the agencies should recognize under the regulatory flexibility banner and Bendix recommends the agencies should expand their list to include other technologies as eligible for credit. The Advanced Technology list proposed by the agencies omits engine accessory technologies, primarily because the fuel efficiency and emissions benefits are perceived as small or insignificant. In fact, while the measure benefit of each accessory may be "small", these contributions are meaningful and do have a favorable impact on overall fuel consumption and emissions output. [EPA-HQ-OAR-2010-0162-1888.1, p.2]

Bendix urges the agency to include other technology areas for credit. Promoting flexibility will increase market penetration and commercialization of these important technologies as well as drive continuous innovation and improvements. [EPA-HQ-OAR-2010-0162-1888.1, p.2]

Bendix recommends that the agencies add the following advanced technology categories that would be eligible for credit in the final rule: 1) Weight, 2) Transmission/Drivetrain, 3) Driver Management & Coaching, 4) Engine and 5) Tires & Wheels. As appropriate, Bendix has provided some details of the advanced technologies to explain the potential of some of these technologies (also see Appendix A). [EPA-HQ-OAR-2010-0162-1888.1, p.3; see p.9 of this comment summary for Appendix A]

Organization: CALSTART

We are pleased to see that hybrid, electric, and fuel cell technologies are called out as "advanced" technologies for the purpose of this program, and that there are incentives to encourage their use. However, we believe the list should be expanded to include other innovative technologies and approaches, such as natural gas, biomethane, and other alternative fuels that can make contributions to reducing carbon. For some of these technologies, there may be better alternative means of encouraging adoption. For example, providing recognition of the full well-to-wheels greenhouse gas emissions benefits of natural gas trucks would provide a strong incentive for manufacturers to bring these vehicles to market. [EPA-HQ-OAR-2010-0162-2121, p.3]

We support the flexibility proposed by EPA/NHTSA in allowing transfer of Advanced Technology Credits across vehicle platform groups. This will leverage and encourage greater emissions reductions than would happen without such flexibility. We believe most of the industry and our members support this, but with some exceptions. There are some concerns over how this flexibility might provide greater rewards to companies with product offerings in multiple categories. We understand this concern. In looking at the proposed rule, we feel EPA/NHTSA has addressed this concern in a couple of important ways: [EPA-HQ-OAR-2010-0162-2121, p.3]

First, any credits transferred across categories (from Vocational to Class 8 line haul, for instance) will be discounted based on the assumed fuel use of the categories. This should minimize concerns about “opting out” of compliance in one category by earning advanced technology credits in another category. [EPA-HQ-OAR-2010-0162-2121, p.3]

Second, we believe all manufacturers have some opportunities for using the credits. For instance, even manufacturers with only Class 8 offerings have Class 8 trucks that would fall in two of your categories (vocational Class 8 and Line Haul Class 8). So, we do believe there are protections and opportunities built into the proposal for all types of manufacturers, regardless of the scope of their product offerings. [EPA-HQ-OAR-2010-0162-2121, p.3]

Furthermore, we believe the potential for abuse and under-compliance in targeted categories is small. The number of advanced technology vehicles likely to enter the market in the regulation timeframe is not so large as to impact compliance actions. Looking at the hybrid truck market as one example, CALSTART and HTUF have estimated an aggressive market penetration would result in 20,000 hybrid trucks by 2015 and 70,000 by 2020. Even under these aggressive market penetration assumptions, the potential for credits from one category to substantially reduce compliance in another is limited. The situation is similar for other advanced technologies such as electric and fuel cell vehicles. Since we are aware of companies concerned on this issue, however, we would welcome and encourage further discussions on how to protect against possible misuse concerns. [EPA-HQ-OAR-2010-0162-2121, p.3]

We applaud and vigorously support EPA/NHTSA’s proposed framework for rewarding, within the structure of the rule, advanced technologies via the Advanced Technology Program and the Innovative Technology Credits Program. The proposed credit system attempts to address the concerns we raised above with regard to incentivizing innovative technologies. Without actually forcing the market, this voluntary program should support the deployment of certain advanced technologies by rewarding over-compliance with the standards. In the absence of such a program, there would be no incentive for manufacturers or suppliers to bring to market technologies that provide benefits beyond what is required by the standards. [EPA-HQ-OAR-2010-0162-2121, p.2]

We therefore support the concept of a credit “multiplier” for advanced technologies, at a minimum at the level discussed in the proposal (1.5). While this credit will not directly assist end-users to purchase these vehicles, we are hopeful it will provide compliance rewards for suppliers and manufacturers to include advanced technologies in their product portfolio and encourage them to maintain their investments. [EPA-HQ-OAR-2010-0162-2121, p.2]

Just as we support incentives for over-compliance, we also believe it is important to provide incentives for early compliance. There are already early production hybrid and electric trucks and will soon be hybrid-hydraulic trucks in the market. In cases where these provide real emissions benefits from current baseline vehicles, we fully support manufacturers or suppliers receiving credit for these deployments. We believe it is important to encourage these early market offerings to continue and do not believe providing credits for these vehicles will disrupt the regulation once it begins. Rather, we think the value of providing earlier than required carbon reductions more than justifies this action. [EPA-HQ-OAR-2010-0162-2121, p.2]

Organization: Center for Biological Diversity

For similar reasons, “early” compliance credits for greenhouse gas emission reductions and fuel efficiency improvements achieved by manufacturers in the period before the proposed 2016-2018 standards go into effect should be granted only if they achieve true “additionality,” and are both quantifiable and verifiable. As in the case of other mechanisms that “offset” pollution, such credits do not advance the goal of achieving the maximum feasible energy consumption and the necessary GHG emission reductions unless they create verifiable and truly additional gains that would not otherwise be achieved. In other words, fuel efficiency improvements already baked into manufacturers’ product plans as of the date the Proposed Rule becomes final should be ineligible for credits as those improvements will be implemented regardless of these regulations. Otherwise, these credits will simply delay further investment and innovation in fuel saving technologies and wholly undermine the Agencies’ efforts. Accordingly, any “early” credits must be carefully tailored and tightly restricted to avoid these effects. [EPA-HQ-OAR-2010-0162-2506.1, pp.11-12]

Lastly, while over-compliance “carry forward” credits (i.e., the ability to apply credits for over-compliance in Year 1 to remedy compliance failures in Year 1+n) are commendable within limits because they indeed incentivize early technological investment and innovation, and initially accelerate the rate of removal of GHGs from the atmosphere, allowing such “carry forward” credits for more than a year or two is excessive. Long “carry forward” periods simply remove the incentive to incorporate newly developed technology into the nation’s vehicle fleet and, after the initial spurt, stagnate rather than drive progress. These detriments could be balanced against the evident benefits of limited “carry forward” credits by selecting a short application period. Moreover, no such credits should be allowed unless a manufacturer can demonstrate additionality and quantify and verify the amount by which its performance actually exceeds the standard. [EPA-HQ-OAR-2010-0162-2506.1, pp.12-13]

Organization: Cummins, Inc.

Although we support the Agencies' proposal to allow early generation of credits, we do not agree with the proposed restrictions. The Agencies propose to allow manufacturers to generate credits no earlier than model year (MY) 2013 for engines and HD pickups and vans (see 75 FR 74255). Cummins does not support limitations on the timing of generating early credits. As with criteria pollutants, manufacturers should be allowed to generate credits with any products certified after the effect date of the final rule. [EPA-HQ-OAR-2010-0162-1765.1, p.13]

Also in the Preamble, the Agencies propose that manufacturers would need to certify to the standards at least 6 months before the start of the first model year of mandatory standards. The Agencies should remove the 6 month leadtime requirement. [EPA-HQ-OAR-2010-0162-1765.1, p.14]

Additionally, the proposal requires manufacturers to certify entire averaging sets in order to generate early credits (see § 1036.150(a) and § 1037.150(a)). Cummins disagrees with this requirement as allowing individual families to earn early credits is an incentive for manufacturers that will benefit the environment. [EPA-HQ-OAR-2010-0162-1765.1, p.14]

The Agencies are requesting comment on whether a multiplier of 1.5 should be applied to early credits (see 75 FR 74255). Cummins does not support any multiplier on early credits, as the opportunity to earn credits at face value should be sufficient incentive for early compliance. [EPA-HQ-OAR-2010-0162-1765.1, p.14]

The Agencies are proposing additional credit opportunities for hybrids, Rankine-cycle engines, all-electric vehicles and fuel cell vehicles (see 75 FR 74255). Cummins supports the development of certification pathways for advanced technologies along with the opportunity for them to generate credits. [EPA-HQ-OAR-2010-0162-1765.1, p.15]

The Agencies propose that credits generated from advanced technologies could be used in any engine or vehicle subcategory. Cummins does not agree with having unique ABT provisions for advanced technologies as this will have negative consequences. [EPA-HQ-OAR-2010-0162-1765.1, p.15]

Allowing advanced technology credits to be exchanged between engines and vehicles threatens the integrity of the proposed regulatory structure by creating a de facto whole vehicle standard. Cummins strongly opposes this approach as described previously in Section III. The rationale does not change simply because the technologies are advanced. [EPA-HQ-OAR-2010-0162-1765.1, p.15]

In addition, the Agencies should maintain the boundaries between engine subcategories and between vehicles subcategories with respect to advanced technology credits (i.e., no credits exchange between LHD, MHD or HHD engines). Again, the rationale as described earlier does not change simply because the technologies are advanced. [EPA-HQ-OAR-2010-0162-1765.1, p.15]

Broad fungibility of credits is unnecessary as there is already sufficient incentive to certify advanced technologies due to the magnitude of their reductions and the resultant credit generation. This provision as proposed actually has the potential to stifle investment and GHG/FC improvements. For example, a manufacturer could generate large quantities of advanced technology credits with a MHD vocational hybrid vehicle that would allow it to forgo making improvements on other entire subcategories such as HHD tractor engines. Cummins believes the intent of the Agencies is as it should be – to drive improvement across all categories: tractors and vocational vehicles, HD engines and HD pickups and vans. That goal is in jeopardy with the proposal to allow unrestricted usage of advanced technology credits. [EPA-HQ-OAR-2010-0162-1765.1, p.15]

Credits for advanced technologies can be appropriately categorized. For example, in the case of hybrids, any credits generated by a hybrid engine would stay within an engine averaging set, and any credits generated by a hybrid vehicle would stay within a vehicle averaging set. Manufacturers would have the flexibility to choose between engine dynamometer and chassis dynamometer hybrid certification methods which in turn determines the appropriate averaging set. [EPA-HQ-OAR-2010-0162-1765.1, p.16]

The Agencies are requesting comment on whether a multiplier of 1.5 should be applied to advanced technology credits. Cummins does not support any multiplier for advanced technology credits, as the GHG/FC reductions achieved with the eligible technologies will already lead to significant generation of credits. [EPA-HQ-OAR-2010-0162-1765.1, p.16]

Cummins proposes that modifications are needed to the regulatory language describing the generation of advanced technology credits. Both § 1036.615(a) and § 535.7(e)(1) should reference the use of Part 1036 engine dynamometer procedures for measuring hybrid system effectiveness and include engine manufacturers as eligible for advanced technology credits. The omission of these aspects appears to be an oversight, since the Preamble includes HD engine manufacturers and also discusses engine dynamometer evaluation as one of the two methods for establishing the number of advanced technology credits generated (see 75 FR 74255 - 74257). [EPA-HQ-OAR-2010-0162-1765.1, p.16]

A Rankine-cycle engine is different than a Diesel- or Otto-cycle engine that includes a Rankine-cycle energy recovery system. We believe the Agencies are referring to the latter. [EPA-HQ-OAR-2010-0162-1765.1, p.16]

Another opportunity exists for generating credits using what the Agencies refer to as innovative technologies. These are technologies not yet in widespread use for which the GHG/FC benefits are not captured over the standard compliance tests of the Credits for advanced technologies can be appropriately categorized. For example, in the case of hybrids, any credits generated by a hybrid engine would stay within an engine averaging set, and any credits generated by a hybrid vehicle would stay within a vehicle averaging set. Manufacturers would have the flexibility to choose between engine dynamometer and chassis dynamometer hybrid certification methods which in turn determines the appropriate averaging set. [EPA-HQ-OAR-2010-0162-1765.1, pp.16-17]

As proposed by the Agencies, credits generated using innovative technologies would be restricted for use within the subcategory where the credit was generated. Cummins agrees with this approach. We do not support innovative technology credits that can be exchanged across vehicle and engine categories, across vehicle subcategories or across engine subcategories for the reasons stated above in the discussion of ABT and advanced technology credits. The rationale does not change simply because the technologies are innovative. Broad fungibility of credits is not advisable given the unlimited number and kinds of technologies to which this provision could apply and the inherently uncertain nature of this provision which pertains to anticipated, but as yet unknown, future innovations. [EPA-HQ-OAR-2010-0162-1765.1, p.17]

The Agencies need to provide more guidance as to what constitutes an innovative technology. Furthermore, additional guidance is needed to define whether the credits generated by an innovative technology are to be applied to the engine program or vehicle program. [EPA-HQ-OAR-2010-0162-1765.1, p.17]

The Agencies have modeled the HD innovative technology provisions after the lightduty regulations. However, these two regulations are different, especially since heavy-duty has separate engine and vehicle programs. In order to reflect these differences and maintain flexibility, the Agencies should include a general categorization of innovative technologies such as the following:

Technologies that improve engine efficiency (brake specific CO2) on a given engine operating cycle - These features can be evaluated through engine testing with no need for the complication of evaluation in a vehicle. Such innovative technology credits will best fit with the engine program. [EPA-HQ-OAR-2010-0162-1765.1, p.17]

Technologies that improve engine efficiency (brake specific CO2) by changing the engine operation, but not necessarily cycle work on a given behavior that changes the engine operating space, such as continuously variable transmissions (CVT). Evaluation of these technologies may need an engine combined with some driveline features, but not an entire vehicle evaluation. However, the credits fit best with the vehicle program, since this is outside the realm of an engine-only evaluation. In order to avoid double counting, the innovative technology and engine improvements would need to be separated. [EPA-HQ-OAR-2010-0162-1765.1, pp.17-18]

Technologies that reduce vehicle power demand [(hp*hr)/(ton*mile)] and subsequently change the cycle work required by the engine on a given vehicle drive cycle - These features are items like high efficiency driveline components, active aero features or specialized vehicle controls. Evaluation of these technologies would require some aspect of driveline or full vehicle evaluation but can be demonstrated to be independent of the engine. This avoids double counting of engine benefits, and as a result, the innovative technology credits would be part of the vehicle program. [EPA-HQ-OAR-2010-0162-1765.1, p.18]

Categories like the above would give more structure to the innovative technology provision, provide clarity to manufacturers using the option and maintain the important separation between the engine and vehicle programs. As part of the approval process for any innovative technology, the Agencies should make a formal determination on the averaging set in which it is appropriate for the credits to reside. [EPA-HQ-OAR-2010-0162-1765.1, p.18]

The Agencies need to make sure that proprietary business information is protected while allowing important public comment. Manufacturers need certainty that to obtain credits for innovative technologies they would not need to disclose proprietary information to competitors. [EPA-HQ-OAR-2010-0162-1765.1, p.18]

A multiplier is not warranted for innovative technology credits. The innovative technology provisions serve as sufficient incentive by merely providing a credit generation mechanism for these technologies that would otherwise not be recognized in the regulation. Additionally, a multiplier is not advisable given the open-ended and uncertain nature of the innovative technology credit program. [EPA-HQ-OAR-2010-0162-1765.1, p.18]

Subject to all of our recommendations above on the innovative technology credit program, Cummins supports allowing credit generation beyond MY2018. The criteria which qualify a technology as innovative for the purposes of this provision – not in widespread use and benefits not measurable over the standard compliance procedures – will still be applicable in the future. [EPA-HQ-OAR-2010-0162-1765.1, p.19]

In line with our previous comments, Cummins proposes that manufacturers be allowed to generate credits as early as possible to encourage the pull-ahead of technologies that improve GHG/FC. [EPA-HQ-OAR-2010-0162-1765.1, p.28]

The high cost of hybrid technology has so far prevented widespread application. Given uncertainties in future component costs and fuel costs, predicting future hybrid volume is challenging. However, even optimistic projections suggest that hybrid volumes will be small until at least 2018, as shown in Figure 2. Because volumes are expected to be low, basing GHG/FC standards on hybrid capability would not be appropriate. Hybrid technology has the potential to significantly reduce GHG/FC, and there are a variety of ways the Agencies could encourage the adoption of hybrid technology including credit generation and modifying DF, useful life and OBD requirements. These incentives can play a critical role in encouraging the development of lower cost, HD-appropriate hybrid technology. [EPA-HQ-OAR-2010-0162-1765.1, p.35]

Organization: Daimler Trucks North America

EPA proposes in section 1036.615 that credits generated by hybrid powertrains and Rankine-cycle engines be fungible across averaging sets and vehicle classes (as defined in 40CFR part 1037). We are not convinced that such broad credit trading is the best way to go. We are concerned that the flexibility to apply credits across a broader range of averaging sets creates the potential for manufacturers producing vehicles or engines in a wider range of averaging sets to utilize credits in a way that competitively disadvantages companies producing vehicles and engines in a more limited range of averaging sets. For example, a manufacturer producing a high volume of medium-heavy-duty engines in a hybrid powertrain vocational application would be able to apply credits to his heavy-heavy- duty vocational averaging set that uses a low technology, inexpensive, less fuel efficiency engine which can then be sold at a significant cost advantage over competitors whose advanced technology engines are GHG compliant and whose product range does not include medium light-heavy-duty engines. We do not believe that agencies intended for GHG regulations to create the potential for such competitive disadvantages and desire to continue to work with the Agencies to ensure that advanced technology credits meet with needs of the industry and the Agencies. [EPA-HQ-OAR-2010-0162-1818.1, p.59]

NHTSA and EPA requested comment on whether a credit multiplier, specifically a multiplier of 1.5, would be appropriate to apply to advanced technology credits as a greater incentive for their introduction. We agree that, as in the case of early compliance incentives and innovative technology credits, the agencies should encourage early introduction by applying a multiplier of 1.5. [EPA-HQ-OAR-2010-0162-1818.1, p.59]

DTNA Agrees With Agencies' Decision To Include An Innovative Technologies Program In The Regulation, As It Will Enhance The Incentive For Manufacturers To Develop Fuel Saving Technologies. [EPA-HQ-OAR-2010-0162-1818.1, p.60]

DTNA supports the Agencies' efforts to incentivize development of fuel saving technologies. We wholeheartedly support programs like Super Truck, with the Department of Energy, and we think that these collaborative research and development programs should be continued, in order to further the state of vehicles on the road. We think that a similar, parallel program that would incent vehicle improvements is one that gives manufacturers credits for vehicle improvements not captured by GEM. The innovative technology program will do that. In fact, we think such a program could be expanded to allow manufacturers credits for improving conventional technologies. For example, if a manufacturer can demonstrate to the Agencies on a bench test that a new transmission has higher efficiency than that assumed in the GEM model, we should be able to override GEM preselected efficiency values with our own values. In turn, manufacturers will have incentive to turn over every rock looking for improvements. [EPA-HQ-OAR-2010-0162-1818.1, p.60]

On page 75 Fed. Reg. 74258, the Agencies seek comment on incorporating off-cycle emission credits into the program. We think that the innovative technology program is the correct manner for such credits: the technologies demonstrated in this program will largely be technologies whose fuel savings cannot be demonstrated through GEM or through the engine test cycles. In turn, they are “off cycle” in the context of this regulation. Crediting a manufacturer for these technologies in a manufacturer’s engine or vehicle credit / debit balance in turn gives manufacturers the credit mechanism they need. In short, the program is well designed. Below we present some specific comments on details of the program. [EPA-HQ-OAR-2010-0162-1818.1, p.60]

On 75 Fed. Reg. 74170, the Agencies suggest that innovative technology credits should be limited in transferability. However, at other points in the NPRM, the Agencies give reasons why transferring credits (e.g., advanced technology credits) should be allowed . We recommend that both types of credits be transferable across vehicle / engine classes. If the Agencies recognize that benefits in one regulated category should be fungible to other categories, then they should allow regular CO2 credits to transfer. In other words, the Agencies should not pick technology winners and losers by favoring some and disfavoring others (meaning by allowing increased credit trading with some and not others). In other words, a credit created in medium heavy-duty should be transferable anywhere in medium heavy-duty and similarly for heavy heavy-duty. [EPA-HQ-OAR-2010-0162-1818.1, p.60]

EPA proposes the availability of innovative technology credits that would be available only through the 2018 model year by which time EPA expects that these technologies will likely be in common use. We agree that EPA should include incentives in its GHG rules that encourage manufacturers to hasten the introduction of innovative technologies into the marketplace. We also agree that features that may be considered innovative in model year 2014 may become commonplace in later model years. The availability of credits for a particular innovative technology should expire at the time that EPA adjusts the standards to a new level that presumably considers that particular technology that at one time was innovative but had become commonplace. [EPA-HQ-OAR-2010-0162-1818.1, pp.60-61]

Manufacturers should be offered incentives to introduce innovative technologies on an ongoing basis, beyond model year 2018. The importance of continuous improvement will be no less in model years beyond 2018 than it is today. Consequently manufacturers will continue to and should be encouraged to pursue new innovative technologies. EPA’s rationale for offering innovative credits in the model year 2014 to 2018 timeframe is equally valid for new innovative technologies being considered in years beyond 2018. Therefore it is recommended that innovative technology credits be offered beyond model year 2018.

The agencies request comments on their proposed approach for off-cycle emissions credits, including comments on how best to structure the program. EPA and NHTSA particularly request comments on how the case-by-case approach to assessing off-cycle innovative technology credits could best be designed, including ways to ensure the verification of real-world emissions benefits and to ensure transparency in the process of reviewing manufacturer's proposed test methods. EPA should assign a technical assessment individual or small team that establishes clear criteria for determining appropriate credits for innovative technologies. A single team, consistently applying well defined guidelines to all manufacturers will be effective in “leveling the playing field” during the evaluation process. Key guidelines must address the representativeness of proposed test methods to the real duty cycle of the vehicle and application for which the technology is intended, Test methods for determining off-cycle emissions credits should be well defined (e.g. standard route, driving cycle, etc.) [EPA-HQ-OAR-2010-0162-1818.1, p.61]

Manufacturers will not be able to demonstrate all innovative technologies with the same types of test procedures, yet manufacturers need certainty, in advance of their investing in development of such technologies, that they will be able to take credit for the technologies’ CO2 and fuel savings. Accordingly, the Agencies should make safe harbor procedures or procedures that a manufacturer can be certain it can use for innovative technology certification. Because pre-existing procedures like Type III and IV (comparative vehicle) testing are available and widely used, we recommend those. The Agencies could specify, for example, that the drive cycle be that used by the GEM model, or as close as a manufacturer can come to that GEM drive cycle in real test conditions. But if a manufacturer needs to use some other test procedure or some other drive cycle to demonstrate the real-world benefit of a fuel saving technology, the manufacturer should not be constrained to the safe harbor test procedures and drive cycles. So, for example, with Predictive Cruise Control (PCC), where vehicles optimize their speed based on topography of the upcoming road, a simple speed-time drive cycle on flat ground will not show real-world fuel saving benefits. A manufacturer should be able to demonstrate PCC over a hilly route so the procedure needs to allow for that possibility. [EPA-HQ-OAR-2010-0162-1818.1, pp.61-62]

Credits that a manufacturer gets for an innovative technology should be analogous to Infrequent Regeneration Adjustment Factors in that the credits are proportional to the emission or fuel savings multiplied by the fraction of time over which those emission or fuel savings are available. In other words, manufacturers should be asked to supply a sound engineering judgment estimate of the fraction of time that an innovative technology is operational and saving fuel. And the manufacturer should be asked to supply the fuel savings during those times. The credits they receive should be proportional to those two factors multiplied. [EPA-HQ-OAR-2010-0162-1818.1, p.62]

Optimizing a vehicle’s fuel consumption involves optimizing the trade-off between aerodynamics and engine cooling; however, the Agencies’ proposed regulations only credit aerodynamics, which can lead to the perverse incentive of manufacturers sacrificing cooling capacity and, in turn, fuel consumption / GHG emissions. Small grille openings or high restriction heat exchanger fin densities lead to lower Cd’s, all else equal, yet to higher fan-on time and, in turn, to higher fuel consumption. So, for example, when DTNA designed the Cascadia, we optimized the hood, grille, and cooling package for total fuel efficiency. Had we been more concerned with a regulatory program, we might have sacrificed grille opening or increased cooling package fin densities in favor of GEM CO2 credits, which would have been counter to the Agencies’ intent for this regulatory program. However, as shown by the figures in the Confidential Business Information portion of our comments, we did just the opposite: optimizing cooling performance and in turn making a trade-off between Cd and full-vehicle fuel consumption. [EPA-HQ-OAR-2010-0162-1818.1, p.62]

In turn, we recommend that manufacturers like DTNA, who optimized for total vehicle fuel efficiency, be able to take credit for the fact that our optimized cooling packages are better than the industry average (and to prevent other manufacturers from gaming the system by sacrificing cooling capacity in the future). So, we recommend that, even though the proposed regulations in §1037.611 only allow manufacturers to get credit for CO2 reductions from technologies not in common use before 2010, that DTNA be able to get credits for our innovative cooling system. For example, DTNA would use our vehicle with a Cummins ISX engine, which is also available in competitors' vehicles. We would choose comparable transmissions, rear axles, tires, etc., so that the vehicles differ as little as possible, except for the cooling systems. And we would demonstrate that our cooling system saves fuel, at which point we would ask the Agencies to credit us in proportion to those fuel savings. [EPA-HQ-OAR-2010-0162-1818.1, p.62]

DTNA supports the proposal to credit manufacturers with hybrid fuel savings (perhaps limited to trading within weight classes as discussed above). We believe that the crucial next steps will be defining test / modeling procedures that fairly credit manufacturers without overly burdening manufacturers. One of the crucial concerns with hybrids is that, with so few vehicles being sold, overly costly or time-consuming tests can make hybrid vehicles all the more costly, in turn driving down their demand. On the contrary, we believe that the Agencies share our desire to increase hybrid demand. [EPA-HQ-OAR-2010-0162-1818.1, p.77]

In addition, we agree with the Agencies' proposal to give 1.5x credits for hybrids and other advanced technologies. These technologies are expensive to develop and costly for customers to buy. Moreover, there are not many financial incentives by which customers can offset the high upfront cost of the hybrid vehicles. In turn, some sort of incentive is necessary. We think that the Agencies are right to give enhanced credits as one manner of incentive. [EPA-HQ-OAR-2010-0162-1818.1, p.77]

DTNA believes that there may be some controversy within the industry as to who owns a credit generated by a hybrid vehicle. We agree with the program that the Agencies put together: either engines or vehicles can generate hybrid credits, and the credits can be transferred across between engines and vehicles. The Agencies should not insert themselves into commercial decisions such as whether the engine or vehicle manufacturer owns the credit. [EPA-HQ-OAR-2010-0162-1818.1, p.77]

We believe that credits should transfer across an entire service class and from engine to vehicle or vice versa, in order to stimulate the most cost-effective development of fuel saving technologies. [EPA-HQ-OAR-2010-0162-1818.1, p.77]

On 75 Fed. Reg. 74255 and in §1037.610, the Agencies suggest giving generous advanced technology credits for "[h]ybrid powertrain designs that include energy storage systems." If the agencies are going to give out 1.5x credits, then they need clear definitions of what are "hybrid vehicles." Otherwise, manufacturers might try to game the system by qualifying for credits by selling extremely mild hybrids. In 26 U.S.C. §30B, wherein Congress enacted tax credits for hybrids, Congress created the threshold definition of an eligible heavy-duty hybrid: having an unconventional power system capable of supplying at least 15% of the vehicle's total traction power for a 10 second pulse. (See 26 U.S.C. §30B(d)(3).) The Agencies should adopt the same or a similar threshold definition for advanced credits. [EPA-HQ-OAR-2010-0162-1818.1, pp.77-78]

In §1037.611 on 75 Fed. Reg. 74395, the EPA proposes to limit innovative technology credit generation through 2018. We think that neither innovative technology credits nor hybrid credits should be limited by time: as long as the standards and test procedures fail to capture the fuel savings of a particular technology, that technology should be eligible for credits. [EPA-HQ-OAR-2010-0162-1818.1, p.78]

DBNA, with the brand Orion Bus, started their hybrid program 1992 as an innovative pioneer in this field, much earlier than the rest of the industry. This allows DBNA to have more than 3000 buses delivered from 2004 to date being in daily transit service in densely populated areas like New York City, San Francisco and Seattle, thereby significantly reducing GHG emissions and air pollution, to the benefit of the environment. Due to 12 year funding of heavy-duty transit buses the replacement of the bus fleets occurs approximately every 12 years. [EPA-HQ-OAR-2010-0162-1818.1, p.87]

For many customers the hybrid bus only makes sense on routes with low average speed and very transient driving conditions and due to the early market availability many Orion customer fleets are already saturated with hybrid buses. With a 12 year funding for heavy heavy-duty duty transit buses these buses will not be replaced in the first years of the GHG emission standard, thus limiting the possibility for DBNA earning credits compared to transit bus OEMs introducing vehicles later in the market, with their customer fleets not being saturated. [EPA-HQ-OAR-2010-0162-1818.1, p.87]

Daimler suggests that the Agencies consider revising the proposed rule to allow OEMs to earn credits for pre rule hybrid vehicles sales. This is necessary to avoid disadvantage in the market. It would not be fair to disadvantage companies, like DBNA that led the market in the field of hybrid vehicles. [EPA-HQ-OAR-2010-0162-1818.1, p.87]

Organization: Union of Concerned Scientists (UCS)

Finally, to promote the deployment of advanced and innovative technologies beyond business as usual, the standards should ensure that credits are valuable by increasing the stringency of the standards rather than using credit multipliers. If the stringency of the standards is not increased to reflect the availability of technologies such as hybrids, their may be little demand for credits. Credit multipliers should be avoided as they could erode overall fuel savings and emission reductions of the program. Other means of promoting advanced technologies outside of the regulatory framework, such as tax credits, manufacturer incentives, and government/manufacturer cost sharing may be more effective than credit multipliers and do not erode overall program benefits. For example, SuperTruck funding from DOE is targeting the development of advanced engine and vehicle technologies and California is offering vehicle rebates for purchasers of heavy duty hybrid trucks. [EPA-HQ-OAR-2010-0162-1764.1, pp.6-7]

Organization: Motor & Equipment Manufacturers Association (MEMA)

The NHTSA and EPA specifically request comment in the NPRM about the suggested 1.5 multiplier.2 MEMA supports the 1.5 multiplier and urges the agencies to incorporate it into the final rule. The credit provided from advanced and innovative technologies is the primary impetus (appropriately so) to integrate these technologies onto vehicles. The end result is real-world impact on reducing commercial vehicle fuel consumption and emissions. [EPA-HQ-OAR-2010-0162-1752.1, p.2]

The NPRM proposes that the following technologies be made eligible for credit: Hybrid Powertrains (designs that include energy storage systems); Rankine Cycle Engines (waste heat recovery); All-Electric Vehicles; and, Fuel Cell Vehicles. The agencies acknowledged in the NPRM, that their proposal would create “additional opportunities for manufacturers to reduce their GHG emissions and fuel consumption” and that those opportunities would “provide additional incentives for manufacturers to innovate and to develop new strategies and cleaner technologies.” MEMA fully supports the agencies’ approach and their inclusion of these proposed technologies. [EPA-HQ-OAR-2010-0162-1752.1, p.3]

At the same time, however, MEMA strongly believes that there are other opportunities the agencies should recognize under the regulatory flexibility banner and MEMA recommends the agencies should expand their list to include other technologies as eligible for credit. The Advanced Technology list proposed by the agencies omits other advanced drivetrain and advanced accessory technologies, primarily because the fuel efficiency and emissions benefits are perceived as small or insignificant. In fact, while the direct measure benefit may be “small” – perhaps in some cases maybe only one or two percent impact on fuel consumption – these contributions can be larger, they are meaningful, and they do have a favorable impact on overall fuel consumption and emissions output.[EPA-HQ-OAR-2010-0162-1752.1, p.3]

All vehicle categories would benefit from a variety of these advanced technologies, but the introduction and adoption of new advanced transmission/drivetrain and engine technologies in the vocational category can offer the largest potential benefit (10 to 15 percent emissions reduction over a large vehicle base, which is up to 85 percent of the segment), while providing manufacturers and fleets with additional flexibility beyond engine improvements to achieve the EPA proposed standards. (For more information, please see the Section I-B.) [EPA-HQ-OAR-2010-0162-1752.1, p.3]

MEMA urges the agency to include other technology areas for credit. Promoting flexibility will increase market penetration and commercialization of these important technologies as well as drive continuous innovation and improvements.[EPA-HQ-OAR-2010-0162-1752.1, p.3]

While we recognize the agency's desire to receive specific input and data on these advanced technologies, the comments herein are general in nature. MEMA fully expects several member companies to supply separate, individual company comments specific to their product mix, technology expertise, effectiveness information, recommended testing procedures, and other relevant research data. [EPA-HQ-OAR-2010-0162-1752.1, p.3]

Therefore, MEMA recommends that the agencies add the following advanced technology categories that would be eligible for credit in the final rule: (1) advanced transmission and drivetrain technologies; (2) advanced engine accessory technologies; and, (3) tire/wheel accessories. As appropriate, MEMA has provided some examples of technologies to explain the potential of some of these technology categories (also see Appendix A). Please note that the technologies listed herein are not intended to be comprehensive and MEMA strongly advises the agencies to review companies' specific comments for technology details. [EPA-HQ-OAR-2010-0162-1752.1, p.3]

There are various advanced transmission drivetrain technologies being developed. Generally speaking, these technologies optimize gear shifting that helps to save fuel and extend clutch service life. In many cases, the technology cost of these advanced drivetrain technologies would not increase total vehicle cost and in other cases would provide fuel cost reductions that would provide a return on investment that is acceptable to fleets in the truck market, which typically ranges 18-24 months. [EPA-HQ-OAR-2010-0162-1752.1, p.3]

Examples of advanced drivetrain technologies are Automated Mechanical Transmissions and Automated Manual Transmissions (both go by the acronym AMT) and Dual Clutch Transmissions (DCT). Automatic systems have a communication system between the engine, clutch and transmission, which protects the entire drivetrain, and a drive program, which always selects the most economical engine speed. In manual systems, sensors help prevent accidental gear changes and precision shifts help the transmission remain highly efficient while delivering the power necessary. In some cases the technology can be equipped with clutch-dependent and drive-dependent power-take off units (PTOs). Also, advanced transmission technologies can not only provide comfort and reliability for the operator, but, when combined with application-specific gears and software, the transmission can operate at maximum efficiency. These "customized" transmissions can reduce emissions and fuel consumption by lowering engine speeds or by compensating for high loads and increasing torque demands so that the transmission works as efficiently as required for the application. Also, advancements in materials and transmission housings can help save weight, which has an additive contribution to vehicle efficiency, and, has the added benefit of abating noise. [EPA-HQ-OAR-2010-0162-1752.1, pp.3-4]

Other examples of advanced drivetrain technology include high efficiency axle systems. Parasitic losses in the drive axle of commercial vehicles range from 4 to 7 percent. Through development of advanced mechanical systems and/or the application of electronic controls, parasitic losses can be significantly reduced, perhaps by over 50 percent. The resulting improvement in fuel efficiency correlates strongly with this increased axle efficiency. Development and commercialization of these technologies promise to deliver meaningful improvements in GHG emissions and fuel consumption during the regulatory period of these proposed rules. [EPA-HQ-OAR-2010-0162-1752.1, p.4]

There are also a range of engine accessories that contribute to an engine's fuel efficiency and emissions output. Various mechanical and electrical accessory technologies can impact efficiencies in various ways. In some cases the measure is small, but, again, these efficiencies and improvements can be beneficial when combined appropriately with other technologies. [EPA-HQ-OAR-2010-0162-1752.1, p.4]

An example of an electrical accessory is an Electronic Air Control system. The system is a compact, electronically controlled air treatment system. The system integrates the air dryer, unloader valve, multi-circuit protection valve, and the park brake mechatronics. Its primary functions are air quality assurance, pressure control, air distributions (defined per customer priorities), and information management. The sensors enable optimized system control, plus on-board/off-board diagnostics. The software algorithms determine when it is favorable for the air compressor to build air and when it is favorable to purge the air dryer. The result is lower fuel consumption. Measurements have shown up to one percent reduction of fuel consumption. These systems would also be particularly appropriate (indeed necessary) for vehicles that operate under full battery electric operation. [EPA-HQ-OAR-2010-0162-1752.1, p.4]

Some examples of mechanical accessories are clutched accessories. First, Clutched Air Compressor disengages during the portion of the duty cycle when no air is demanded. This reduces parasitic drag and reduces fuel consumption. Testing has shown a range of one to three percent reduction in fuel consumption. Second, a Clutched Turbocharged Air Compressor routes pressurized air from the engine's turbocharger to the air compressor intake port. Specific power consumption of the compressor is reduced by 30 to 50 percent compared to a naturally aspirated air compressor. Turbocharging of the air compressor has shown an additional one percent of fuel savings when combined with the compressor clutch. Third, a hybrid water pump which uses an electric motor most of the time to reduce parasitic losses, but is driven by a belt at higher loads when maximum cooling is needed, can show a fuel savings of up to two percent. [EPA-HQ-OAR-2010-0162-1752.1, pp.4-5]

Superchargers have provided performance, power and fuel efficiency in the passenger car market for decades. Next generation superchargers designed for diesel engines have the capability to increase vehicle power and acceleration for a wide range of vehicles. Superchargers will increase fuel economy thru engine downsizing, lower particulate emissions (reduction in transient smoke) and GHGs. [EPA-HQ-OAR-2010-0162-1752.1, p.5]

An example of one type of an engine boosting technology enabler is a Pneumatic Booster System. The system is placed near the air intake manifold on an engine and monitors the Controller Area Network (CAN) for specific signals. Once the conditions for activation are met, the system injects compressed air from an auxiliary air tank into the engine manifold, delivering the desired amount of air that the diesel combustion processes require. Typically, when a driver presses down on the throttle to demand acceleration, there is a delay in engine response because of turbo lag. This lag constitutes the time difference between acceleration demand and the maximum air delivery of the turbocharger. The system overcomes turbo lag by instantaneously injecting the desired air into the intake manifold, allowing the turbocharger to spin up to its full capacity and take over the air delivery demands. The result is lower average engine speed which translates to lower fuel consumption. Testing has resulted in one to three percent reduction of fuel consumption. [EPA-HQ-OAR-2010-0162-1752.1, p.5]

Improper tire pressure is a safety issue that, unfortunately, is often overlooked. Small decreases in tire pressure, even just a few pounds per square inch (psi) results in decreased fuel efficiency, tire life, safety, and vehicle handling/performance. In the commercial vehicle market, there are a variety of systems available to passively monitor tire pressure (tire pressure monitoring systems) as well as to actively manage and maintain proper tire pressure (central tire inflation systems). [EPA-HQ-OAR-2010-0162-1752.1, p.5]

Advanced systems, combine the monitoring and the management technologies to be a completely automated system to alleviate the need for actively maintaining tire pressure by the operator/fleet and continuously monitors and applies air pressure, when needed, to the appropriate tire/wheel position. Typically, a tire pressure management system has the following components: centralized processor, air compressor, air control valves and rotary seals near each wheel. The system takes periodic tire pressure readings and makes adjustments according to the desired pressure setting. These systems typically come with several pre-defined settings but also allow the user to enter their own pressure setting, if needed. Also, the pressure settings, current pressures and flat/leak notifications can be on a dash display. By maintaining proper pressures, not only does it provide the obvious safety benefit of mitigating potential flat tires, but also the consistent pressure maintenance helps retain the optimum rolling resistance, which maintains optimal fuel efficiency. [EPA-HQ-OAR-2010-0162-1752.1, p.5]

MEMA urges the agencies to adopt guidelines that the application of advanced vehicle technologies in the vocational category, which, under the proposal, achieves improvements to emissions mainly with engine enhancements. But there is a gap between engine and vehicle improvement targets. Furthermore, there are very few variables available for manufacturers to achieve the overall targets in the vocational segment. [EPA-HQ-OAR-2010-0162-1752.1, p.5]

In the vocational segment there are several advanced technologies newly entering the market that offer significant additional emissions reduction – potentially as large as 10 to 15 percent. These technologies are entering the market slowly, partially because they address a specific transient behavior characteristic of the vocational market and are different from line-haul applications. (Note: Typically, the traditional way technologies enter the business stream is through the linehaul segment and then adapted to the vocational sector.) [EPA-HQ-OAR-2010-0162-1752.1, p.6]

Earlier we mentioned examples of advanced drivetrain technologies – Automated Mechanical Transmissions and Automated Manual Transmissions (AMTs) and Dual Clutch Transmissions (DCT). Power pack testing is proposed by the EPA as an alternative, voluntary certification for hybrid vehicles because the proposed procedures for vocational vehicles do not recognize GHG emissions reduction due to hybridization. Without any modification, the power pack testing procedures applied to non-hybrid drivetrains measure the GHG improvement of an advanced drivetrain. In effect, this extension offers the vehicle manufacturers additional flexibility or variables to achieve the EPA targets and drives the market to introduce these commercially available technologies into the vocational segment. [EPA-HQ-OAR-2010-0162-1752.1, p.6]

Today, the vocational market is dominated by Automatic Transmissions (AT) based on Torque Converter Automatic technology; with more than 85 percent market share, it is the de facto baseline transmission today. MEMA examines the following categories of GHG improvement: (a) the baseline, engine-based improvement as prescribed by the NPRM; (b) hybrid systems; and, (c) advanced transmissions/drivetrains (see Figure I1 below). [EPA-HQ-OAR-2010-0162-1752.1, p.6]

The vocational segment uses about 1 million barrels of oil per day, which is significant. The certification procedure in the NPRM saves four to eight percent fuel, based on an assumed penetration of hybrids between three and 10 percent during the period 2014–2017. The proposed extension of the rule allows for an additional 4.5 percent fuel savings, or alternatively, increased flexibility to achieve the five to 10 percent GHG reduction targets. [EPA-HQ-OAR-2010-0162-1752.1, p.6]

[Figure I-1 can be found on page 6 of this comment.]

NHTSA and EPA also asked for comment on restricting the innovative credit within the subcategory under which it was generated; MEMA does not agree and prefers that the innovative technology credits should be transferable among categories. Furthermore, MEMA requests that the agencies consider extending the availability of innovative technology credits beyond MY2018. This will provide continuous momentum to evolve and elevate more innovative technologies. Perhaps some of the innovative technologies considered as eligible under this rule for MY2014-2018 will be – as characterized in the NPRM – “common” by 2018. MEMA strongly encourages the agencies to continue the availability of such a credit program in the next rulemaking phase beyond MY2018. By not limiting this credit to just 2018, the OEMs and engine manufacturers will be incentivized to always look beyond the horizon. Also, component manufacturers/suppliers will be encouraged to continue to innovate new and creative technologies to take the next generation of commercial vehicles to another level of efficiency and performance. [EPA-HQ-OAR-2010-0162-1752.1, p.8]

Organization: Eaton Corporation

As seen above, there are significant GHG and fuel efficiency gains to be had in the vocational tractor segment of the combination tractor category. However, the situation is different for line-haul tractors where the potential for improvement is reduced, as recognized in the NPRM and shown in the National Academy of Science report, mainly because in line haul applications the drive cycle is such that most of the fuel is consumed at high freeway speed with the transmissions in direct drive where current transmissions are 98% efficient or better.[EPA-HQ-OAR-2010-0162-1649.1, p.10]

There are a number of technologies in research and development stages in the area of automation and driver assistance that can improve driver performance in the line-haul segment of the combination tractor category. If the Agencies consider advanced drivetrain technology incentives for line-haul combination tractors, it is important that the following principles should apply: 1) Set a performance threshold for eligibility to prevent gaming the system; 2) Set a proper baseline consistent with the line haul category (e.g. appropriate manual transmission); 3) Remain technology neutral regarding eligible transmissions or other eligible technologies. [EPA-HQ-OAR-2010-0162-1649.1, pp.10-11]

EPA and NHTSA have proposed the ATC Program targeting particular advanced technologies which would generate special fungible credits that could be applied to other heavy duty vehicles or engines, including those in other categories. [EPA-HQ-OAR-2010-0162-1649.1, p.3]

Eaton strongly supports the EPA/NHTSA proposed design of these fungible ATC credits across engine-to-vehicle and across categories as essential to provide the correct incentive to stimulate market penetration of technologies such as hybrid power systems able to deliver significant fuel consumption and GHG emission reductions. [EPA-HQ-OAR-2010-0162-1649.1, p.3]

Eaton also believes that the Agencies were correct in suggesting an ATC credit multiplier of 1.5 for hybrids and other advanced technologies. These technologies are expensive to develop and purchase. Absent appropriate incentives such as the 1.5 multiplier and fungibility, market penetration of these fuel efficient technologies will suffer. [EPA-HQ-OAR-2010-0162-1649.1, p.3]

Eaton supports the EPA/NHTSA proposed Innovative Technology Credit (ITC) program as an important compliment to the ATC and Early Credit programs. As described, the ITC program is designed to capture the GHG and fuel efficiency benefits of technologies not measured by the test procedures used to determine compliance with the standards (i.e. “off cycle” benefits). [EPA-HQ-OAR-2010-0162-1649.1, p.3]

These emerging technologies, which are “not widely utilized in a particular subcategory” of Vocational or Heavy Duty trucks – if recognized, measured and properly credited – will incentivize early OEM introduction of technologies including advanced transmission (e.g., Dual Clutch) providing fleets with greater product choice. [EPA-HQ-OAR-2010-0162-1649.1, p.3]

The ITC proposal can be improved in important ways. First, EPA and NHTSA should explicitly identify test methods in the final rule which can be utilized for ITC certification. This will provide stakeholders with greater clarity, transparency and certainty and will drive early technology introduction. These methods should include PowerPack as well as appropriate chassis methods that cover large market segments and technologies. The opportunity for other methods to be proposed and considered through a public process should remain. [EPA-HQ-OAR-2010-0162-1649.1, pp.3-4]

Eaton does not agree with the EPA/NHTSA proposal to limit generation of ITC credits to 2018. While some innovative technologies may, in fact, be more common by 2018, new innovative technologies will emerge and face the same barriers to market penetration. Eaton therefore urges EPA and NHTSA not to end either the ATC or ITC programs in 2018. Further, Eaton urges EPA/NHTSA to make the ITC credits fungible across vehicle and engine categories. [EPA-HQ-OAR-2010-0162-1649.1, p.4]

EPA has had extensive and successful experience with programs providing Credits for early action. This Early Credit program in the proposed rule is an important element in incentivizing early adoption of advanced and innovative technologies which can drive important early GHG and fuel consumption reduction benefits. Eaton supports the Early Credit program for these reasons and because it is necessary to prevent market distortion before the 2014 standards become effective. [EPA-HQ-OAR-2010-0162-1649.1, p.4]

Eaton supports the EPA/NHTSA proposal for a 1.5 credit multiplier for all early credits generated prior to the effective date of the 2014 standards. The multiplier is an appropriate mechanism to drive early adoption which would not otherwise occur prior to 2014. [EPA-HQ-OAR-2010-0162-1649.1, p.4]

Eaton recommends that Early Credits should be recognized by product specific over-compliance, rather than by requiring over-compliance with an entire vehicle category. Using a category based approach would severely diminish the value of the Early Credit incentive for hybrid power systems and other Advanced and Innovative Technologies. [EPA-HQ-OAR-2010-0162-1649.1, p.4]

Despite the severe economic downturn, hybrid power is expanding, and we're seeing proven acceptance of hybrid technology among global truck and bus manufacturers as well as fleet owners and operators. The early adopters of the technology are returning to place orders for hundreds of trucks and buses, and a record number of new customers are starting to step forward and experience the benefits of our proven technology. The rule has the potential to impact this momentum in the market; both negatively and positively. Eaton believes that NPRM properly recognizes the potential contributions of hybrid technologies toward the public policy goals of the Rule through the Advance Technology Credit Program and has the potential to create incentives that will accelerate the adoption of this important technology. There are a few potential issues that should be addressed by the Agencies to ensure that the Rule indeed accomplishes this goal: [EPA-HQ-OAR-2010-0162-1649.1, p.11]

1. Definition of a hybrid

2. Hybrid testing procedures

3. Hybrid duty cycles

4. On Board Diagnostics (OBD)

5. Warranty and minimum performance issues

6. Plug In Hybrid vehicles

7. Hybrid testing procedures and duty cycles

8. Class 7 and 8 Vocational Heavy Hybrid Classification [EPA-HQ-OAR-2010-0162-1649.1, p.12]

The Rule must define minimum performance requirements of hybrid systems to avoid market distortions and market "gaming" via mild hybrids while not excluding legitimate hybrid technologies. Eaton believes that the Agencies should use the definition of a hybrid found in the 2005 Energy Policy Act under IRS code section 26 U.S.C. §30B, wherein Congress enacted tax credits for hybrids, Congress created the threshold definition of an eligible heavy-duty hybrid: having an unconventional power system capable of supplying at least 15% of the vehicle's total traction power for a 10 second pulse. (See 26 U.S.C. §30B(d)(3).) The Agencies should adopt the same or a similar threshold definition for hybrid receiving Advanced Technology Credits. [EPA-HQ-OAR-2010-0162-1649.1, p.12]

As for certification for EV and PHEV technologies, the Agencies should rely on existing guidance for EV and PHEV certification for light duty vehicles when calculating GHG and Fuel economy for these types of vehicles. [EPA-HQ-OAR-2010-0162-1649.1, p.14]

Organization: Edison Electric Institute

The proposed HD program appropriately includes flexible compliance options that will reduce the costs for manufacturers and consumers of medium- and heavy-duty vehicles. The flexible compliance options include incentives that will promote the early manufacture and deployment of EVs in these vehicle classes. These incentives will help ensure that EVs are commercially available to serve as compliance options for future HD program emissions standards for model years 2018 and beyond while further reducing GHG emissions from the transportation sector in the near term. [EPA-HQ-OAR-2010-0162-2114.1, p.2]

EPA should not undercut its efforts to incent the manufacture and deployment of EVs in any vehicle class by adopting policies that require that upstream emissions related to the generation of electricity be included in any assessment of EV tailpipe emissions. Tailpipe emissions from electric vehicles (or plug-in hybrid vehicles operating in all electric mode) are zero. Any consideration of upstream emissions will skew the market for EVs, despite the fact that increased EV deployment will reduce GHG emissions from transportation when compared to conventional vehicles. Emissions from electricity generation should be addressed at the source, and EPA has begun the process of regulating these emissions. Moreover, EPA should not use static, outdated national average estimates of upstream emissions when assessing EV emissions. [EPA-HQ-OAR-2010-0162-2114.1, p.3]

The HD Program appropriately recognizes the diversity among the different vehicles and vehicle uses in the medium- and heavy-duty vehicle sector and, accordingly, proposes different standards and regulations to reflect this diversity. [EPA-HQ-OAR-2010-0162-2114.1, p.3]

EEI also supports the proposed flexibility mechanisms in that they are designed to promote the further development and manufacture of medium- and heavy-duty EVs. As EPA notes, advanced vehicle technologies – in particular, hybrid drivetrains and full electric vehicles – will not be necessary to comply with the standards proposed in this rulemaking, which the Agency terms a “first step” in the regulation of GHG emissions from medium- and heavy-duty vehicles. However, EPA states that EVs will play a key role in the next step, which will regulate emissions from vehicles in model years 2018 and beyond. See 75 Fed. Reg. 74172. Flexibility provisions that incent the development and manufacture of EVs before 2018, including the proposed “early credits,” “innovative technology” and “advanced technology” credits, are critical in ensuring that these advanced technologies are commercially available compliance options for “step two” of the HD Program. Using a 1.5 multiplier in calculating these credits would further the effort to spur the early deployment and manufacture of EVs. [EPA-HQ-OAR-2010-0162-2114.1, p.4]

Given the diversity of the medium- and heavy-duty sector, EPA proposes different flexibility provisions for different classes of vehicles. For HD pickups and vans, the primary proposed flexibility provision is a fleet averaging program similar to the one used in light-duty vehicle GHG emissions regulations. See id. at 74197. In the proposed HD program, GHG emissions from EVs manufactured in the HD pickup and van category correctly are determined to be zero. This is the appropriate approach for quantifying emissions from EVs because GHG emissions (for all electric and plug-in electric vehicles operating in all electric mode) measured at the tailpipe are 0.0 grams/mile. EPA indicates, however, that it will consider upstream emissions from the generation of electricity used to power EVs in future HD Programs. [EPA-HQ-OAR-2010-0162-2114.1, pp.4-5]

For GHG emissions standards for light-duty vehicles, EPA determined that it would only use the technically correct emissions value of 0.0 grams/mile for a limited number of EVs sold, citing concerns about upstream emissions related to the generation of electricity. For vehicles sold above this arbitrary limit, EPA assigns an emissions value, based on outdated national data on electricity production. This effectively sets a national cap on the number of light-duty EVs manufactured and/or sold in the U.S., despite EPA's desire to incent a promising technology for reducing GHG emissions from the transportation sector. See 75 Fed. Reg. 25434-25436. [EPA-HQ-OAR-2010-0162-2114.1, p.5]

In this rulemaking, EPA notes that upstream emissions from electricity production should be addressed, but determines that it is not necessary to apply a sales cap to EVs sold in the HD pickup and van category, finding that fewer of these types of EVs will be manufactured and sold for the model years covered by the proposed HD Program, such that EPA does not have to be concerned about "dilution" of emissions standards by commercial introduction of EVs. See 75 Fed. Reg. 74256. [EPA-HQ-OAR-2010-0162-2114.1, pp.5-6]

While EEI agrees with EPA's decision not to apply sales caps on EVs in the HD truck and van category, EEI remains concerned with the Agency's determination that upstream emissions related to electricity production should be addressed in the context of vehicle emissions standards. GHG emissions related to electricity production should not be charged to EVs in this or future rulemakings addressing other model years for any class of vehicle. Instead, vehicle emissions should be measured at the tailpipe, consistent with EPA's regulations for vehicles sold in the United States since the 1970s. Upstream emissions should only be addressed via standards applicable to electricity generators. EPA already has begun the process of regulating GHG emissions from electric generators with the Prevention of Significant Deterioration permitting program that went into effect for some stationary sources on January 2, 2011.4 On December 23, 2010, EPA announced that, under the terms of a settlement agreement, it will finalize New Source Performance Standards for GHG emissions that eventually will apply not only to new units and major modifications, but also existing steam generating units via a final rule to be issued by May 2012. [EPA-HQ-OAR-2010-0162-2114.1, p.6]

Expanded introduction of EVs into all classes and categories of vehicles will serve to significantly reduce GHG emissions from the transportation sector, not "dilute" vehicle emissions standards. See Electric Power Research Institute and Natural Resources Defense Council, Environmental Assessment of Plug-in Hybrid Vehicles, Vol. 1: Nationwide Greenhouse Gas Emissions (July 2007).6 While the carbon intensity of electricity generation plays a significant role in the GHG emissions of EVs, increased deployment of EVs will reduce GHG emissions from the transportation sector, even given the current composition of the generating fleet, as compared to conventional vehicles. See id. ch. 5. [EPA-HQ-OAR-2010-0162-2114.1, pp.6-7]

Charging emissions to EVs will serve as a disincentive to the production and purchase of these vehicles by driving up the cost of compliance with the HD Program. In addition, because EPA does not factor upstream emissions into the emissions of vehicle that use traditional fuels,7 charging emissions to EVs will serve to disadvantage these advanced technologies in domestic markets. The unintended consequence of considering upstream emissions, therefore, is to penalize the use of EVs, contrary to the Agency's stated goal of promoting their use. [EPA-HQ-OAR-2010-0162-2114.1, p.7]

Moreover, EPA's use of a national average for electricity emissions is incorrect. Emissions associated with the generation of electricity vary significantly from utility to utility– with nuclear, wind, solar, geothermal, and hydroelectric powered sources emitting low or no GHGs. Any meaningful estimates of upstream emissions associated with electricity as a transportation fuel would need to be tailored not only to reflect regional variations in current electricity baseload (and/or peak load) generation and expectations for marginal electricity generation mix, but also assumptions about usage of the vehicle, as well as state/federal electric generation policies (such as Renewable Energy Standards) and state/regional/federal GHG emissions limits and reductions programs (e.g., California's A.B. 32, the New England Regional Greenhouse Gas Initiative, and the federal Clean Air Act). Consequently, any static average estimate of upstream emissions based on annualized data from several years ago cannot even begin to approximate the upstream emissions associated with a particular manufacturer's vehicles. If upstream emissions cannot be calculated accurately, they should not be used. [EPA-HQ-OAR-2010-0162-2114.1, pp.7-8]

For the HD Program, EPA determined not to recognize the benefits of flexible (liquid) fuel vehicles, which in the future may include hybrid electric vehicle and plug-in hybrid vehicle technologies to improve fuel economy and lower emissions. See 75 Fed. Reg. 74198. This decision fails to recognize the significant GHG emissions reductions that could be achieved in the near term by employing these technologies. It is also inconsistent with the philosophy of the HD Program, which recognizes the diversity of vehicles and vehicle uses that are encompassed by the medium- and heavy-duty sector. [EPA-HQ-OAR-2010-0162-2114.1, p.8]

Some of these uses may not be compatible with full electric vehicles at this time. For example, utility bucket trucks may have to travel well beyond the driving range of certain current EVs to service the thousands of miles of utility transmissions and distribution lines that bring electricity to customers. In this case, use of hybrids matches the goal of GHG emissions reductions with the current state of technology development and the needs of the vehicle purchaser. Where appropriate, EPA should incent early transition of fleets and utility vehicles to hybrid vehicles. To the extent that EPA has included incentives for hybrids in the light-duty standards, EPA should do so in the HD Program, where applicable. [EPA-HQ-OAR-2010-0162-2114.1, pp.8-9]

Organization: Engine Manufacturers and Truck Manufacturers Associations

Recognizing that advancing technological innovation is a crucial part of future GHG reductions and fuel efficiency improvements, the Proposed GHG/FE Standards also include mechanisms to incentivize the development and deployment of new technologies that may be used to achieve improved GHG/fuel efficiency performance. A manufacturer will be able to earn emissions credits for 'advanced' and 'innovative' technologies that reduce GHG emissions and improve fuel efficiency. [EPA-HQ-OAR-2010-0162-1940.1, p.6]

Specifically, the proposal to restrict early credits to only model year 2013 engines and vehicles precludes manufacturers from earning credits even earlier by pulling forward GHG-reduction/FE improvement technologies into model year 2012. (See 75 FR at 74368, 74386.) Similarly, the proposal requires manufacturers to 'certify their engines and vehicles to the standards at least six months before the start of the first model year of the mandatory standards,' unnecessarily restricting manufacturers from earning credits by introducing new technologies less than six months prior to 2014. (See 75 FR at 74255.) Additionally, the proposed credit provisions require that a manufacturer certify an entire averaging set to the standards to be able to generate credits. Requiring the certification of an entire averaging set further precludes a manufacturer from targeting the early introduction of new technologies on a particular model or vehicle configuration. (See 75 FR at 74368, 74386.) [EPA-HQ-OAR-2010-0162-1940.1, p.9]

Considering the foregoing, and in the interest of promoting the introduction of new GHG/FE technologies early, the Agencies should expand the opportunity for early credits to model year 2012, remove the six-month 'blackout' period prior to the mandatory standards, and allow manufacturers to generate early credits from a particular engine or vehicle family. [EPA-HQ-OAR-2010-0162-1940.1, p.9]

EMA and TMA strongly support the provision of credits for innovative technologies, recognizing that there are many existing or emerging technologies for reducing GHG emissions and improving fuel efficiency that will not be fully demonstrated within the proposed testing and modeling process, particularly since, by definition, 'innovative' engine, transmission, and driveline combinations are not incorporated. into FTP/SET testing or the GEM model. Innovative technologies should be encouraged since they can be cost-effective, and may become the basis for technological advancement. Failure to provide credits for such innovations would bias the industry toward the development of technologies for which credits are already given within the limited scope of the proposed testing and modeling provisions, rather than focusing on truly innovative possibilities. [EPA-HQ-OAR-2010-0162-1940.1, pp.9-10]

While supportive of innovative technology credits, the Associations are concerned that the Agencies' proposal in this regard lacks the certainty that manufacturers require. Manufacturers need to know with a reasonable degree of certainty whether an 'innovative technology' will be considered as such, and to what extent that 'innovative technology' will be eligible to generate emission credits. Without that certainty, manufacturers will not be able to complete the necessary cost/benefit and return-on-investment analyses that govern whether innovative projects should be implemented and pursued. Thus, clear and certain guidelines are required from the Agencies regarding the approval and credit-generation process for innovative technologies. At the same time, the Associations recognize that 'innovative technology,' by its very nature, cannot be fully anticipated, nor can the appropriate approval process be fully defined. Nonetheless, it is feasible to anticipate the impacts of many potential technologies and to provide examples of how they could be adequately demonstrated. One way to accomplish this would be for the Agencies to provide some categorization of technologies and provide more structure and certainty to the process for generating innovative technology credits for each category. Indeed, EPA and NHTSA already are doing that for hybrid technology. [EPA-HQ-OAR-2010-0162-1940.1, p.10]

It is also important to recognize the relatively low volume of the commercial truck market as compared to that for light-duty cars and trucks. Because of that, only limited funds are available for technology development, and an overly burdensome innovative technology approval process would be cost-prohibitive. Accordingly, and by way of example, the Agencies should not require field testing to demonstrate statistical significance. (See 75 FR at 74257.) While such testing may be feasible for high volume markets such as that for cars and light trucks, it is cost-prohibitive for heavy duty vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.10]

Manufacturers also are concerned about the need to subject data to a 'public evaluation process,' since innovative technologies are also likely to be highly proprietary. (See id.) That becomes even more problematic if a manufacturer enters into discussions with the Agencies prior to fully developing the technology (in order to gain assurance that it can be approved). The nature and timing of the publication of this data must carefully balance the need to protect confidential business information against any interest in public input to the approval process. [EPA-HQ-OAR-2010-0162-1940.1, p.10]

Considering the foregoing, the Agencies need to define a clear path to the certification of innovative technologies. One possibility is to use the long-standing fuel consumption test procedures jointly developed by the Society of Automotive Engineers (SAE) and the Technology & Maintenance Council (TMC), specifically the 'Type II' or 'Type III' procedures. Those test procedures provide accurate methods of comparing the in-service fuel consumption of a vehicle with two different technologies. The Agencies should allow manufacturers to utilize those industry-accepted test methods to achieve approval of the CO_2 reductions and fuel efficiency improvements of an innovative technology. [EPA-HQ-OAR-2010-0162-1940.1, p.10]

Organization: Florida Power & Light Co.

Encourage the aggressive further development of hybrid and similar technologies by recognizing significant past efforts and providing benefits to the manufacturers, and price reductions to customers that actively support them. [EPA-HQ-OAR-2010-0162-2115.1, p.5]

The hybrid developmental effort required a significant investment of time and resources, and assumption of risk, in this case by International Truck and Engine, and Eaton Corporation, and also by a small, forward thinking and progressive group of their customers. The results were a “giant step” improvement – as mentioned above 40% - 60% reduction of fuel consumption and 90% emissions reduction. Further continued development will require similar investment. It would appear that some mechanism for recognizing this effort as part of the “flexibility” or “credit” provisions of this rulemaking would be appropriate. We would encourage NHTSA/EPA to make such provisions flexible and liberal both in time and amount, and to consider providing financial benefit to customers who support the manufacturer’s efforts. [EPA-HQ-OAR-2010-0162-2115.1, p.5]

FPL concurs with your judgment that in the overall scope of this rulemaking, the best approach for encouraging the expansion of electric vehicle technology is to exclude emissions related to the source of the electricity from the emission calculation. On December 23, 2010, EPA announced that it will finalize New Performance Standards for greenhouse gas emissions that will apply to new power generating units, major modifications, and eventually to existing units, with a final rule to be issued by May of 2012. Furthermore, we feel that it would be extremely difficult, given the diverse nature of power generation technologies and resulting diverse emissions in different areas of the country, to develop a valid methodology to apply generating unit emissions to electric vehicles. Our Company also supports the position of the Edison Electric Institute regarding this issue. [EPA-HQ-OAR-2010-0162-2115.1, p.5]

Organization: Green Truck Association (GTA)

The GTA supports the recognition of advance technologies in the averaging, banking and trading system (ABT). The proposed provisions would create incentives to incorporate technologies such as hybrid systems and electric vehicles by making them eligible for special credits. These credits could be applied to other vehicles or engines, including those in other categories. The ABT system could potentially accommodate some level of multiplier to further incentivize such technology. [EPA-HQ-OAR-2010-0162-1596.1, p.2]

In considering advanced technologies that would qualify for ABT the GTA believes that any idle-reduction technology should be included. The GTA feels also that things such as advances in specialized and lighter weight materials and others should be included, not only driveline technologies. [EPA-HQ-OAR-2010-0162-1596.1, p.2]

The GTA believes that providing a credit multiplier of 1.5 or 2.0 is appropriate and reasonable to provide an additional incentive to incorporate new advanced technology. In addition to a base multiplier of 1.5 or 2.0 the agencies should consider the possibility of additional incremental multipliers for incremental improvements provided by advanced technology over and above the baseline. [EPA-HQ-OAR-2010-0162-1596.1, p.2]

Advanced technology can help reduce greenhouse gas emissions and increase fuel efficiency while reducing foreign oil dependency and should be promoted. Despite these benefits, advanced technology can face an economic hurdle as it can be more expensive than traditional methods of fuel usage reduction. [EPA-HQ-OAR-2010-0162-1596.1, p.2]

An ABT multiplier can help level the playing field for more expensive technologies which will help speed their adoption by the marketplace. Making those credits usable across heavy duty categories helps also to increase the incentive value for advanced technologies. [EPA-HQ-OAR-2010-0162-1596.1, p.2]

The agencies should also consider allowing additional companies to participate in the ABT system. Often, the intended use of the completed truck is unknown as the chassis is being built. Understanding the intended use of the truck can allow for the application of appropriate advanced technologies that might not make sense on that particular chassis for other work purposes. As such, not all advanced technologies are necessarily installed by the engine or chassis manufacturer or by the time the chassis is completed. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

For instance, there are hybrid systems for heavy duty trucks that will be utilized at the worksite to power truck-mounted electrical and hydraulic equipment that can be, and are being installed by later-stage manufacturers. Indeed, such systems can be retrofitted to fully completed trucks. These hybrid systems, tied to the power take off (PTO) unit, can reduce diesel fuel usage at idle by 50% or more. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

To best incentivize the use of advanced technologies, the entity installing the applicable technology should be given control of the credits. We recognize this would add complexity to the ABT system but it would greatly promote the end use of advanced technologies. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

The GTA supports the agencies' proposal to provide ABT credits for new and innovative technologies that reduce fuel consumption and CO2 emissions. We would suggest, however, that those credits not be restricted to the subcategory within which they were generated. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

Any technology that reduces greenhouse gas emissions and increases fuel efficiency creates societal benefits – not simply benefits that are restricted to one segment. The ABT credits accrued should be usable across vehicle lines and classes as the benefits for which they were earned are not limited. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

Similar to the advanced technology credits, also we would suggest that these credits be made available to entities other than the engine manufacturer or OEM that may install them after completion of the chassis. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

The GTA believes that providing a credit multiplier of 1.5 or 2.0 is appropriate and reasonable to provide an additional incentive to incorporate new and innovative technology. In addition to a base multiplier of 1.5 or 2.0 the agencies should consider the possibility of additional incremental multipliers for incremental improvements provided by new and innovative technology over and above the baseline. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

Innovative technologies should be well incentivized as it requires risk taking and investment to develop. It is through new inventions and new applications of technology that we will see breakthrough improvements in fuel efficiency and greenhouse gas reduction. Technological developments of this caliber may well come from small companies or individuals. Those entities should not be faced with putting that technology directly in the hands of another company in order to fully benefit from the ABT system. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

Organization: Heavy-Duty Fuel Efficiency Leadership Group

For vocational trucks, EPA and NHTSA have proposed GHG and fuel consumption standards that would achieve reductions of 7% - 10% depending on the size of the vocational truck (Light Heavy, Medium Heavy and Heavy Heavy). While only engine efficiency and tire rolling resistance are required inputs, the proposed rules have provided flexibilities and incentives to encourage adoption of hybrid power systems across very diverse vocational applications which include the following categories:

- Delivery, refuse, utility and cement trucks

- Transit, Shuttle and School Buses

- Energizing Vehicles and Tow Trucks [EPA-HQ-OAR-2010-0162-1620.1, p.3]

The Agencies have attempted to capture additional technologies not specifically included in the proposed standards that could be utilized to achieve greater improvements through the Advanced Technology Credit (ATC) and Innovative Technology Credit (ITC) programs. The Leadership Group supports these programs. [EPA-HQ-OAR-2010-0162-1620.1, p.3]

In considering the inclusion of additional technologies in the base or ATC and ITC programs, EPA/NHTSA will need to carefully consider the impact on the standards in the regulation, measurement of improvement, certification procedures, generation and application of credits and other key details. One important area highlighted by the Group is transmission efficiency, which could potentially utilize the PowerPack testing procedure to accurately measure the GHG and fuel efficiency benefits of advanced driveline technologies such as Dual Clutch and other novel approaches being introduced into the market in the near future. With the proper considerations, these driveline improvements could be directly included in the regulation and result in significant GHG and fuel efficiency improvements. [EPA-HQ-OAR-2010-0162-1620.1, p.4]

Another way that the Agencies have attempted to limit unintended consequences is through inclusion of various flexibility provisions in the proposal. The Leadership Group strongly supports the Averaging, Banking and Trading provisions as well as the ability to generate advanced Innovative Technology and Early Credits. [EPA-HQ-OAR-2010-0162-1620.1, p.5]

Organization: Honeywell

Credit programs designed to promote real world benefits are an important addition to compliance testing. The credit programs created for the medium- and heavy-duty vehicle segments should not be premised on forcing particular types of technology, such as electric drive-trains, but instead should be technology neutral. Advances in traditional engines will contribute the majority of real world benefits during the time-frame covered by this rulemaking. For future model years, both continued improvements in traditional engine technologies and their adaptation to alternative drive-trains will further assist in reducing emissions. Advanced and innovative technology programs should be designed to capture these benefits by encouraging new turbo-technologies as applied to both traditional and emerging drive-trains. [EPA-HQ-OAR-2010-0162-1891.1, p. 3]

Organization: Hybrid Truck Action Group (HTAG)

It is because of these concerns that we applaud and vigorously support EPA/NHTSA's proposed Advanced Technology Program and the Innovative Technology Credits Program. These programs provide a framework for rewarding, within the structure of the rule, advanced technologies. Since the program is voluntary, it supports but does not force technologies into the market, yet it allows fleets to continue to choose those technologies and apply them to the vocational duty cycles where they perform best. [EPA-HQ-OAR-2010-0162-1817.1, p.2]

We support the concept of a credit “multiplier” for advanced technologies. While there is no strong consensus on a specific credit level, we do believe the credit multiplier outlined in the rule proposal (1.5) is a useful starting place. While this will not directly assist the fleet market to purchase vehicles, it will provide compliance rewards for suppliers and manufacturers to include advanced technologies in their product portfolio and encourage them to maintain their investments. [EPA-HQ-OAR-2010-0162-1817.1, p.2]

The credits provided in this program are extremely important as the market is in the early stages for many of these effective technologies. The proposed rule will serve as a major voluntary catalyst for technologies that will reduce fuel consumption and emissions by as much as 50% and more in some vocational applications, far beyond what is required for vocational trucks in the proposed rule.

We also support early credits for selling hybrid and plug in trucks (in advance of the regulation. There are already early production hybrid and electric trucks and will soon be plug-in hybrid-electric trucks in the market. Where these provide real reductions (as verified via testing) from current baseline vehicles we fully support manufacturers or suppliers receiving credit for these deployments before the regulation. We do not believe these early credits will harm compliance, but would be very willing to work with EPA/NHTSA to understand any such impacts better. It is our belief the salutatory benefits of earlier carbon reductions outweigh concerns about potentially building up too many early credits. [EPA-HQ-OAR-2010-0162-1817.1, p.3]

We as a group are generally supportive of the flexibility proposed by EPA/NHTSA in allowing transfer of Advanced Technology Credits across vehicle platform groups. However, not all our members are comfortable with it. We strongly believe this credit flexibility will encourage greater and earlier reductions than called for in the vocational segment, for instance, than would happen without such flexibility. There are some concerns this flexibility might provide greater rewards to companies with product offerings in multiple categories. We would encourage EPA/NHTSA to set up a work group with industry to help quantify, better understand and mitigate through rule language unintended outcomes that might result from this flexibility. Given the relatively low expected volumes of hybrid and plug in vehicles during the rule’s time horizon, and the discount factors applied to transferred credits, we believe there may be a self-limiting function to this. [EPA-HQ-OAR-2010-0162-1817.1, p.3]

Organization: Institute for Policy Integrity

The agencies’ proposed credits for early compliance and advanced vehicle technologies may help incentivize early, cost-effective reductions and long-term investment in new technologies. Unfortunately, in awarding these credits, the agencies propose to treat electric vehicles as if they had zero greenhouse gas emissions. The agencies should reconsider this approach. Electric vehicles do not have a zero carbon emissions value: electric vehicles run on energy from an electric grid, and producing this electricity emits carbon. The proposed rule does not account for these upstream emissions, even though it easily could assign all electric vehicles an emissions figure based on the national average for electricity production, or require manufacturers to report the specific average amount of greenhouse gases emitted for each electric vehicle model. [EPA-HQ-OAR-2010-0162-1895.1, p.13]

The agencies also ask for comments on applying a 1.5 multiplier to early and advanced technology credits. Generally, the agencies should give careful thought to whether the benefits of early action and investment in research justify that size of a multiplier. But the credit multiplier is perhaps most dangerous where credits are not based on real emissions reductions. Namely, if electric vehicles are treated as having zero emissions and then awarded 1.5 credits, that combination will allow manufacturers to avoid emissions cuts elsewhere and will undermine the regulatory goals. [EPA-HQ-OAR-2010-0162-1895.1, p.13]

Organization: International Council on Clean Transportation (ICCT)

Credits are also available for “innovative” technologies if savings from these technologies can be demonstrated to the satisfaction of the agencies. With regard to transmissions, should the agencies be unable to assign a fixed percentage savings to the specified transmission improvements for vocational vehicles as discussed above, both the chassis test and the post-transmission powerpack options should be available for demonstrating benefits, and the final rule should state this explicitly. For “innovative” technology credits more generally, the agencies should provide extensive guidance on eligible technologies, pre-approved test protocols, and suitable test cycles. Doing so would give manufacturers the certainty that they could gain credits for these technologies in a well-defined and straightforward fashion, reducing risk and expense. [EPA-HQ-OAR-2010-0162-1945.1, p.7]

The value of the advanced and innovative technology credits could also be increased by allowing them to be applied across classes, but the ICCT feels that this is not a good idea. In this first phase of the rule, it is important that all covered engine and vehicle categories be required to reduce fuel consumption and GHG emissions, and that flexibility provisions not create inequities and loopholes in the standard. [EPA-HQ-OAR-2010-0162-1945.1, p.7]

Keep the application of advanced and innovative technology credits to the same class in which they were earned. [EPA-HQ-OAR-2010-0162-1945.1, p.7]

Organization: National Automobile Dealers Association (NADA)

The final rule must do more to incentivize the purchase of alternate fuel and new technology vocational trucks and tractors. As noted in the NAS report, natural gas, propane, biofuel, hybrid, and/or plug-in electric vehicles each offer a significant potential for reducing petroleum fuel use and/or GHG's. However, each of these alternatives involves significant cost, performance, infrastructure and other concerns. These concerns are being addressed through numerous EPA, DOE, DOT, and state research, grant, and loan programs. However, the final rule could and should supplement these efforts with an appropriate credit scheme designed to promote and reward the in-use adoption of these alternative fuels and new technologies. It would appear that an expanded and fully-fungible version of the proposed Advanced or Innovation Technology Credit would be the best way for the rule to incentivize alternate fuels and new technology vehicles and systems. [EPA-HQ-OAR-2010-0162-2705, p.9]

Organization: National Truck Equipment Association (NTEA)

The goals of this rulemaking include increasing the fuel efficiency of trucks, reducing greenhouse gas emissions and also to lower our nation's dependence on oil. Alternative fuels along with advanced and innovative technologies potentially can accomplish all three of those goals. If they can accomplish those goals they should be incentivized. [EPA-HQ-OAR-2010-0162-1608.1, p.9]

The NTEA supports ABT credits for the use of alternative fuels, advanced and innovative technologies. The credits should be fungible across vehicle categories and should be made available to the entity responsible for the installation of the advanced or innovative technology or the conversion to an alternative fuel. The credits should be based on a 1.5 multiplier of the demonstrated benefits of the alternative fuel or technology over a similar diesel or gasoline based vehicle. [EPA-HQ-OAR-2010-0162-1608.1, p.9]

Organization: Natural Resources Defense Council (NRDC)

NRDC recommends the use of standard stringency, as opposed to additional credits, to drive development and deployment of the advanced technologies, such as hybrid drivetrains. The agencies propose to allow generation of "advanced technology" credits for manufacturers that sell hybrids, Rankine cycle engines, all-electric vehicles and fuel cell vehicles. Very cost-effective, off-the-shelf technologies are available to meet the standards, however, so it is unlikely that the advanced technology credits will be an effective motivator for advanced technology deployment. In the vocational vehicle segment, where hybridization and other advanced technologies are very applicable, the standard fails to capture even less sophisticated conventional transmission and weight reduction benefits. As discussed in the vocational vehicle stringency section above, NRDC recommends tightening the stringency to capture the fuel and emissions savings benefits of a broader suite of technologies, including advanced technologies. [EPA-HQ-OAR-2010-0162-1776.1, p.11]

NRDC opposes a multiplier for advanced technology credits and urges EPA and NHTSA to consider removal of cross-category trading of advanced technology credits. Because the standard is not driving advanced technology deployment, credits issued for the technology are windfalls and not providing additional fuel consumption and emissions reductions beyond what the standards require. The multiplier would make the windfall larger. By making the advanced technology credits tradable across categories (because they are not valuable in the vocational sector, for example), the windfall credits could undermine deployment of conventional technologies in other classes where less expensive technologies could be more widely adopted and result in larger overall emissions and fuel use reductions. [EPA-HQ-OAR-2010-0162-1776.1, p.11]

NRDC appreciates the EPA and NHTSA's interest in encouraging creative approaches to GHG reductions that are not captured in an existing compliance test cycle ("innovative technology credit program"). However, in order to maintain the integrity of the standard, any granting of credits must be based on a sufficient data to scientifically verify that the reductions are real, quantifiable, enforceable and surplus. To ensure full transparency, any approval of innovative credits should be open to public input prior to final agency decisions. We also support the proposal to restrict the use of innovative technology credits to within the subcategory where the credit was generated. [EPA-HQ-OAR-2010-0162-1776.1, p.11]

We support proposal to treat flexible fuel vehicles (FFVs) similarly to conventional fuel vehicles, in that FFV emissions are based on actual CO2 results from emissions testing on the fuels on which it operates unless it can be demonstrated a low carbon ethanol fuel is being used in the vehicles. This is the only approach which is consistent with EPA's obligation to accurately quantify and credit emissions from vehicles fueled on different alternative fuels. [EPA-HQ-OAR-2010-0162-1776.1, p.11]

1. Treating Advanced Technology Vehicles as "Zero" Emissions Undermines Pollution and Technology Benefits of Program

NRDC fully supports the development and deployment of electric drive vehicles. However, we are also concerned that applying a 0 gCO2/mi upstream emissions factor for these vehicles allows manufacturers to use these credits in other parts of their fleet, resulting in higher actual greenhouse gas emissions. Production of only a small number of electric vehicles could slow the penetration of conventional vehicle technologies to cut emissions across a broad part of the fleet. NRDC raised this concern in the context of the light-duty vehicle MY 2012 to 2016 rulemaking and continues to believe that the upstream emissions for electric-drive vehicles must be counted in the vehicle regulation. [EPA-HQ-OAR-2010-0162-1776.1, pp.11-12]

Organization: Navistar, Inc.

All credits, including any innovative or advanced technology credits, should be available across all classifications, between engines and vehicles, and available for use in the future (i.e., 2017 and beyond). As proposed, the flexibility provisions arbitrarily restrict the fungibility of credits and undermine the feasibility of the standards.

The innovative technology credits for engines and vehicles should be completely flexible, like the advanced technology credits.

Advanced SmartWay early compliance or over-compliance also needs to be recognized as an advanced technology credit. SmartWay vehicles sold before 2014 should generate credits under the advanced technology provision.

Innovative technology credits should be available broadly, including credits for technologies that allow the use of lighter engines because such use reduces fuel usage and CO2 emissions in real world operation. [EPA-HQ-OAR-2010-0162-1871.1, p.2]

Recognition of this process will allow manufacturers to bring new innovations, such as Advanced SmartWay vehicles, to market. Recognition of this process also means that manufacturers must be allowed to apply credits with the maximum extent of flexibility. As currently written, only advanced technology credits may be used with sufficient flexibility to fully realize potential technologies. That distinction is arbitrary. All credits generated from either the vehicle or engine should be available for use not only by all engine/vehicle families and classes but also from engines to vehicles and vice versa. Innovative technology credits should be applicable across engines and vehicles. The current proposal arbitrarily restricts the fungibility of credits and impacts the feasibility of the standards. [EPA-HQ-OAR-2010-0162-1871.1, p.6]

Innovative technologies must be encouraged to support investment and must be broad enough to compensate for the lack of lead time. Given EPA's feasibility analysis, the innovative technology provisions for engines and vehicles are essential and must be broadly applicable to allow for the greatest opportunity for their development. Credits must also be available across engine families, across vehicle classifications, and from the engine to the vehicle and vice versa for reasons discussed in more depth in Section II.D. below. [EPA-HQ-OAR-2010-0162-1871.1, p.12]

For these same reasons, EPA must take an expansive view of what constitutes an "innovative technology." For example, at a public hearing held on the proposed rules on November 15, 2010, EPA pointed out that weight is an area where innovative technologies credits may be available; however, the Proposed GHG Rule lacks any explanation of the methodology EPA proposes to use when evaluating weight or other improvements as "innovative" technologies. EPA must adopt a broad approach to crediting improvements in weight and other innovative technologies. For example, substitution of lighter-weight components for heavier components in both the engine and vehicle is an innovative technology. This is also an example of why an innovative technology cannot be placed in a restricted classification box – an innovative technology that decreases the weight of an engine has the same beneficial consequences as a technology that decreases the weight of a vehicle component. Allowing trading of credits for weight between engine and vehicle allows optimization based on a particular vehicle application. [EPA-HQ-OAR-2010-0162-1871.1, p.12]

Moreover, the "innovative technology" concept must also encompass actions to transform fleets to higher efficiency vehicles. Design and other changes made to meet a customer's needs with lighter engines must be incentivized under the innovative technologies provision. Without such incentives, some of the most significant actions a manufacturer can take to move customers to lighter and more efficient engines will be missed. For example, lightweight engines allow reduced bobtail or tare front axle loading. Lighter bobtail front axle loads in turn allow a farther-forward fifth wheel placement than heavier bobtail front axle loads, which reduces trailer gap and can substantially reduce aerodynamic drag. Moreover, downsizing engine displacement through advanced technologies such as better power cylinder structure and materials, high boosting turbo machinery, and high injection pressure improves engine efficiency and total weight. These technologies bring forward the engine-technology frontier and need to be incentivized for the sake of feasibility and cost effectiveness. [EPA-HQ-OAR-2010-0162-1871.1, pp.12-13]

The Proposed GHG Rule also lacks a clear definition of the important phrase "not in common use" prior to 2010. Does "not in common use" include variations on a technology that is in common use? What standards will EPA use to judge whether a technology was in "common" use? EPA needs to define its intent, and that definition must make clear that "not in common use" is to be read broadly to allow for generation of credits. If a particular set of technologies is used in a new way or to a new purpose that will achieve GHG reductions, such technologies should qualify as not having been in "common use." This includes implementing and adapting a set of technologies in order to encourage the use of lighter engines for applications dominated by larger engines. Additionally, in the NAS Report, the National Research Council clearly indicated several advanced powertrain technologies and their potential to positively impact engine emission and efficiency, including high injection pressure, variable valve timing, combustion feedback control, cold EGR for low temperature combustion, turbo compounding, and waste heat recovery. These advanced technologies are only now beginning to emerge. Early implementation of any of these technologies should be considered "not in common use" and, thus, entitled to generate innovative technology credits. [EPA-HQ-OAR-2010-0162-1871.1, p.13]

Also, the method the Agencies have proposed to evaluate innovative technologies is flawed. EPA has stated that the credits will be allowed "consistent with" the LD rules at section 86.1866-12(d); however, the LD rules do not fully allow for the range of innovations that are possible in the heavy-duty market. For example, the Agencies should not require field testing to demonstrate statistical significance. Although such testing may be feasible for high volume LD vehicles, it would be cost-prohibitive for heavy-duty vehicles. Moreover, the auto market structure is vastly different (push versus pull) from heavy-duty; therefore, using LD regulations as the model for heavy-duty technologies will carry inherent misapplications. Increased flexibility over LD regulations will allow heavy-duty manufacturers to navigate this large and complex rule. The heavy-duty industry already has a long history of improving fuel efficiency and this proposed regulation must enable continued improvements and innovation. Increased flexibilities over LD methods serve these purposes. [EPA-HQ-OAR-2010-0162-1871.1, pp.13-14]

Moreover, any requirement to seek, collect, and respond to a "public evaluation process" would chill the development of innovative technologies by unnecessarily adding time and cost to the credit process. EPA proposed to use the same language at 40 CFR § 86.1866-12(d) in the regulations applicable to LD vehicles, but it is not appropriate in the context of heavy-duty engines and vehicles. As EPA acknowledges extensively in the joint preamble, the heavy-duty market is significantly different than the LD area, with a far greater diversity of vehicle types and configurations. Navistar expects that this diversity will also be reflected in the number of potential innovative technologies that will arise in the heavy-duty market. A "public evaluation process" with regard to each potential technology would seriously impact the time to approval and discourage investment in innovative technologies. Accordingly, the requirement for a "public evaluation process" must be deleted consistent with EPA's own feasibility analysis. If the Agencies create such significant burdens that no manufacturer actually takes advantage of the potential credit opportunities, then the Agencies eviscerate the very flexibilities that they themselves admit are critically necessary to make this Proposed GHG Rule feasible under the CAA and EISA. Indeed, EPA has no facts on this record to show that innovative technology credits will be pursued if "public evaluation" is required. As a result, the Agencies are making innovative technology a practical nullity and the proposed standard technologically "infeasible." [EPA-HQ-OAR-2010-0162-1871.1, p.14]

Moreover, the large variety of innovative technologies should lead EPA to streamline the review and approval process. The proposed current timeframe is too long. Because of the greater range of potential configurations in heavy-duty, when considering innovative technologies at both the engine and vehicle level, there will be substantially more proposed innovative technologies than in the LD realm. Thus, EPA should institute a program that allows qualified third parties to conduct initial evaluations of innovative technologies, with EPA later reviewing the innovative technologies on an expedited basis. [EPA-HQ-OAR-2010-0162-1871.1, p.14]

The innovative technologies provisions have the potential to become a powerful force for new advances. For that potential to be meaningful, EPA must allow the greater breadth of flexibility described above. [EPA-HQ-OAR-2010-0162-1871.1, p.15]

Navistar strongly supports the provision of credit for advanced technologies. We believe that broad compliance flexibility drives innovation, and we agree with EPA and NHTSA that the development and deployment of advanced technologies must be encouraged because they will be a basis of technological advancement and an "important part" of a "possible next set of regulatory standards." Navistar also endorses the Agencies' proposal to allow unrestricted use of advanced technology credits. EPA and NHTSA correctly determine that such credits should be applicable to any heavy-duty vehicle or engine, regardless of the vehicle or engine category that generated the credit. Such flexibility allows manufacturers to better manage technology development while achieving overall environmental goals. Moreover, Navistar agrees that a credit multiplier of 1.5 is appropriate "as a greater incentive for their introduction." A 1.5 credit multiplier properly rewards the innovation and commitment of resources needed to develop and deploy such technologies. [EPA-HQ-OAR-2010-0162-1871.1, p.29]

Navistar also strongly supports the designation of credits generated from vehicles using "Advanced SmartWay" or "Advanced SmartWay II" technologies as advanced technology credits. The Agencies' request for comment, and the preamble generally, implicitly recognize the importance of including such technologies within the advanced technology category. As noted by the Agencies, heavy-duty trucks under the voluntary SmartWay program "represent the pinnacle of current heavy-duty truck reductions in fuel consumption." The Agencies drew heavily from that program in developing the proposed standards. Trucks utilizing Advanced SmartWay and, eventually, Advanced SmartWay II will build upon the technologies and strategies developed to date under the SmartWay program. As such, Navistar believes it is necessary to designate such technologies as advanced technologies and that early compliance (i.e., before 2014) or over compliance (i.e., more in 2014 and beyond than needed in the proposed regulations) be considered an advanced technology credit. [EPA-HQ-OAR-2010-0162-1871.1, p.30]

For the same reasons, "SmartWay" trucks sold before 2014 must be permitted to generate advanced technology credits. As noted above, the Agencies recognize that these trucks represent the current "pinnacle" of fuel consumption reduction. Participation in the program is voluntary and providing opportunities to generate credits is a means to reward participation in the program. As a result, the Agencies must be seeking to incentivize participation in, and to accelerate the development and deployment of technologies under, such program. Failure to provide credits for such improvements would create a disincentive for manufacturers to develop and deploy such technologies until such time as is mandated by regulation. Opportunities for innovation will be lost. Accordingly, the Agencies must encourage early compliance before 2014. [EPA-HQ-OAR-2010-0162-1871.1, p.30]

Moreover, as with the other proposed advanced technologies, SmartWay, Advanced SmartWay and Advanced SmartWay II technologies "lend themselves to straightforward methodologies for quantifying the emission or fuel consumption reductions." For instance, similar to hybrid technologies, SmartWay technologies could be demonstrated using an "A to B" testing method (where the "B" vehicle uses the SmartWay version with all else being equal). [EPA-HQ-OAR-2010-0162-1871.1, p.30]

And, designating SmartWay, Advanced SmartWay and Advanced SmartWay II technologies as approved for advanced technology credits has the double benefit of incentivizing participation in the SmartWay program itself. EPA and NHTSA correctly observe in the preamble the importance of this program to the gains made in reducing fuel consumption and the emissions of GHGs. Providing credits will correctly reward the implementation of new technologies under this innovative collaboration. [EPA-HQ-OAR-2010-0162-1871.1, p.31]

Finally, as discussed in-depth previously in relation to innovative technology credits, the use of advanced technology credits must be available to achieve the proposed alternative standard under the draft regulations. See supra at Parts III.B., D. Likewise, those credits that are not needed to meet the alternative standard must be able to be "banked" for future use in 2017 and beyond. By unduly restricting the very flexibility provisions that the Agencies rely on to justify the Proposed GHG Rule, the Agencies themselves make the proposed standards infeasible and, thus, in violation of the CAA and EISA. [EPA-HQ-OAR-2010-0162-1871.1, p.31]

NHTSA proposes in subpart 535.7(e)(2) that it "may adopt the same amount of fuel consumption [innovative technology] credits into its program" that EPA adopts. Navistar strongly supports innovative technology credits. See supra at Part III.B. Indeed, the current proposal is too narrow. Innovative technology credits must be treated with the same flexibilities as advanced technology credits in order to create a more robust incentive structure for rapid progress toward GHG emission and fuel consumption reduction. See id. NHTSA and EPA correctly observe that these "special" credits are necessary in order to provide manufacturers flexibility in complying with the standards and to incentivize technology development. [EPA-HQ-OAR-2010-0162-1871.1, pp.60-61]

Given the recognized importance of these credits, NHTSA must revise the language of its proposed rule to reflect that innovative technology credits under the EPA program "shall" be adopted by NHTSA. The agency must ensure that innovative technologies be assigned equal importance and equal "credit" under both programs. There is no rational basis why credits that qualify as "innovative technology" under EPA's program should not automatically qualify for credit under NHTSA's program. In order to meet the Agencies' stated objectives of the joint proposal, NHTSA must revise its proposed regulation to "shall adopt." [EPA-HQ-OAR-2010-0162-1871.1, p.61]

Organization: Odyne Systems, LLC

As acknowledged in the proposed rules, trucks are often manufactured in multiple stages using multiple manufacturers. Odyne's unique hybrid technology can be installed by the chassis manufacturer during the incomplete vehicle manufacturing process (also known as the OEM chassis manufacturing stage), during an intermediate stage of manufacturing or during the final stage of manufacturing. While outside of this rule making, the Odyne hybrid system can also be retro-fit on existing vehicles that are already in commerce (conventional trucks can be converted to hybrids using Odyne's patented and patent pending minimally-intrusive technology). [EPA-HQ-OAR-2010-0162-1853.1, p.2]

Odyne strongly recommends that other entities involved in truck manufacturing, besides the chassis manufacturer, also known as the incomplete vehicle manufacturer, be eligible for credits and benefit from the ability to transfer credits. The actual application for a truck may not be known until after the chassis has been manufactured. Vocational trucks can especially benefit from the installation of a hybrid system in the intermediate or final stage of manufacturing where it can be best matched to the application and equipment that is mounted to the truck. Energy storage and electric motor power for drive cycle efficiency and job-site idle reduction can be most appropriately specified after the application is understood. [EPA-HQ-OAR-2010-0162-1853.1, p.2]

Allowing only chassis manufacturers to accrue and transfer credits creates an un-level playing field in which smaller companies with advanced or innovative technology are at a disadvantage to large transmission suppliers and other entities already within the chassis supply chain. In some cases, it is foreseeable that a large windfall for established suppliers may be caused by the currently contemplated regulatory approach that only includes the chassis manufacturer. [EPA-HQ-OAR-2010-0162-1853.1, pp.2-3]

Odyne encourages the EPA and NHTSA to further strengthen the “provisions to account for and credit the use of hybrid technology as a technology that can reduce emissions and fuel consumption. Hybrid technology can currently be a cost-effective technology in certain specific vocational applications, and the agencies want to recognize and promote the use of this technology.” (p. 32 of 673). [EPA-HQ-OAR-2010-0162-1853.1, p.3]

Odyne suggests that advanced technology credits be multiplied higher than 1.5 and suggests a 2.0 multiplier to encourage the development of technology that has the capability to provide much larger reductions in green house gases. Odyne recommends that the EPA and NHTSA continue to compel chassis manufacturers to meet higher efficiency base regulations with engine improvements and the inclusion of low rolling resistance tires, especially for vocational applications, while offering additional credits to hybrid suppliers that provide improvements above the performance of the conventional powertrain. Odyne’s unique minimally intrusive hybrid drive interface through the PTO does not change the emissions certification of the engine. Due to this minimally invasive approach, The EPA and NHTSA should provide special credits to encourage the introduction of advanced technology that enhances current and future conventional drive trains, and limit penalties if the failure of such technology does not cause the conventional drive train to become non-compliant with base efficiency regulations, (in other words, if the vehicle still meets higher base GHG and fuel consumption regulations without the hybrid system functioning, then do not penalize the new technology as severely in the event of a failure). The reduction in penalty is especially important for smaller manufacturers of advanced technology which may not be able to field technology if subject to the same penalties as much larger companies which are better positioned to pay larger penalties. Using the same penalties creates an uneven playing field, by creating additional financial hurdles for smaller, innovative companies. [EPA-HQ-OAR-2010-0162-1853.1, p.3]

The credits should increase in proportion to the larger fuel and CO_2 reductions and be larger than the 1.5x multiplier (2.0x multiplier is recommended) to account for the additional development costs associated with advanced technology. A larger credit amount should be given if reductions exceed the 2014 standards. For example a 30% reduction would provide a greater credit than a 15% reduction. This would incentivize manufacturers to innovate advanced technologies. Odyne agrees that the current approach takes the higher efficiency into account in calculation of the credits, but the currently proposed regulations do not appear to allow for the higher multiplier, nor does it allow for entities outside of the chassis OEM to take advantage of the credits and trade them. [EPA-HQ-OAR-2010-0162-1853.1, p.9]

To further increase the value of the credits, Odyne recommends that the incentives and credits should be allowed to be transferred or to be sold to other manufacturers. This would increase the value of the credit making it more attractive to develop advanced technologies. [EPA-HQ-OAR-2010-0162-1853.1, p.9]

EPA Vol. 75 No. 229 pg. 74255: We request comment on ways the early credit opportunities can be tailored to accomplish this objective and protect against unanticipated windfalls. [EPA-HQ-OAR-2010-0162-1853.1, p.11]

To protect against windfalls, the agencies should open up the early credits outside of the OEM solution. The current regulations focus on OEM solutions that could create a potential windfall for transmission manufacturers and leave out other possible advanced or innovative solutions. [EPA-HQ-OAR-2010-0162-1853.1, p.11]

EPA Vol. 75 No. 229 pg. 74258: The agencies request comments on the proposed approach for off-cycle emissions credits, including comments on how best to structure the program. EPA and NHTSA particularly request comments on how the case-by-case approach to assessing off-cycle innovative technology credits could best be designed, including ways to ensure the verification of real-world emissions benefits and to ensure transparency in the process of reviewing manufacturer's proposed test methods. [EPA-HQ-OAR-2010-0162-1853.1, pp.13-14]

Credits could be determined by using telematic systems on vehicles to determine real fuel and CO_2 reductions. The amount of real world savings could then generate credits that are provided to the manufacturer of the technology. [EPA-HQ-OAR-2010-0162-1853.1, p.14]

Organization: Oshkosh Corporation

NPRM states: "In addition to ABT, the agencies are proposing that a manufacturer that reduces CO_2 emissions and fuel consumption below required levels prior to the beginning of the program be allowed to generate the same number of credits ("early credits") that they would after the program begins." [EPA-HQ-OAR-2010-0162-1591.1, p.2]

Oshkosh Corporation Response: This seems a reasonable method of allowing manufacturers to "ease into" the new regulations. [EPA-HQ-OAR-2010-0162-1591.1, p.2]

The NPRM states: "The agencies are also proposing that manufacturers that show improvements in CO2 emissions and fuel consumption and incorporate certain technologies (including hybrid powertrains, Rankine engines, or electric vehicles) be eligible for special "advanced technology" credits. Unlike other credits in this proposal, the advanced technology credits could be applied to any heavy-duty vehicle or engine, and not be limited to the vehicle category generating the credit." [EPA-HQ-OAR-2010-0162-1591.1, p.3]

Oshkosh Corporation Response: We do not agree with this approach. This provision will give an unfair advantage to companies who both produce their own engine and chassis as a completed unit. As an example if this provision on broad fungibility remains, integrated manufacturer "C" could develop waste heat recovery for tractor engines that would generate advanced technology credits that the manufacturer could use to produce a lower cost, less efficient vocational engine or forego installing more efficient tires. This puts manufacturer "D" at a serious disadvantage since they do not make engines and thus do not have the ability to generate similar credits. [EPA-HQ-OAR-2010-0162-1591.1, p.3]

NPRM states: The technologies eligible for advanced technology credits above lend themselves to straightforward methodologies for quantifying the emission or fuel consumption reductions. For other technologies which can reduce CO2 and fuel consumption, but for which there do not yet exist established methods for quantifying reductions, the agencies still seek to encourage the development of such innovative technologies, and are therefore proposing special "innovative technology" credits. These innovative technology credits would apply to technologies that are shown to produce emission and fuel consumption reductions that are not adequately recognized on the current test procedures and that are not yet in widespread use. Manufacturers would need to quantify the reductions in fuel consumption and CO2 emissions that the technology could achieve, above and beyond those achieved on the existing test procedures. As with ABT, we propose that the use of innovative technology credits be only allowed among vehicles and engines expected to have similar emissions and fuel consumption characteristics (e.g., within each of the nine Class 7 & 8 combination tractor subcategories, or within each of the three Class 2b-8 vocational vehicle subcategories). [EPA-HQ-OAR-2010-0162-1591.1, p.3]

Oshkosh Corporation Response: We agree that if Innovative Technology Credits are allowed, then they should be only allowed among vehicles and engines expected to have similar emissions and fuel consumption characteristics. Allowing integrated manufacturers to move credits around will produce the same unfair competitive advantages discussed in the ABT comments above. As for how these credits will be measured, we see this as being rather difficult to monitor and enforce. It is also important that in any A to B testing protocol, the configuration utilized to represent the vehicle which forms the basis of the comparison (i.e., the "A" vehicle) must include vehicle systems of the current model year. This is vital to ensure that the correct level of technology advancement is considered in the comparison testing that is performed with respect to the new technology vehicle (i.e., the "B" vehicle). The A vehicle system would consist of all vehicle components that impact fuel efficiency and emissions. These components would include hardware, computers, software, and calibrations as offered in the OEM databook. Such an approach would be consistent with the overall goal of the innovative technology credit program – to provide incentives for the development and adoption of technology that provides benefits over and beyond that currently employed in the vehicle fleet. By maintaining stringent standards for the A vehicle, EPA and NHTSA can eliminate any potential for "gaming" the system and developing GHG and FE estimates that will not be realized when and if the new technology is deployed. [EPA-HQ-OAR-2010-0162-1591.1, pp.3-4]

Organization: Parker Hannifin Corporation

This rule lacks incentives to encourage the development of innovative technology. For two of the three categories of trucks, compliance with vehicle fuel consumption standards is based on a model where the only variable available for a manufacturer to adjust is tire rolling resistance and in the case of Combination Tractors aerodynamic drag coefficient. The rule does propose several methods of generating credits in an attempt to encourage innovation, but the testing burden to demonstrate these credits are much greater than the effort to comply using the technology dictated by the rule. We believe that there is an opportunity to create incentives for innovative technology and ideas by linking credits to demonstrated real world fuel reductions. We believe that credits should be available to fleet operators that are able to demonstrate real world reductions in fuel consumption. Credits could be based on reduction in fuel consumed calculated from the fuel purchasing records of the fleet. This would not only encourage innovative technology, but would provide incentives for innovative fleet logistics and routing changes that could reduce fuel consumption. [EPA-HQ-OAR-2010-0162-1855-cp, p.1]

The rule does propose several methods of generating credits in an attempt to encourage innovation, but the testing burden to demonstrate these credits are much greater than the effort to comply using the technology dictated by the rule. We believe that there is an opportunity to create incentives for innovative technology and ideas by linking credits to demonstrated real world fuel reductions. We believe that credits should be available to fleet operators that are able to demonstrate real world reductions in fuel consumption. Credits could be based on reduction in fuel consumed calculated from the fuel purchasing records of the fleet. This would not only encourage innovative technology, but would provide incentives for innovative fleet logistics and routing changes that could reduce fuel consumption. [EPA-HQ-OAR-2010-0162-3276, p.1]

This rule should consider additional incentives for fleet operators Parker Hannifin believes the demand for more fuel efficient technologies will be driven by the fleet owners. The Proposed Regulatory Flexibility Provisions in Section IV of this proposed rule do not offer strong incentives for fleet owners to try innovative technology. Fleet owners cannot generate credits for employing fuel efficiency measures. We believe that if the rule is truly attempting to develop innovative fuel reduction technology, there should be incentives beyond emission credits (tax credits, preferred status for government contracts, grants, etc.) for fleet operators that pioneer new fuel efficient vehicle concepts. These incentives should be tied to the technology a fleet chooses and be dependent on reductions in fuel consumption and emissions. To receive these incentives each year a fleet must report their fuel consumption to EPA and NHTSA. These reports will allow EPA and NHTSA to verify the real world reduction in fuel consumption and emissions, benefitting both the government and the fleets. [EPA-HQ-OAR-2010-0162-3278, p.1]

Organization: Robert Bosch LLC

Maintains that the early, advanced technology (AT), and innovative technology (IT) credit mechanisms should be broadened suitably to enable other entities – not just HD engine, combination tractor, PUV, and vocational vehicle chassis manufacturers – to earn these credits as well; [EPA-HQ-OAR-2010-0162-1630.1, p.3]

Supports the inclusion of early credit and AT credit multipliers of at least 1.5; [EPA-HQ-OAR-2010-0162-1630.1, p.3]

Recommends that the agencies add language that would render eligible for AT credits any new and promising technologies that do not qualify either as hybrid vehicles, electric vehicles (EVs), fuel cell vehicles (FCVs), or Rankine-cycle engine vehicles but that, because their reduction benefits would be reflected in the specified test procedures and emission models, would not qualify for IT credits; [EPA-HQ-OAR-2010-0162-1630.1, p.3]

Bosch strongly supports the inclusion of flexibility mechanisms – the advanced technology (AT) credit as well as the innovative technology (IT) credit – that seek to encourage the development of and increase the HD sector's use of hybrid powertrains and other advanced and innovative technologies. (Bosch comments further on the AT and IT credit mechanisms in section III below.) Bosch especially endorses the agencies' intent "to monitor the development of and production feasibility of new vehicle-related GHG and fuel consumption reduction improving technologies and consider including these technologies in future rulemakings." In this regard, and mindful of the agencies' consideration of Alternative 8 in the alternatives analysis, Bosch projects that hydraulic hybrid technology in particular not only will develop further in the coming years, but will reach an adoption/penetration rate in the PUV and vocational vehicle sectors such that standards premised on the technology's application could very well be justified for these HD vehicles in the model year (MY) 2016-17 timeframe. [EPA-HQ-OAR-2010-0162-1630.1, p.5]

In addition, Bosch agrees with the EPA-NHTSA proposal to allow for early compliance. Once a HD National Program is in place, Bosch hopes and anticipates that the HD industry will take advantage of the early credit opportunities and seek to bring about GHG emissions reductions and fuel consumption improvements in advance of the standards' actual start date. [EPA-HQ-OAR-2010-0162-1630.1, p.6]

That said, though, Bosch strongly believes that the proposed flexibility mechanisms for early, AT, and IT credits need to be revised to account for the "stage manufacturing" that frequently occurs in this HD sector. Essentially, Bosch believes that these credit options should be broadened so that it is clear that vocational vehicle chassis manufacturers (in addition to combination tractor, PUV, and HD engine manufacturers) are not the only entities in the HD industry that may earn these credits. Bosch discusses this issue in more detail in section III.D.1 below. [EPA-HQ-OAR-2010-0162-1630.1, p.25]

EPA and NHTSA repeatedly emphasize that the proposed GHG emissions and fuel consumption standards take into account the "diversity and complexity" of the HD industry. In the context of vocational vehicles, the agencies explain, quite correctly, that the manufacturing process is especially complex, often occurring in stages and involving a number of different entities (e.g., engine manufacturers, transmission manufacturers, chassis manufacturers, and body manufacturers). Vehicle customization, in fact, is very common in the HD sector, certainly more so than it is in the LDV sector. [EPA-HQ-OAR-2010-0162-1630.1, p.25]

With respect to advanced HD vehicle technologies (e.g., hybrid powertrains and advanced transmission systems such as Bosch's H-IVT), the market is an ever-evolving one, with new integration pathways and business models constantly being explored and implemented by industry participants. Current hybrid system installation options in the HD sector include the following: (i) installation by the chassis manufacturer; (ii) installation by the body manufacturer, sometimes referred to as the final stage manufacturer; and (iii) installation by a dedicated hybrid system integrator, either before or after the vehicle body has been built onto the chassis by the body manufacturer. The second and third installation options are extremely important, as they allow for customization of the vehicle and optimization of the hybrid system based on what the vehicle's actual application will be. In all cases, the hybrid systems' installation occurs before the complete vehicle is delivered to the ultimate purchaser. [EPA-HQ-OAR-2010-0162-1630.1, p.26]

In view of this current industry structure, Bosch strongly believes that the early, AT, and IT credit options should be broadened suitably to enable other HD sector entities (i.e., not just vocational vehicle chassis manufacturers and HD engine, PUV, and combination tractor manufacturers) to earn these credits as well. Excluding other entities – for example, body manufacturers and hybrid system and other technology integrators – from the credit options would restrict technology developers' and system installers' flexibility and business development opportunities, not to mention limit competition as well as customers' technological choices and inhibit the HD industry as a whole from being able to achieve the maximum GHG emissions and fuel efficiency improvements that are possible. Bosch thinks this would be unwise and unjustified. [EPA-HQ-OAR-2010-0162-1630.1, pp.26-27]

With respect to the agencies' proposed early credit option, Bosch believes that a credit multiplier of 1.5 is appropriate because it would further encourage the adoption and implementation -- by HD engine, combination tractor, and PUV manufacturers, by vocational vehicle chassis manufacturers, and, as discussed above, by other entities in the HD industry -- of beneficial technologies prior to the final standards' actual start date, which in turn would lead to early GHG emissions and petroleum consumption reductions. [EPA-HQ-OAR-2010-0162-1630.1, pp.28-29]

In addition, it is unclear to Bosch whether early AT (and also IT) credits may be generated, as is the case in the LDV National Program. Bosch believes that such an avenue should be included in the final HD standards. Bosch also thinks the language of the final regulations should explicitly allow for compliance sooner than MY 2013 (i.e., MY 2012). [EPA-HQ-OAR-2010-0162-1630.1, p.29]

Bosch applauds the inclusion of the AT credit mechanism, which EPA and NHTSA explain would cover the following technologies: hybrid powertrain designs with an energy storage system; Rankine-cycle engines; all-electric vehicles (EVs); and fuel cell vehicles (FCVs). [EPA-HQ-OAR-2010-0162-1630.1, p.29]

As an initial matter, Bosch notes that EPA's proposed Part 1037 regulations include a definition of the term "hybrid vehicle" (proposed section 1037.801), while NHTSA's proposed Part 535 regulations do not. Bosch's understanding is that a plug-in hybrid electric vehicle (PHEV) would qualify as a "hybrid vehicle" as that term is defined by EPA, but given the lack of a corresponding NHTSA definition, the proposed AT credit provision in Part 535 (i.e., section 535.7(e)) should be broadened to include PHEVs and thereby make that NHTSA provision consistent with EPA's proposed section 1037.610(a). [EPA-HQ-OAR-2010-0162-1630.1, pp.29-30]

Bosch agrees that AT credits should be fungible across all of the regulatory subcategories, as provided in proposed sections 1037.104(d)(7), 1037.610(f), and 535.7(e), rather than applicable only to the subcategory in which the credits were generated. Bosch also believes that a credit multiplier of 1.5, and preferably higher, would incentivize further the HD sector's use of advanced technologies and, therefore, is appropriate. [EPA-HQ-OAR-2010-0162-1630.1, p.26]

With regard to those technologies identified as eligible, Bosch recommends that the agencies add language that would render eligible for AT credits any new and promising technologies that do not qualify either as hybrid vehicles, EVs, FCVs, or Rankine-cycle engine vehicles but that, because their reduction benefits would be quantified through the specified test procedures, do not qualify for IT credits. Bosch's H-IVT may be a good example. As indicated in section III.C.2.b above, the H-IVT is a conventional transmission replacement solution whose GHG emissions and fuel consumption reduction performance is anticipated to be significant in Urban Stop-and-Go and Intermediate Distance Stop-and-Go operations. The H-IVT's performance would not be captured in the specified vocational vehicle engine test procedure (i.e., the HD FTP cycle) because it is a driveline technology and not an engine technology. Its performance, however, likely would be reflected in the GEM certification drive cycle – extremely poorly in the agencies' proposed three-mode drive cycle with the 42/21/37 drive cycle weightings, much more accurately in a five-mode HHDDT/Low and High Speed Cruise plus Urban Stop-and-Go and Intermediate Distance Stop-and-Go drive cycles with the adjusted weightings as proposed by Bosch. Thus, despite being a novel technology, Bosch fears that its H-IVT may not qualify for IT credits. [EPA-HQ-OAR-2010-0162-1630.1, pp.30-31]

Bosch feels strongly that its H-IVT technology and other pioneering, yet to be commercialized technologies that are deemed to fall within the scope of the test procedures or GEM should be eligible for AT credits. The number of credits for such "unspecified" technologies could be determined in the same fashion proposed by the agencies for hybrid and Rankine-engine vehicles – through a comparative (i.e., vehicle with the technology vs. a conventional vehicle) chassis dynamometer evaluation, modified, as proposed by Bosch, to include five drive cycle modes (six for hybrids with PTO systems), or through a comparative engine dynamometer evaluation using the HD FTP as appropriate for the technology. [EPA-HQ-OAR-2010-0162-1630.1, p.31]

If the agencies are disinclined to adopt this recommendation, then the H-IVT should be added to the list of technologies that qualify for AT credits. [EPA-HQ-OAR-2010-0162-1630.1, p.31]

On the issue of upstream emissions, Bosch agrees that EPA and NHTSA should follow the approach taken in the LDV National Program and treat EVs, and also PHEVs and FCVs, as zero emission vehicles for credit generating purposes, albeit without imposing a cumulative production cap. [48] As the agencies state, there is "at least an equally compelling reason to provide an incentive for the technology's commercial introduction" and no "need to adopt the type of cumulative caps which would trigger an upstream emission accounting procedure as in the [LDV] rule." [EPA-HQ-OAR-2010-0162-1630.1, pp.31-32]

Bosch also supports the inclusion of the IT credit mechanism. Unlike AT credits, though, the agencies have proposed that the use of IT credits be restricted to the regulatory subcategory in which the credits were generated. In Bosch's view, there is no sound reason for this disparate treatment. Entities should be able to use both types of technology credits outside of the originating subcategory, as this would effectively strengthen the incentive to adopt both advanced and innovative technologies. [EPA-HQ-OAR-2010-0162-1630.1, p.32]

Moreover, Bosch believes that the IT credit mechanism should be extended beyond MY 2018. This is particularly important for combination tractors and vocational vehicles, whose compliance with the vehicle-based GHG emissions and fuel consumption standards would be evaluated via the GEM. Until the agencies update that simulation model, those technologies that are not reflected in the GEM will remain as technologies not reflected in it. Similarly, until the agencies amend the initial standards, innovative technologies, no matter how quickly they may be adopted by the HD industry, will remain technologies "on whose performance the . . . standards [were not] premised." [50] [EPA-HQ-OAR-2010-0162-1630.1, pp.32-33]

Finally, EPA and NHTSA state that they "would not consider technologies to be eligible for [IT] credits if the technology has a significant impact on CO2 emissions and fuel consumption over the primary test cycles . . . ." Bosch encourages the agencies to clarify this statement, and specifically to elaborate in the final rule on what would and would not constitute a "significant impact" over the test cycles (e.g., establish certain percentage parameters). [EPA-HQ-OAR-2010-0162-1630.1, p.33]

It is obvious to Bosch that EPA and NHTSA intend for PUVs to be eligible for early (i.e., pre-MY 2014) credits. However, Bosch notes that this unequivocal intent appears not to have found its way into EPA's proposed regulatory language. Proposed section 1037.104(i)(4) leaves no doubt that the interim provisions in proposed section 1037.150 are applicable to PUVs, but proposed section 1037.150(a) indicates that early credits "relative to the standard that would apply in [MY] 2014 [are to be calculated] using the equations in subpart H of this part." The subpart H equations are set forth in proposed section 1037.705, specifically subsection (b), yet equations are provided only for vocational vehicles and combination tractors. Thus, it appears that no method is provided for PUV manufacturers to calculate their early credits. If, however, EPA means for PUV manufacturers' early credits to be determined under subpart S of 40 C.F.R. Part 86 (i.e., 40 C.F.R. § 86.1867-12) and in accordance with proposed section 1037.104(d)(6), this point should be explained with much greater clarity in the final rule. [EPA-HQ-OAR-2010-0162-1630.1, p.12]

A similar regulatory glitch appears to exist for IT credits. Although the agencies explain that PUVs can yield "credits for innovative technologies that are shown by the manufacturer to provide GHG and fuel consumption reductions in real world driving, but not on the test cycle," EPA's proposed regulatory language does not reflect this. The problem stems from proposed section 1037.104(i), which does not identify proposed section 1037.611, the IT credit mechanism, as one of the Part 1037 provisions applicable to certified PUVs. Once again, if EPA means for PUV manufacturers' IT (and AT) credits to be determined under subpart S of 40 C.F.R. Part 86 (i.e., 40 C.F.R. § 86.1866-12), this point should be made more clearly in the final rule. [EPA-HQ-OAR-2010-0162-1630.1, p.13]

---

[47] Bosch notes that while the agencies' intent as expressed in the preamble and Draft RIA is clear, the engine dynamometer method for establishing the number of credits generated by a hybrid vehicle does not appear anywhere in proposed section 1037.610. In addition, Bosch points out that contrary to what is stated in subsection (b)(2)(iii), no test procedures are specified in section 1037.610 [EPA-HQ-OAR-2010-0162-1630.1, p.31]

---

[48] EPA's proposed sections 1037.150(g) and 1037.610(e) (as well as the parenthetical clause in proposed section 1037.150(a)) refer only to EVs. [EPA-HQ-OAR-2010-0162-1630.1, p.32]

[50] Id. at 74257. In this regard, EPA and NHTSA might consider including in the final regulations lists of the specific technologies on which the various standards are premised, so that it is clear to all which technologies are not eligible for IT credits. [EPA-HQ-OAR-2010-0162-1630.1, p.33]

[55] Bosch notes that a 0.15 conversion factor should apply to B20, a blend of 20% neat biodiesel and 80% diesel fuel. See 49 U.S.C. § 32905(b)(2)(B). [EPA-HQ-OAR-2010-0162-1630.1, p.34]

Organization: Union of Concerned Scientists (UCS)

Support Advanced Technologies Standards should support advanced vehicle technologies to ensure investments in technologies that offer even greater reductions in fuel consumption and emissions reductions. [EPA-HQ-OAR-2010-0162-1764.1, p.4]

The compliance status and credit balances for each manufacturer should also be made publicly available. Credit balances, including the use of advance technology and innovative credits, is important in testing assumptions about technology development, availability, and overall market potential. [EPA-HQ-OAR-2010-0162-1764.1, pp.5-6]

The standards as proposed include crediting systems which would apply to “advanced” and “innovative” technologies. To encourage both advanced and innovative technologies the standards must be strong enough to reflect the benefits of these technologies, and test procedures, a certification pathway, and crediting system must all be clearly defined. The agencies can ensure credits earned are valuable by increasing the stringency of the standard, rather than relying on credit multipliers or fungibility of credits across vehicle classes or engine and vehicle standards which can erode the overall benefits of the rule and come at the expense of other technology advancements. [EPA-HQ-OAR-2010-0162-1764.1, p.6]

We strongly support the development of electric drive and other advanced technologies in the heavy-duty sector. However, the use of a 0 gram/mile emissions factor as proposed by the agencies does not accurately reflect the real world emissions impact of these vehicles. We do not support providing credits for these technologies that come at the expense of making other readily-available highly cost-effective improvements to heavy-duty vehicles. Electric vehicles and other technologies should earn credits for the emission reductions and efficiency improvements they provide. If the upstream emissions of these technologies represent a significant amount of their overall emissions impact, they must be accounted for to ensure the emission benefits and fuel savings expected are actually occurring. [EPA-HQ-OAR-2010-0162-1764.1, p.7]

Organization: Volvo Group

EPA and NHTSA have proposed a process for approval and accreditation of "innovative technologies" but provide very limited guidance on the required burden of proof. The NPRM uses the following language: "Credits would have to be based on real additional reductions of CO2 emissions and fuel consumption and would need to be quantifiable and verifiable with a repeatable methodology. Such submissions of data should be submitted to EPA and NHTSA, and would be subject to a public evaluation process in which the public would have opportunity for comment." *See* 75 FR 74152, 74257. "In cases where the benefit of a technological approach to reducing CO2 emissions and fuel consumption cannot be adequately represented using existing test cycles, EPA and NHTSA would review and approve as appropriate test procedures and analytical approaches to estimate the effectiveness of the technology for the purpose of generating credits. The demonstration program should be robust, verifiable, and capable of demonstrating the real-world emissions benefit of the technology with strong statistical significance. *See* 75 FR 25440." *Id.* In the discussion found at 75 FR 25440 (outlining requirements for a credit program for light-duty), there is discussion of the potential need for extensive field testing to demonstrate statistical significance. [EPA-HQ-OAR-2010-0162-1812.2, pp.8-9]

Volvo Group strongly supports provisions for innovative technology credits. We recognize that there are many existing or emerging technologies for reducing fuel and CO2 emissions that will not be fully demonstrated within the proposed testing and modeling process, particularly since the proposed vehicle model does not account for specific engines, transmissions, and drivelines that will be used in different applications. Innovative technologies should be strongly encouraged since they can be cost-effective, and will become the basis of technological advancement and for future standards. Failure to provide credits for such innovations would bias the industry toward developing only those technologies that are given credit within the limited provisions of the proposed testing and modeling, rather than focusing on real-world potential. [EPA-HQ-OAR-2010-0162-1812.2, p.9]

We are concerned that the proposal does not provide adequate assurance that any technology will ultimately gain approval. Improved guidelines for the approval process are needed. At the same time, we recognize that "innovative technology" by its very nature cannot be fully anticipated, nor can the appropriate approval process be fully defined. Nonetheless, it is quite feasible to anticipate the effectiveness of many potential technologies and to provide examples of how they could be adequately demonstrated. EPA and NHTSA are already doing this for hybrid technology. [EPA-HQ-OAR-2010-0162-1812.2, p.9]

Compared to light-duty car and truck industry, the commercial truck industry has relatively low volumes. Because of this, only limited funds are available for technology development and an overly burdensome innovative technology approval process would chill development of many promising technologies. Hence, we are concerned about the discussion of the potential need for extensive field testing to demonstrate statistical significance. *See* 75 FR 24440. While such testing may be feasible for high volume cars and light trucks, it may be cost prohibitive in heavy-duty. Examples with specific test expectations would provide useful guidance. [EPA-HQ-OAR-2010-0162-1812.2, p.9]

It is useful to consider several categories of innovative technology and how each might be approved. Two such categories might include (1) technologies that could be demonstrated on the proposed vehicle drive cycles but are not accounted for in either the proposed engine test or vehicle model of the proposed certification scheme; and (2) technologies that cannot be adequately demonstrated on the proposed vehicle drive cycles, but could be demonstrated as noted below. [EPA-HQ-OAR-2010-0162-1812.2, p.9]

Technologies in the first category can be further subdivided into: (1a) driveline technologies that change the way the engine operates within the vehicle drive cycle; and (1b) vehicle technologies that reduce the load on the engine within the same drive cycle. Approval of category 1a technologies could be demonstrated by running A vs. B testing, simulation or other comparative methods that demonstrate good engineering judgment (where vehicle A is set up per the Agencies' standard assumptions and vehicle B is similar except modified with the innovative technology) using the vehicle test cycle designated for the vehicle sub-category. This is similar to what has been proposed for hybrid systems. Indeed, a hybrid system could be viewed as sub-category of category 1a, although its merits might not be fully exploited on the standard vehicle test cycles. Category 1b technologies could be demonstrated similarly, except that it would first be necessary to establish how the vehicle loads had been reduced in various parts of the drive cycle using appropriate testing or analysis. [EPA-HQ-OAR-2010-0162-1812.2, p.9]

It should be noted, however, that the proposed vehicle drive cycles are not optimal for demonstrating many innovative technologies. Drive cycles should be distance- rather than time-based to ensure that the same mission is completed over the cycle and to provide credit when the mission is completed in less time. Also, highway grade is critical to evaluation of heavy vehicle efficiency and should be part of the drive cycles. DOT data show that over half the arterial highway miles have grade exceeding 0.5 percent. *See Comprehensive Truck Size and Weight Study*, Department of Transportation Report to Congress, Aug. 31, 2000, Chapter 9. (http://www.fhwa.dot.gov/reports/tswstudy/Vol3-Chapter9.pdf) [EPA-HQ-OAR-2010-0162-1812.2, p.10]

Technologies in the second category are those with added complexity in that they must be demonstrated against specific customer usages. Truck manufacturers have varying evaluation methods that they use to develop technical fuel efficiency improvements matched to the intended customer usage. It would be appropriate to immediately work with manufacturers and other interested parties to establish a range of duty cycles and driver behavior that could become the basis for evaluating innovative technologies that cannot be demonstrated on the currently proposed cycles. Once these techniques are established, it should be possible to use comparative testing or simulation testing methods to demonstrate the advantage of category 2 technologies similar to what is discussed above for category 1 technologies. [EPA-HQ-OAR-2010-0162-1812.2, p.10]

These proposals are meant to be illustrative, rather than limiting. However, they do provide a better sense of what might be considered adequate technology demonstration. The important point is to develop unbiased guidelines before specific technologies are developed by manufacturers. [EPA-HQ-OAR-2010-0162-1812.2, p.10]

Volvo Group opposes the need to subject data to a “public evaluation process.” Innovative technologies are likely to be proprietary, and subjecting them to public review would dampen corporate enthusiasm for their development. This becomes even more problematic if a manufacturer enters into discussions with the Agencies prior to fully developing the technology in order to gain assurance that it can be approved only to have the details of the technologies made available to competitors through the public evaluation process. If this information is made public early enough, competitors could beat the original development manufacturers to market. This possibility is a strong disincentive to technological innovation. [EPA-HQ-OAR-2010-0162-1812.2, p.10]

In addition, the Agencies specify that “advanced technology” credits would be applicable to hybrid, electric vehicles, and Rankine waste heat recovery. See 75 FR 74152, 74255, 74372 and 74394. “Innovative technology”, meanwhile, applies to any vehicle technology that improves fuel efficiency but is not measured in EPA’s standard process and is not in “wide use” as of 2010. See 75 FR 74152, 74257. EPA’s examples include gear-down protection, predictive cruise, and active aerodynamics. The Agencies, however, propose treating the advanced technology credits differently from the innovative technology credits by allowing advanced technology credits to be transferable across all engine and vehicle averaging sets. See 75 FR 74152, 74255-74258, 74372 and 74394-74395. [EPA-HQ-OAR-2010-0162-1812.2, p.10]

Volvo Group vigorously opposes this advanced technology credit provision as proposed on the grounds that the Agencies are singling out certain technologies as “winners” in the market place. Those provisions will work to the competitive disadvantage of those manufacturers who do not participate in markets where those technologies are feasible (i.e., medium duty hybrid vehicle markets). In order to avoid creating a competitive disadvantage based on products offered, credits should only be transferable within a weight class. Since hybrid technology is currently more utilized because it is more effective and more affordable within lower weight classes, a manufacturer with limited or no product line in the medium duty weight classes would be disadvantaged if a competitor could apply such credits generated from medium duty vehicles to heavy-duty vehicles. The larger size of the medium duty markets, compared to the heavy-duty markets, would further exacerbate this competitive disadvantage. There is no reason why these technologies should be treated any differently than those that are considered innovative technologies. Volvo Group expects both advanced technology credits and innovative technology credits should be given the same treatment with ability to be traded across all engines and vehicles within a size class, i.e. LHD, MHD, and HHD. [EPA-HQ-OAR-2010-0162-1812.2, pp.10-11]

The NPRM language also does not clearly explain which party owns the credits generated by a hybrid powertrain (i.e. vehicle vs. hybrid system manufacturer). Volvo Group strongly believes the vehicle manufacturer should own the credits. Vehicle manufacturers make the ultimate manufacturing decisions for the hybrid vehicle. Marketing, and market development, is the work of the vehicle manufacturer (not the hybrid system component suppliers) and the vehicle manufacturer should get the credit for putting the technology in the hands of customers. The Agencies must make this clear in the final rule language. [EPA-HQ-OAR-2010-0162-1812.2, p.11]

The EPA's expectation that an engine or vehicle manufacturer's entire U.S. -directed production volume within an averaging set must be certified to gain credit is not workable and renders early credit provisions nearly useless. See 75 FR 74368, 74386. EPA stated it is the Agency's intent to require the entire averaging set go into the early credit generation. However, the Agency also has said that certain subsets can be credit generators and others credits users – as long as the averaging set as a whole generates credits. Volvo Group does not support this approach. In addition criteria emissions rules have allowed for early certification of credit generators without requiring the certification of non-credit generators. These rules should follow the same provision. [EPA-HQ-OAR-2010-0162-1812.2, p.27]

Volvo Group requests that certification of any subset of an averaging class be permitted. Additionally, transfer of early credits across averaging sets within a size class should be permitted, as noted elsewhere. Volvo Group also requests that the following language from 1036.150(a) and 1037.150(a), 'you must certify your entire US directed production volume within that averaging set to these standards', be removed. [EPA-HQ-OAR-2010-0162-1812.2, p.27]

Organization: Eaton Corporation

The rule does not provide compliance credits for advanced driveline technologies and thus the Agencies are missing a significant opportunity to further the goals of the Rule by not incentivizing advanced drivetrain technologies. This can be done without market disruption. [EPA-HQ-OAR-2010-0162-1649.1, p.6]

Eaton recommends that the Agencies add advanced driveline technologies to the list of eligible technologies in the Innovative Technology program proposed in the rule. A to B tests using the PowerPack or chassis test methodologies should form the basis for quantifying incremental benefits of the technology. [EPA-HQ-OAR-2010-0162-1649.1, p.6]

We recommend the introduction of these technologies through a voluntary program, not mandated, as these technologies are new to the market. We believe the market should pick the innovations that can best do the job. However, if these new advanced driveline technologies are not recognized in the Rule, their contributions to fuel efficiency and GHG improvement will not be measured. Therefore, the market will not recognize them and the rule becomes an obstacle to their market penetration. Not Including these technologies may result in limited availability of advanced driveline technology options for fleets in the vocational space. [EPA-HQ-OAR-2010-0162-1649.1, p.6]

If the Agencies should choose the Innovative Technology credit as the Incentive program for advanced driveline technologies, then we recommend that the PowerPack methodology be explicitly cited in the Final Rule as a testing option, without restricting other approaches. The existence of a pre-defined testing option would avoid the proliferation of niche, manufacturer or technology test cycles for individual driveline technologies and offer manufacturers a simple, clear, consistent and transparent testing alternative. [EPA-HQ-OAR-2010-0162-1649.1, p.6] 2010-0162-2734.1, p.9]

Organization: National Association of Clean Air Agencies (NACAA)

NACAA supports the targeted Advanced Technology Credits being proposed for heavy-duty vehicles and engines. NACAA believes that these credits should be expanded to include a wider range of important technology and alternative fuel options, such as the following:

- Plug-in electric hybrid designs;
- Advanced electric drive hybrid designs without energy storage;
- Hydraulic hybrid systems;
- Compressed natural gas;
- Liquefied natural gas;
- Bio-methane;
- 2nd generation ethanol;
- Other bio-alcohols such as methanol;
- CO_2-based liquid fuels produced from renewable feed stocks;
- Advanced bio-butanol;
- 2nd generation renewable (i.e., non-oxygenated) diesel fuels; and
- Atkinson cycle engines.

The use of all of these advanced technology and alternative fuel options, as well as the list of currently proposed technologies, could result in significant reductions in petroleum fuel use as well as GHG, criteria and toxic emissions. It is therefore appropriate that we provide incentives for their development and commercialization. An expansion of such credits is directly consistent with – and indeed flows directly from – the vision expressed by President Obama in his January 25, 2011, State of the Union address regarding the nation's "Sputnik Moment" and the need to expedite renewable and clean energy options.[EPA-HQ-OAR-2010-0162-1607.1, p.5]

Response:

Early Credits

The agencies received comments from Cummins, DTNA, EMA/TMA, Navistar, Eaton, Bosch, CBD and CALSTART relating to these early credit provisions. All of these commenters supported the early credit provision for the most part, but many requested that the agencies eliminate some of the restrictions relating to this provision. EMA/TMA argued that MY 2012 should also be considered for early credits and that the requirement to certify six months before the start of the first model year would unnecessarily restrict manufacturers from earning credits for technology introduced within six months of the respective model year. Additionally, EMA/TMA stated that requiring certification of the entire averaging set instead of individual vehicle configurations would not allow for early introduction of new technologies. Cummins stated that the six month lead time requirement should be removed and that manufacturers be allowed to earn early credits for individual engine families rather than only for the entire averaging set, stating that removal of these restrictions would further benefit the environment. CBD stated that early credits should only be granted if the emission and fuel consumption benefits are in addition to or above the existing performance levels, not already reflected in manufacturers' product plans, and are quantifiable and verifiable.

EPA and NHTSA have reviewed these comments and decided to clarify the early credit provision as proposed in the NPRM to account for the above concerns. Early credits are intended to be an incentive to manufacturers to introduce more efficient engines and vehicles earlier than they would have planned. However, the agencies do not want to provide a windfall of credits to manufacturers that may already have one or more products that meet the standards. Therefore, the final rule will include the proposed option for a manufacturer to obtain early credits for products if they certify their entire subcategory at GHG emissions and fuel consumption levels below the standards. The agencies are making a clarification in this rule that the manufacturers must certify their entire subcategory, not necessarily their entire averaging set, because the averaging sets are broadened under the final rulemaking from the proposed categories in the NPRM. For example, credits would need to be generated by all of a manufacturer's HHD vocational engines, but not need to include HHD engines used in combination tractors. In addition, the agencies are providing the flexibility for combination tractor manufacturers to obtain early credits for their additional sales, as compared to their 2012 model year sales, of SmartWay certified combination tractors in 2013 model year. The agencies view this subcategory of vehicles as the only segment of vehicles or engines where the true additional reductions due to the early credits can be quantified outside of certifying an entire subcategory, because the benefit is tied directly to the increase in the SmartWay vehicles manufactured in MY 2013 in excess of those manufactured in MY 2012.

A manufacturer may opt to apply for early credits from their 2013 model year SmartWay combination tractor sales by first calculating the difference between the number of SmartWay certified combination tractors sold in 2012 model year versus 2013 model year. The increment in sales determines the number of 2013 model year SmartWay tractors which can be used to certify for early credits. The manufacturer would then determine each tractor configuration's performance by modeling in GEM, using each vehicle configuration's appropriate inputs for coefficient of drag, tire rolling resistance, idle reduction, weight reduction, and vehicle speed limiter. Next, the difference between a specific tractor configuration's performance and the 2014 MY standard for the appropriate regulatory subcategory (Class 8 sleeper cab high roof tractors) would be calculated.

As discussed above and in preamble Section II, during the years when the EPA standards are mandatory, manufacturers will have the option of complying with NHTSA fuel consumption standards equivalent to the EPA emission standards in order to accumulate credits in the ABT program. NHTSA would like to clarify that for the early credit provision, implementation must occur in MY 2013 exactly as implemented under the EPA emission program, and not in the model year immediately before the NHTSA standards become mandatory. Further, once a manufacturer opts into the NHTSA program it must stay in the program for all the optional MYs and remain standardized with the implementation approach being used to meet the EPA emission program. EPA and NHTSA intend for manufacturers' ABT credit balances to remain equivalent wherever possible.

The agencies also received comments from EMA/TMA and Cummins opposing the requirement to certify six months prior to the first model year of the mandatory standards for early credits. The commenters argued and the agencies agree that this restriction could cause some delays in technology rollout and are therefore removing this requirement for the final rule. The agencies reviewed the restriction and evaluated the 2012-2016 MY Light-duty early credit program. No such restriction exists for LD vehicles. Upon reconsideration we believe that this requirement is not necessary for our implementation of the program

Several commenters, including DTNA, Edison Electric Institute, Eaton, and Bosch, supported adding the provision to further incentivize early credits by using a 1.5 multiplier, stating that it would encourage early introduction of technology. Cummins and UCS opposed the added provision stating that the opportunity to earn credits at their normal value should be sufficient incentive for early compliance. The agencies believe that this incentive will further encourage faster implementation of emission and fuel savings technology and help to reduce the costs manufacturers will incur in efforts to comply with this rule. The agencies have therefore decided to finalize a 1.5 multiplier for early credits earned in MY 2013.

With respect to heavy-duty pickups and vans, the agencies proposed that early credits could be generated on a fleetwide basis by comparison of the manufacturer's 2013 heavy-duty pickup and van fleet with the manufacturer's fleetwide targets, using the target standards equations for the 2014 model year. 75 FR at 74255. The agencies are finalizing these provisions as proposed. Under the structure for the fleet average standards, this credit opportunity entails certifying a manufacturer's entire HD pickup and van fleet in model year 2013. Industry commenters argued that early credits should be calculated against a target curve that is less stringent than the 2014 curve. We disagree. Because it is the first year of a 5-year phase-in, the 2014 model year has quite modest emissions and fuel consumption reductions targets of only 15 percent. Targeting even less significant improvements over the baseline would unduly increase the prospect for windfall credits by individual manufacturers who may have better than average baseline fleets. Again, the agencies consider the availability of early credits to be a valuable complement to the overall program to the extent that they encourage early implementation of effective technologies.

Advanced Technology Credits

MEMA asked that the agencies expand the list of technologies that are eligible for Advanced Technology Credits to include advanced transmission and drivetrain technologies, tire and wheel accessories, and advanced engine accessories technologies (such as electronic air control systems and clutched turbocharged air compressor). Bendix requested that weight reduction approaches, improved transmission and drivetrains, driver management and coaching, and tire and wheel improvements be allowed to receive credit through the Advanced Technology Credit Program. Other stakeholders requested the addition of alternative fuel technologies to the advanced technology list.

The advanced technology credit program is intended to encourage development of technologies that are not yet commercially available. In order to provide incentives for the research and development needed to introduce these technologies, Advanced Technology Credits are allowed to be applied to any heavy-duty vehicle or engine and so are not limited to the vehicle category generating the credit. Because of this flexibility in the application of ATCs, it is important that the list of eligible technologies be restricted to those that are not yet available in the market. In addition, the technologies must lend themselves to straight forward methodologies for quantifying emissions and fuel consumption reductions. For some of the technologies that MEMA and Bendix asked be included in the program, such as electrified accessories and tires, the agencies have already established a mechanism for quantifying reductions associated with these approaches. For example, the agencies assumed in the regulatory impact analysis that some electrified accessories will be used to comply with the regulations. Specifically, improved water and oil pumps are assumed to be used for 2014 LHD, MHD, and HHD FTP and SET diesel engines to comply with standards and would receive credit though engine certification process. (See RIA Chapter 2). Any reductions in engine load and resulting emissions and fuel consumption resulting from accessory electrification will be accounted for in engine dynamometer testing. (Thus, these technologies would also not be eligible for innovative technology credits, since granting credits would result in double counting the emission reductions associated with the technologies' use.) However, other electrified accessories, such as power steering and air conditioning may not be reflected in the engine certification process – if they do not impact engine operation over the FTP and SET cycles. As such, these technologies could be potential generators of innovative technology credits to be established through the Innovative Technology Credit Program described in section IV. B (2). With regard to tire rolling resistance improvements, light weight wheels, and weight reduction associated with the use of super single tires, these are already reflected in the combination tractor standard (and the standard for heavy-duty pickups and vans); tire rolling resistance is accounted for in the vocational vehicle standard. To the extent the technologies are reflected in the standards, they are not credit generators. Some improved transmissions – such as automatic manuals - have been available commercially for ten years and as such, this technology would not be eligible for ATC. However, the agencies acknowledge the importance of including advanced transmissions and drivetrains in the program. As such, we are allowing credit to be established through the Innovative Technology Credit Program described in Section IV. B (2). Likewise, with regard to weight reduction, the agencies are allowing additional weight reduction approaches to be used for tractors through GEM modeling. Weight saving approaches will not be credited for vocational vehicles given the very small percentage improvement that weight reduction provides for vocational vehicles. And finally, for driver management and coaching – while we recognize that there could be significant benefits to this, the difficulty in establishing a baseline condition for driver behavior limits the agencies' ability to establish a reduction for this approach at this time.

The agencies have decided not to change the proposed list of technologies evaluated as advanced technologies, but are providing additional clarity in the advanced technology list. The agencies proposed that Rankine cycle engines be included, but the agencies are adopting the wording of Rankine cycle waste heat recovery system attached to an engine.

The agencies received comments from Bendix, Bosch, MEMA, Navistar, Odyne, Green Truck Association, Eaton, ArvinMeritor and Calstart, which supported the 1.5 multiplier for advanced technology credits. MEMA argued that these added flexibilities are absolutely necessary to help advanced technologies penetrate the marketplace and are the primary impetus to integrate these technologies onto vehicles given the technologies' costs. The agencies also received comments from several stakeholders, including ACEEE and Cummins opposing the 1.5 multiplier for advanced technology credits. ACEEE argued that multipliers should be avoided because they lessen the total emission reductions by allowing a greater increase in the emissions of other vehicles than they offset. After reviewing these comments, the agencies have determined that the relatively low volumes expected in this timeframe are likely to mitigate any potential adverse impact. Further, the credit multiplier will provide enough added benefit to the potential hybrid community to help reduce barriers to market entry for these technologies. Therefore, the final rule includes a multiplier of 1.5 for advanced technology credits.

The agencies are also capping the amount of advanced credits that can be brought into any averaging set into any model year to prevent market distortions.

In response to DTNA's comment requesting that the agencies credit prior sales of hybrid buses, the agencies are not adopting this provision although we proposed and are finalizing a similar provision for full EVs. We have no mechanism for validating the tailpipe CO_2 performance of past hybrid vehicle sales unlike full electric vehicles where we can be confident that the tailpipe CO_2 emissions are zero. Therefore, we do not believe it would be appropriate to provide a retroactive CO_2 credit for past hybrid vehicle production.

Innovative Technology Credits

In response to the NPRM, the agencies received numerous comments relating to all aspects of the innovative technology credit flexibility provision. The vast majority of the commenters supported this provision as proposed, but have requested further clarification, so the agencies are adopting the full provision as proposed and providing further discussion that addresses and clarifies the provision in response to the comments solicited and the comments received.

A number of organizations, including DTNA, MEMA, Navistar, Green Truck Association, Eaton, ACEEE, and NESCAUM, commented that technologies such as advanced transmissions, engine cooling strategies, idle reduction, light-weight components (including light-weight engines), and advanced drivelines should be able to receive credit through the innovative technology program. The agencies agree with these commenters. The NPRM did not provide a specific list of technologies that the agencies would consider "innovative" because the agencies intended that an innovative technology could be any technology that can be proven to reduce CO_2emissions and fuel consumption but for which the benefits are not captured utilizing the FTP procedures, SET procedures and GEM methodology used to determine compliance with the emission and fuel consumption standards. Technologies which are inputs to the GEM for combination tractors, but not for vocational vehicles, may be considered for innovative technologies in vocational vehicles. Any of the suggested technologies could be considered as an innovative technology if the associated emission and fuel consumption benefit has not already been considered in developing the standard and similarly if the technology is not already in substantial use in the heavy duty sector, if the associated emission and fuel savings can be measured and validated, and if the technology and measurement methodology have been approved by the agencies.

A number of commenters, including Bendix, Bosch, Cummins, EMA/TMA, Eaton, DTNA, Navistar, Volvo, ArvinMeritor and USC requested that the innovative technology process and procedures be more clearly structured and defined. Bendix requested that the agencies prescribe specific processes and procedures in the final rule by which innovative technologies can be submitted for review and approval. EMA/TMA requested that the agencies provide guidance on the certification process, and suggested that existing fuel consumption test procedures developed jointly by the Society of Automotive Engineers (SAE) and the Technology & Maintenance Council (TMC), specifically that the Type II and Type III procedures be used. Eaton requested that the agencies identify test methods that can be used for certification in order to provide transparency and certainty, and promote early technology introduction. In response to these comments, the agencies in the final rule are further defining the process for evaluating applications for innovative credits.

In cases where the benefit of a technological approach to reducing CO_2 emissions and fuel consumption cannot be adequately represented using existing test cycles, EPA and NHTSA will review and approve test procedures and analytical approaches as appropriate to estimate the effectiveness of the technology for the purpose of generating credits. The innovative technologies will be evaluated in an A-to-B comparison. The baseline engine and/or vehicle configuration must represent a configuration which is equivalent to the engine and/or vehicle with the innovative technology in terms of the other aspects of the engine and/or vehicle to prevent double counting of emissions reductions or gaming. For example, for a vehicle with an active aerodynamic technology that the manufacturer would like to be considered for innovative technology credits, the A and B vehicles would need to have the same engine, transmission, final drive ratio, tires, and any other vehicle component which impacts the fuel consumption and GHG emissions of the vehicle.

Since innovative credits will be available for use within the same averaging set as the engine or vehicle which employ the innovative technology, the agencies are defining innovative credit approaches by regulatory category.

16.3. Alternate CO_2 Standards Based on 2011 Model Year Engines

Organizations Included in this Section:

Cummins, Inc.
Daimler Trucks North America
American Lung Association & Environmental Defense Fund
Navistar, Inc.
Union of Concerned Scientists
Volvo Group
California Air Resources Board
Center for Biological Diversity
American Council for an Energy-Efficient Economy

Organization: Cummins Inc.

To accommodate engines that are significantly worse than the industry average baseline used in setting the standards, the Agencies have proposed alternate CO2 standards whereby a manufacturer, for model years 2014-2016, would have the option to comply with a unique standard based on a fixed reduction from the individual engine's own MY2011 baseline level (see 75 FR 74178-74179 and 75 FR 74202). If the Agencies choose to include this provision in the final rule, the reductions must align with the basic program reductions, i.e., 3% for HHD and MHD tractor engines and HHD vocational engines and 5% for MHD and LHD vocational engines. The Agencies requested comment on requiring a less stringent reduction level of 2% from the MY2011 baseline. Cummins does not support a 2% reduction in this alternative as it does not align with the reductions required in the primary program. [EPA-HQ-OAR-2010-0162-1765.1, p.28]

In line with this recommendation, we point out an error in § 1036.620(a) which says "The alternate CO2 standard for vocational engines is equal to the baseline emission rate multiplied by 0.950." That language should be corrected to show that for HHD vocational engines, the appropriate multiplier is 0.970. [EPA-HQ-OAR-2010-0162-1765.1, p.28]

The Agencies requested comment on extending the alternate CO2 standards for one year for a single engine family. Cummins strongly opposes extending the alternative for one year. By MY2017, all manufacturers will have had appropriate leadtime - well over four years - in which to make the product changes needed to comply with the primary program. Since other manufacturers will also be making investments and product improvements to comply with the primary MY2017 standards, no further unique accommodations should be made for manufacturers with engines that are significantly worse today than the industry average baseline used in setting the standards. [EPA-HQ-OAR-2010-0162-1765.1, pp.28-29]

In conjunction with using the alternate CO2 standards, the Agencies are proposing ABT restrictions that require the manufacturer to exhaust all available credits in the regulatory subcategory (see 75 FR 74179, 75 FR 74202 and § 1036.620). Cummins supports the requirement to exhaust all available credits, including those generated through the advanced technology or innovative technology credit provisions. [EPA-HQ-OAR-2010-0162-1765.1, p.29]

The Agencies have also proposed that manufacturers using this alternative would not be able to generate or use credits on other engines in the same subcategory. Cummins agrees with this restriction. [EPA-HQ-OAR-2010-0162-1765.1, p.29]

Cummins also urges the Agencies to not allow the manufacturer using this alternative to trade credits to another party to avoid using them, with the possible intent of receiving them back in a subsequent trade. [EPA-HQ-OAR-2010-0162-1765.1, p.29]

All of these restrictions are necessary to ensure that alternate CO2 standards are not used as a work-around to accumulate credits while at the same time avoiding meeting the level of GHG/FC improvements to which other manufacturers will be complying. [EPA-HQ-OAR-2010-0162-1765.1, p.29]

Organization: Daimler Trucks North America

As noted above in the engine section, there should be disincentives to using the alternative engine certification procedure. An appropriate disincentive would be to not allow a vehicle into which an OEM installs and Alternative Standard engine to generate any vehicle GHG credits. This would provide an incentive for the vehicle OEM to select GHG friendly compliant (or credit generating) engines. Stated another way, a vehicle using an Alternative Standard engine may have higher CO2 emission per unit work done than a vehicle using a regularly certified engine. The former should not get credits. Again, we reiterate that NCPs should be used in lieu of Alternative Standards, but if the Agencies adopt Alternative Standards, they need to further disincentivize certification using those standards. [EPA-HQ-OAR-2010-0162-1818.1, pp.58-59]

The agencies request comment on the provisions described in the alternative path certification option and the appropriateness of relaxing the proposed targets. We believe that the alternative path for certification should be eliminated. Many manufacturers had the foresight to make the necessary considerable investments in technology to establish a strong competitive position relative to fuel economy (and therefore inherently low GHG emissions) of their products. Consequently, provisions in the proposal to accommodate those manufacturers who elected to delay similar investments seem inappropriate. [EPA-HQ-OAR-2010-0162-1818.1, p.32]

However, given that the framework leading to this rulemaking was designed to accommodate the existing broad range of newly designed and legacy products that manufacturers are constrained to produce in the near years GHG rule implementation, the Agencies may need to provide some relief for poor engines. That relief, however, should not prejudice others. One solution is to adjust the standard so that all manufactures are able to comply with existing technologies. Having a single standard for all would be a fair approach. The Agencies should not create a program with non-uniform targets. [EPA-HQ-OAR-2010-0162-1818.1, p.32]

We believe that we understand the Agencies' concern and, in turn, their reasons for offering the alternative certification program: because one manufacturer is unable to meet the emission targets. However, a second solution is offered in the Clean Air Act which has provisions for such a technological laggard. [EPA-HQ-OAR-2010-0162-1818.1, p.32]

On 75 Fed. Reg. 74280, the Agencies write that 'the proposed GHG and fuel consumption standards are readily feasible, and we do not believe a technological laggard will emerge in any sector covered by these proposed standards.' Yet the Agencies also write that a provision is necessary to allow the Agencies to certify engine manufacturers who are unable to meet the engine standards that all other manufacturers must meet. This inability to meet the standards is precisely the technological lag that Congress addressed with NCPs. The present regulations are a prime example of when NCPs should be applied, both under Congress's program and the regulatory scheme that the EPA developed in 40 CFR 86.1103-87: (1) standards have changed from a condition of no standards to a condition of new numerical standards, (2) the numerical standards are sufficiently difficult to meet that at least one manufacturer cannot meet them without a relaxed regulatory provision, and (3) a laggard has developed, presumably because of reliance upon technologies that do not adequately save fuel. The Agencies (or EPA at the least) should follow the CAA and the EPA's existing regulatory program rather than create a flexibility provision designed for the very technological laggards that Congress clearly meant to fall within the NCP program. Stated another way, the Agencies should not create a separate program for those engine manufacturers who cannot meet the technological requirements required of all other manufacturers (the numerical limits on gCO_2 / bhp-hr or gallons / bhp-hr), when Congress already created a separate and distinct program that would be in express contradiction to this one in several regards. The EPA should follow the CAA provisions for NCPs by assessing a fee equivalent to the incremental cost increase required of all engines upgraded for improved CO2. Failure to assess NCPs for technological laggards is counter to CAA 206(g). [EPA-HQ-OAR-2010-0162-1818.1, p.32]

If the program must allow Alternative Standards, those standards need to require 3% (tractor engines) and 5% (vocational engines) to keep parity with engines that actually achieve the absolute thresholds and not the 2% CO2 reduction that was posed for comment. Nor should the Agencies provide further relaxation via the extension of the alternative path for an additional model year. Such additional relaxation that further rewards technical laggards is simply unacceptable. [EPA-HQ-OAR-2010-0162-1818.1, p.33]

In addition, if there must be provided an alternative approach to accommodate underperforming manufacturers, the Agencies must include provisions to guard against potential gaming by manufacturers in their setting of model year 2011 baseline levels against which progress is to be measured. Specifically, the calibration of the parent rating of the baseline model year 2011 engine may be manipulated to produce a high CO2 level making it easier to pass alternative path requirements, but with no intent to actually sell units with that rating. To help avoid this possibility it is recommended that EPA require that the manufacturer provides evidence that its parent baseline rating was actually offered and units sold. Further, there needs to be some consequence associated with underperforming engines. Any engines certified to an alternative standard should be required to exhaust all available credits before obtaining certification to a lower standard. In other words, a manufacture of engines should have no banked credits it alternative path compliance is needed. Finally, as a disincentive to using the alternative path, the details of alternative path certification, including the manufacturer identity, certified CO2 levels, and credit balances should be available to the public. [EPA-HQ-OAR-2010-0162-1818.1, p.33]

Organization: American Lung Association (ALA) & Environmental Defense Fund (EDF)

EDF and ALA strongly support the proposal not to set nonconformance penalties for the proposed standards. As discussed above, the proposal finds that “the proposed GHG and fuel consumption standards are readily feasible, and we do not believe a technological laggard will emerge in any sector covered by these proposed standards. In addition to the standards being premised on the use of already-existing, cost-effective technologies, there are a number of flexibilities and alternative standards built into the proposal.” The standards are indeed feasible and the proposed decision not to allow nonconformance penalties will bring the greatest emissions and fuel consumption reductions to the program and is an essential element of a rigorous final rule. [EPA-HQ-OAR-2010-0162-3129.1, p.12]

Yet, despite the feasibility of the standards, the proposal contains an alternative compliance path for some engine manufacturers. Contrary to the feasibility conclusion, the proposal finds that “a relatively small group of engines” are “significantly worse than the average baseline for other engines" and may "experience significant issues of available lead-time and cost because these products may require a total redesign in order to meet the standard." 75 Fed. Reg. 74178. The proposal provides that instead of meeting the standard, those engines would be required to comply with a unique standard based on a three percent reduction from an individual engine's own MY 2011 baseline. The proposed alternative compliance path is inequitable, inappropriate and fails to carry out the law. These disparate standards will be applied to a few engine manufacturers who have failed to invest in and develop engines as efficient as their competition and penalizes those manufacturers who have already invested in, developed, and deployed cleaner engines. As the agencies indicate, all engines are technologically capable of applying the technology packages proposed in this rule. We respectfully urge all manufacturers be required to meet the proposed standards and that those standards apply on a nationwide basis. Indeed, there is ample compliance flexibility built into the proposal through provisions like ABT, advanced technology credits and innovative technology credits. [EPA-HQ-OAR-2010-0162-3129.1, pp.12-13]

Organization: Navistar, Inc.

The alternative engine standard must be a 2% reduction from the 2011 model year ("MY") baseline for any engine in any application and with the added flexibility to use either the alternative standard or the proposed emission standard for a particular engine family or application.

The restrictions on credit use with the alternative standard should be eliminated. The advanced technology and innovative technology credits as well as vehicle credits must be available for use toward compliance with the alternative standard. [EPA-HQ-OAR-2010-0162-1871.1, p.2]

Navistar strongly supports the inclusion of the alternative standard for heavy-duty engines in proposed 40 CFR § 1036.620. The proposed reductions of 5% for vocational and 3% for tractor from an individual engine's own MY 2011 baseline, however, are not technologically feasible in the lead time allotted and with existing technologies. An alternative standard of 2% improvement from the MY 2011 baseline level is necessary for all engines covered by proposed part 1036. [EPA-HQ-OAR-2010-0162-1871.1, p.7]

The very limited lead time (essentially 23 months) available from the anticipated release of the final rule to start of production for MY 2014 engines is, as EPA itself admits, dramatically shorter than the typical heavy-duty engine development lead time, which is closer to 48 months. This longer time is necessary to investigate various technology and design options, make a technology choice and then, very importantly, complete a full test and validation program to ensure the engine meets both customer and legislative requirements when it enters production. Due to the short lead time, it will be impossible to develop and bring to market new technological advances to meet the standards. [EPA-HQ-OAR-2010-0162-1871.1, pp.7-8]

While the Agencies claim the proposed standards can be met using purported "existing" technologies,16 the technologies in question are not in production for all manufacturers, and certainly not with respect to all heavy-duty engine applications. Just as the short lead time prevents manufacturers from bringing to market new technologies, so too will it be impossible for manufacturers to bring to market "existing" technologies that are not in their current production because of the substantial development and deployment efforts to achieve the necessary commercial availability. [EPA-HQ-OAR-2010-0162-1871.1, p.8]

Setting aside that the Proposed GHG Rule provides less than the minimum Congressionally-mandated lead time, the very tight time constraints proposed severely limit the engine system changes that could be introduced to the air handling system, fuel system, combustion system, and control system calibration. However, development work to comply with existing emissions regulations, up to and including the "near zero" 2010 NOx standards, have already optimized these systems to a very high degree in order to simultaneously meet current standards while achieving the best possible fuel efficiency needed to compete in our industry. [EPA-HQ-OAR-2010-0162-1871.1, p.8]

A maximum 2% improvement from an engine's own MY 2011 baseline strikes a healthy balance between meaningful GHG emissions reductions while maintaining other emissions and establishing a level playing field within the industry. A 2% improvement will be challenging, as it depends on Navistar meeting the following sub-system goals:

- An improvement from turbocharger refinements such as higher efficiency compressors and turbines, along with matching refinements to drive higher EGR rates or reduce EGR flow losses. This improvement requires the active involvement of our turbocharger supplier.

- Further refinement of design-of-experiment optimization techniques to understand the trade-off between the numerous combustion system design factors, including piston bowl geometry, fuel injector nozzle geometry, and control system calibration. These improvements will be difficult to achieve because Navistar already makes extensive use of these experiments. [EPA-HQ-OAR-2010-0162-1871.1, p.8]

- Navistar has consulted with our fuel system suppliers on potential actions. Given the lead time for this regulation, the current fuel systems cannot be leveraged for improvements. They are already close to physical limits for injection pressure such that asking for higher pressures could potentially compromise component durability.

- Improvements based on addressing additional parasitic losses within current hardware constraints. [EPA-HQ-OAR-2010-0162-1871.1, p.9]

In short, it will be extremely challenging from a technological development and cost perspective to achieve a 2% reduction from MY 2011 baselines. Emission standards and fuel consumption improvements higher than the 2% alternative for 2014-2016 would be technologically infeasible and drive a need for the use of technologies with longer lead-times, higher costs, and/or undesirable durability consequences. As such, EPA's abbreviated lead time requires the alternative standard to be reduced to 2%. A 2% improvement comports with the collaborative core principles that form the basis of this proposed joint rulemaking. [EPA-HQ-OAR-2010-0162-1871.1, p.9]

In addition, manufacturers must have the option of certifying to the alternative standard or the regulatory standard for engines that would otherwise be within the same family. For example, a manufacturer must be able to certify a heavy-heavy engine to the regulatory standard when used in a vocational application and certify the same engine to the alternative standard when used in a combination tractor. And the alternative standard must be 2% for both the vocational and tractor engines (not 5% and 3%), because manufacturers do not otherwise have sufficient lead time to bring all variations of products to the standard. The variety of products in the heavy-duty industry greatly increase the costs that arise from meeting the standards with a manufacturer's existing technologies in such short lead time across a broad product line. [EPA-HQ-OAR-2010-0162-1871.1, p.9]

The alternative standard, with the changes discussed above, is similar in concept to the temporary lead time alternate standards adopted in the Light Duty ("LD") vehicle rules and should be adopted in this instance for the same reasons. Indeed, compared with heavy-duty, LD vehicles are relatively more uniform, and it is consequently easier to make changes across engine families. The variety of vehicles and, hence, engines in the heavy-duty industry is vast. As commenters noted in the LD rule process, temporary lead time alternatives help provide time for industry to develop advanced technologies while simultaneously implementing aggressive standards in their existing fleets. And, as the Agencies themselves admit, the variety of heavy-duty engines in terms of size, horsepower, torque and other features, even within a single manufacturer, is immense. For this reason, the case for an alternative standard is even greater than adopted in the final LD rules. [EPA-HQ-OAR-2010-0162-1871.1, pp.9-10]

Moreover, we understand that in setting the baseline from which the CO2 emission standards for MY 2014-2016 are derived, the Agencies are using, and intend to use, a normalization factor to 0.20 g/bhp-hr NOx ("0.20 g NOx"). Analyses of emissions data from Navistar's MY 2007-2010 medium-heavy duty diesel engines demonstrate an inverse relationship between CO2 and NOx emissions is necessary to normalize the CO2 data to 0.20 g NOx. All of Navistar's comments assume that normalization will be done appropriately for the alternative standard as well – namely, that there will be an appropriate normalization to 0.20 g NOx applied to baseline MY 2011 engines utilized to measure the alternative standard. 22 We look forward to sharing the relevant date with the Agencies. [EPA-HQ-OAR-2010-0162-1871.1, p.10]

Finally, EPA proposes some serious restrictions on the alternative standard that, if adopted, will undermine the overall feasibility of the Proposed GHG Rule. The proposal appears to require the consumption of all credits prior to use of the alternative standard and prohibits generation or use of credits for any family within the same averaging set, presumably if any engine within the set is certified to the alternative standard. If this is correct, and if only one (small) family within an averaging set uses the alternative standard, all other families within the same set are prohibited from credit use or generation, with very limited exceptions. These restrictions on credit use must be removed, and credits should be applicable across engine families, classifications, between engines and vehicles, and to engines certifying under the alternative standard. For instance, credits generated from vehicles though the GEM model must be available for use towards meeting the alternative standard for engines. [EPA-HQ-OAR-2010-0162-1871.1, pp.10-11]

Such arbitrary restrictions will cause severe economic repercussions and significantly increase costs, in a manner not accounted for in the Agencies' analysis. For example, a manufacturer may be forced to drop an engine that could meet a 2% alternative standard simply because the manufacturer would be precluded from generating credits for other more efficient engines that fall within the 2% engine's averaging set. At the same time, the manufacturer would have little incentive to bring innovations to market within that averaging set during the alternative standard model years, because it would not be able to use the credits. There would be no incentive to do anything other than conduct research and wait to bring higher performing engines within that averaging set to market in MY 2017. Thus, these arbitrary restrictions on the use of credits would have a negative impact not accounted for by the Agencies. [EPA-HQ-OAR-2010-0162-1871.1, p.11]

In sum, the alternative engine standard of 2% for both tractor and vocational applications is necessary to support a finding of "feasibility" given the limited lead time, and the alternative standard must also have sufficient flexibilities built in for it to function appropriately. [24] Altering the Proposed GHG Rule in the manner identified by Navistar is required for technological feasibility even from the Agencies' perspective and even ignoring the independent statutory requirements for lead time and stability. [EPA-HQ-OAR-2010-0162-1871.1, p.11]

/22/ We note, however, that EPA's analysis is not at all clear from the preamble or supporting agency documents. Proper rulemaking procedures require that the public be able to assess exactly how EPA created the GHG standards. EPA's failure to provide such necessary information not only inhibits Navistar's ability to meaningful comment but also means that EPA has not followed proper rulemaking procedures under the CAA and general due process. [EPA-HQ-OAR-2010-0162-1871.1, p.10]

[24] We would like to comment briefly on the method for determining the baseline engine for the alternative standard. With the noted assumptions in these comments, the standard set out in the proposal is adequate. As EPA will be reviewing the applicability of the alternative standard on a certification by certification basis, we do not see the need for the regulations to set specific criteria beyond that currently in the proposal. Although some may raise concerns about the potential for manipulation by certifying an engine that is not for actual production, we believe the real-world potential for this is non-existent. EPA will have product data and all other certification data for the MY 2011 baseline engine already in its possession and will be able to

determine whether it is representative. There is no opportunity for a “sham” engine to become a baseline engine. [EPA-HQ-OAR-2010-0162-1871.1, p.11]

Organization: Union of Concerned Scientists (UCS)

Finally, flexibility provisions should not reduce the benefits of the program. The agencies are proposing an alternative baseline for manufacturers who may have difficulty meeting the 2014 engine standards based on their current engine technology mix. The proposal already contains flexibility with a 3 year ABT provision and stringency levels that reflect off-the-shelf technologies. We believe the manufacturer specific baseline is unnecessary given the existing flexibilities. However, if the agencies continue to pursue this option, they should ensure that use of this provision would not result in a net reduction in overall program benefits. As proposed, the provision would allow a manufacturer to under comply in the 2014 to 2016 model years. To ensure emission and fuel saving benefits are maintained, a manufacturer using this option should be required to meet a more stringent standard in 2017 to account for the lost benefits occurring from their 2014-2016 model year products. [EPA-HQ-OAR-2010-0162-1764.1, p.11]

Organization: Volvo Group

Volvo Group opposes EPA’s proposal to allow a company to establish its own 2014-2016 engine emissions target at 5% better (vocational) or 3% better (tractor) than its own 2011 engine rather than the 2010 industry baseline. *See* 75 FR 74152, 74179. All manufacturers should be subject to the same requirements. If a manufacturer is unable to comply with the standard due to lack of available technology, despite the fact that other manufacturers can comply, the appropriate resolution is to use the non-conformance penalty provisions already available. [EPA-HQ-OAR-2010-0162-1812.2, p.11]

This provision could allow a manufacturer with a poorly-performing 2011 engine to avoid technology expenses that add cost to competitors, creating a competitive advantage, particularly for applications with less sensitivity to fuel efficiency. Further, CO2 measurement in 2011 is not subject to any targets. There are no standards for the measurement process, accuracy, or fuel variability, creating opportunities to set arbitrarily high baselines. The range of CO2 data already submitted with 2010 and 2011 certifications demonstrates that these data are poorly measured and not uniformly reported. According to the EPA database, reported CO2 emissions range from 466 to 711 g/bhp-hr for similar engines. [EPA-HQ-OAR-2010-0162-1812.2, p.11]

If this provision remains in the final rule, Volvo Group expects that the revised target set by any OEM be made available as an alternative to any engine manufacturer in that engine size class. In addition, there must be rigorous oversight of any data used that purport to establish a company’s 2011 baseline, including verification that the data are statistically comparable to production data, and that data acquisition meets certification requirements. In view of the current lack of a well-defined protocol and correlation for GHG emissions measurements, it is appropriate that EPA conduct a confirmatory test on any engine certification submitted to establish an alternative baseline and target. EPA must also require that any credits available to the engine be forfeited, including those in the same averaging set or transferable from any other vehicle or engine averaging set. This will avoid a potential situation in which the alternative certification is made to a less stringent standard, giving manufacturers an incentive to use both credits and a lesser standard. In order for this provision to be effective in reducing GHG emissions, EPA must also require that (1) no future certification engines have a higher rating than the 2011 baseline; and (2) the 2011 baseline certification engine must be produced and sold in significant volumes with the certified calibration so as to prevent a manufacturer from developing a high GHG output engine that cannot or will not be sold in order to set an artificially high standard. [EPA-HQ-OAR-2010-0162-1812.2, pp.11-12]

Organization: California Air Resources Board (ARB)

Under the current proposal, the agencies would provide manufacturers of an atypical, inefficient engine with the option to meet a temporary, engine-family-specific standard based on a three percent reduction from the engine's own 2011 model year baseline level. While ARB staff recognizes the need for flexibility in these situations, the agencies should establish a program that requires affected manufacturers to fully reconcile any shortfall based on the otherwise-applicable standard level. This would help ensure that manufacturers that have already invested in improving the efficiency of their engines are not penalized. [EPA-HQ-OAR-2010-0162-2354.1, p. 6]

Organization: Center for Biological Diversity

A similarly arbitrary approach is proposed for the worst-polluting engines within the HD Vehicle class. The Agencies have identified a “group of legacy engines” with emissions higher than the industry baseline. Instead of requiring their immediate phase-out or complete redesign, the Agencies propose to allow them a special worst-polluter exemption by adjusting their baseline upwards. This is proposed even though there are no technological obstacles to building HD Vehicles with much higher-performing engines now: [EPA-HQ-OAR-2010-0162-2506.1, p.7]

The issue is not whether these engines’ GHG and fuel consumption performance cannot be improved by utilizing the technology package on which the proposed standards are based. These technologies can be utilized by all engines and the same degree of reductions obtained. Rather the underlying base engine components of these engines reflect designs that are decades old and therefore have base performance levels below what is typical for the industry as a whole today. [EPA-HQ-OAR-2010-0162-2506.1, p.8]

The Agencies claim that to accelerate full replacement of these dirty engines to MY 2014 would be “impossible as a practical matter given the engineering structure and lead-times inherent in the companies’ existing product development process.” Since engines with much better performance already exist, what might require “development” is unclear. But even assuming some need for development, the Agencies also leave unexamined what it would cost to change those “existing” processes. The proposed solution – permitting the dirtiest engines with decades old designs to be built for many more years – is stated without full analysis of the requisite statutory factors. The Agencies should excise this proposed worst-polluter-protection exception from the final rule. [EPA-HQ-OAR-2010-0162-2506.1, p.8]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The proposed rules would allow engine manufacturers to meet an alternative, presumably less stringent, standard through 2016 (pp.74178-74179). This provision would permit a manufacturer with an engine model having emissions higher than the industry average to achieve the same percentage emissions reduction from 2011 levels that the standard requires relative to the industry average. It is not clear that this provision, which can only reduce GHG and fuel savings from the rule, is necessary, because the proposed standards are not very stringent. The proposal offers no data supporting the need for such a provision, noting only that certain engine families are substantially below the industry average. Whether manufacturers might reasonably be expected to offset the greater reductions required of these engines by additional savings from other engine families or by using banking or trading provisions was not discussed in the proposal. Moreover, the provision could incentivize certain undesirable actions, such as the use of a particularly inefficient representative of the affected engine family to represent the family's 2010 average and hence its target through 2016. If the agencies believe that this alternative standard is essential and adopt it, then they should require that any engine used to establish a baseline is truly representative of the engine family. They should also require, at a minimum, that any manufacturer that takes advantage of the alternative standard must compensate for its greater emissions and fuel consumption in 2017-2018. [EPA-HQ-OAR-2010-0162-1894.1, p.16]

The agencies request comment on the suggestion that this alternative engine standard be expanded by i) allowing manufacturers to reduce a family's emissions by a lesser percentage than the basic standard would require of other engines; and/or ii) extending the period in which manufacturers could use the alternative standard through 2017. These expansions of the alternative standard should not be adopted.[EPA-HQ-OAR-2010-0162-1894.1, p.17]

Response:

Although the agencies believe that the standards for the HD diesel engines installed in combination tractors and vocational vehicles are generally appropriate, cost-effective, and technologically feasible in the rulemaking timeframe, we also recognize that when regulating a category of engines for the first time, there will be individual products that may deviate significantly from the baseline level of performance, whether because of a specific approach to criteria pollution control, or due to engine calibration for specific applications or duty cycles. In the current fleet of 2010 and 2011 model year engines, NHTSA and EPA understand (and comments confirm) that there is a relatively small group of engines that are up to approximately 25 percent worse than the average baseline for other engines. For this group of engines, when compared to the typical performance levels of the majority of the engines in the fleet and the fuel consumption/GHG emissions reductions that the majority of engines would achieve through increased application of technology, the same reduction from the industry baseline may not be possible at reasonably comparable cost given the same amount of lead-time, because these products may require a total redesign in order to meet the standards. Manufacturers of these engines with atypically high baseline CO_2 and fuel consumption levels may also, in some instances, have a limited line of engines across which to average performance to meet the generally-applicable standards.

Navistar supported the alternative engine standard, but asked that it be set at 2 percent below the manufacturer's 2011 baseline. They also supported the extension to 2017 MY at 6 percent. Navistar provided CBI in support of its comments. Volvo, DTNA, environmental groups, NGOs, and the New York State Department of Environmental Conservation opposed the optional engine standard, arguing (in general terms) that existing flexibilities are sufficient to allow compliance with the standards and that all manufacturers should be held to the same standards.

Based on certification data and data submitted by the manufacturers , the agencies found that a large majority of the HD diesel engines used in Class 7 and 8 combination tractors and in vocational vehicles were relatively close to the average baseline, with some above and some below, but also that some of these diesel engines were far enough away from the baseline that they could not meet the generally-applicable standards with any application of technology by 2014 model year. Navistar also provided information in its public comments indicating why there is insufficient lead time to make major changes in existing engines, either to develop and incorporate new technologies, or to incorporate existing technologies not already contemplated as part of current production plans. See in particular Navistar comments at pp. 8-9. The agencies continue to believe that an interim alternative standard is needed for these products, and reflects a legitimate differentiation between products starting from different fuel consumption/GHG emitting baselines. First, as explained at proposal, it is legally permissible to accommodate short term lead time constraints with alternative standards. Second, commenters did not dispute that there are legacy engine families with significantly higher CO_2 baselines and for which simple addition of readily available technology will be sufficient to improve performance enough to comply. Those commenters nevertheless maintaining that these engines could meet the general standards using other flexibilities in the rule, or by incorporating more advanced technologies, provided no specifics for their assertions and in particular do not provide any analysis of how engines can be totally redesigned by MY 2014 at all, much less at reasonable cost. The agencies do not know of any way this can be done. The agencies also do not accept the generalized assertion that other flexibilities are available which would allow these engines to meet the main standards. One basic reason these legacy engines are faced with special lead time difficulties is manufacturers' inability to generate credits which can be averaged across engine products because of limited product lines.

Although the agencies are of course sympathetic to the view that technological laggards should not be rewarded, the agencies do not believe that this is the case here. The GHG and fuel consumption standards are first-time standards for these engines, so the possibility of significantly different baselines is not unexpected.[79] Moreover, the agencies do not believe that the alternative standard affords a relative competitive advantage to the higher emitting legacy engines: the same level of improvement at the same cost will be required of the engines installed in tractors. In the case of vocational engines, where a smaller reduction is required, we believe no significant advantage is conferred because legacy engines start at a significant disadvantage due to their poor fuel economy, and typically poor performance, reliability and higher manufacturing cost reflected in their aged designs. Further, manufacturers with these engines will face significant investments to replace these legacy products by 2017.

The agencies developed separate alternative standards for these legacy engines depending on whether they are installed in combination tractors or in vocational vehicles. Notwithstanding that engine averaging sets are no longer limited by the type of vehicle in which the engines are installed, so that (for example) all HHD engines are a single averaging set, these engines need to be evaluated separately for purposes of standard setting, including the alternative engine standard. This is because the engines are tested on different test cycles (FTP for engines installed in combination tractors and STP for engines installed in vocational vehicles) and perform differently on these different cycles. The differences are sufficient that different per cent reductions are necessary depending on ultimate engine utilization.

Although the technologies we have identified to achieve the proposed five percent reduction for engines installed in vocational vehicle would theoretically work for the legacy products, there is inadequate leadtime for manufacturers to complete the pre application development needed to add the technology to these engines by 2014. The mix of technologies available off the shelf for legacy engines varies between engine lines within OEMs and varies among OEMs as well. On average, based on our review of manufacturer development history and current plans, we project that for the legacy products approximately half of the defined technologies appropriate for the 2014 standard will be available and ready for application by 2014 for older legacy engine designs. Hence, we have concluded that if we limit the reductions to those improvements which reflect further enhancements of already installed systems rather than the addition or replacement of technologies with fully developed new on the shelf components, the potential improvement for the 2014 model year will be 2.5 percent for LHD and

[79] *See* 75 FR at 74178.

MHD engines and 3 percent HHD engines installed in vocational vehicles. Navistar has commented that 2 percent would be more appropriate, however, after reviewing the technologies available to manufacturers including Navistar and the CBI data Navistar provided we are convinced that a 2.5 percent improvement is achievable even reflecting the limited leadtime for model year 2014. The improvements possible in turbomachinery, combustion optimization, and reductions in parasitic loss show potential for improvements equaling 2.5 percent or more.

By 2017 MY, those engines using the alternative engine standard option in MYs 2014-2016 will be required to make the additional improvements to meet the same standards as other engines (at higher cost, given the greater gap to make up). The agencies continue to believe the 2017 MY standards are achievable using the technology approaches discussed in Section III.B and III.D of the preamble to the final rules and, in the case of MHD and HHD engines installed in tractors, turbocompounding. While Navistar commented that the 2017 MY standard may be challenging because not all manufacturers are using the technologies that may be required to meet the standards. The lead time provided to bring new technology to bear for engines with the alternative standard compliance by model year 2017 is consistent with comments raised by at least one manufacturer suggesting typical heavy-duty engine development lead time is 48 months. Thus, the agencies are finalizing a regulatory alternative whereby a manufacturer, for an interim period of the 2014-2016 model years, would have the option to comply with a unique standard based on an individual engine's own 2011 model year baseline level. This is similar to EPA's approach in the light-duty rule for handling a certain subset of vehicles that were deemed unable to meet the generally-applicable GHG standards during the 2012-2015 timeframe due to higher initial baseline conditions, and which therefore needed alternate standards in those model years.[80]

The agencies stress that this option is temporary and limited and is being implemented to address diverse manufacturer needs associated with complying with this first phase of the regulations. As will be codified in 40 CFR 1036.620, this optional standard will be available only for the 2014 through 2016 model years, because we believe that manufacturers will have had ample opportunity to benchmark competitive products during redesign cycles and to make appropriate changes as part of redesign to bring their product performance into line with the rest of the industry after that time. As at proposal, the final rules require that manufacturers making use of these provisions for the optional standard would need to first exhaust all credits available to the averaging set prior to using this flexibility. In other words, a manufacturer first must comply to the fullest extent possible using existing flexibilities such as credit averaging or banking before the manufacturer can use the alternative standards. We have followed this approach to help ensure that no advantage is conferred to manufacturers using the alternative standard. Without this approach, it would be possible for manufacturers to selectively create credits with their newest and best performing products while using the alternative standards for their poorest performers be they legacy products or not. Such a bifurcation of the manufacturers

[80] *See* 75 FR 25414-25419

average compliance would circumvent the intent of the regulation and would confer an advantage for those manufacturers in the marketplace.

The agencies note again that manufacturers choosing to utilize this option in MYs 2014-2016 will have to make a greater relative improvement in MY 2017 than the rest of the industry, since they will be starting from a worse level. Since the NHTSA standards are optional in 2014, manufacturers may choose not to adopt either the alternative engine standard or the regular voluntary standard by not participating in the NHTSA program in 2014 and 2015.

Some commenters argued that manufacturers could game the standard by establishing an artificially high 2011 baseline emission level. This could be done, for example, by certifying an engine with high fuel consumption and GHG emissions that is either: 1) not sold in significant quantities; or 2) later altered to emit fewer GHGs and consume less fuel through service changes. In order to mitigate this possibility, the agencies are requiring that the 2011 model year baseline must be developed by averaging emissions over all engines in an engine family certified and sold for that model year so as to prevent a manufacturer from developing a single high GHG output engine solely for the purpose of establishing a high baseline. As an alternative, if a manufacturer does not certify all engine families in an averaging set to the alternate standards, then the tested configuration of the engine certified to the alternate standard must have the same engine displacement and its rated power within 5 percent of the highest rated power of the baseline tested configuration. In addition, the tested configuration of the engine certified to the alternate standard must be a configuration sold to customers. See §1036.620. These three requirements will prevent a manufacturer from producing an engine with an artificially high power rating and therefore produce artificially low grams of CO_2 emissions and fuel consumption per brake horsepower. In addition, the tested configurations must have a BSFC equivalent to or better than all other configurations within the engine family which will prevent a manufacturer from creating a baseline configuration with artificially high CO_2 emissions and fuel consumption.

The agencies are adopting a provision for the alternative engine standard which provides an adjustment factor to the baseline CO2 level for baseline engines certified to a NOx FEL above the NOx standard. See 40 FR 1036.620 (b)(1).

Some commenters recommended that the agencies address the issue of legacy engines through the establishment of a nonconformance penalty (NCP) rather than through the use of an alternative standard. Had the agencies set these standards years ago providing ample leadtime and then when approaching the standards today discovered that some manufacturers were unable to comply because technology developments for the manufacturer had not developed as expected and hence the manufacturer was a technology laggard, the agencies would have considered the establishment of an NCP an appropriate approach. However, when setting new standards especially for the first time, we believe it is more appropriate to develop phase-in schedules, alternate standards or other forms of flexibilities to provide a compliance path that is technically feasible given the leadtime available. We do not believe that NCPs are the most appropriate means to address issues of the necessary leadtime to comply with an emissions standard.

Commenters also recommended that the agencies create a two step alternative standard where any emissions loss due to the alternative standard for model years 2014-16 would be offset by a more stringent 2017 standard. While we agree that such balancing of emissions through time can be appropriate (see for example the alternative phase-in schedule matched to EPA's OBD standards), the use of such an approach in this case is unfortunately not feasible. Had the agencies concluded that even more stringent engine standards were feasible for 2017, we would have set the 2017 standard at that more stringent level for all manufacturers. Having set the 2017 standard at the most stringent level we believe technically feasible, we see no opportunity to set an even more stringent standard for 2017 to offset any emissions loss due to the alternative engine standards.

16.4. Exemptions

16.4.1. Emergency Vehicles

Organizations Included in this Section:

National Truck Equipment Association
International Association of Fire Chiefs
Spartan Motors, Inc.
Fire Apparatus Manufacturers' Association

Organization: National Truck Equipment Association (NTEA)

We are concerned about emergency vehicles. Vehicles such as fire trucks, ambulances and snow removal vehicles would not qualify under the proposed exception. We believe, however, some form of exception should be created for them. [EPA-HQ-OAR-2010-0162-1608.1, p.8]

Emergency vehicles typically are on-road vehicles that need to be capable of traveling at highway speeds. As such, the speed limitations for the off-road exception would not be appropriate. In emergency situations, however, they may be called upon for significant off-road use. In off-road use lower rolling resistance tires would likely not be appropriate or safe. Creating an exemption that allows emergency vehicles to be sold with proper tires for their intended use is appropriate. [EPA-HQ-OAR-2010-0162-1608.1, p.8]

The loss of benefits from lower rolling resistance tires for this small population of vehicles would be negligible but the risk to these vehicles and the people they serve if they need to go off-road with improper tires is significant. [EPA-HQ-OAR-2010-0162-1608.1, p.9]

Organization: International Association of Fire Chiefs (IAFC)

Consistent with the Off-Road Vocational Vehicle Standards in the NPRM, please exclude emergency vehicles from the proposed vocational vehicle standards. Emergency vehicles would still be required to use certified engines. [EPA-HQ-OAR-2010-0162-1760.1, p.1]

As a function of their emergency response mission, emergency vehicles, such as fire apparatus and ambulances, can be deployed in a number of different types of environments. In responding to a wildland fire, an apparatus or ambulance may operate on dirt and gravel roads, fields or other off-road environments. In responding to a hazardous materials incident or highway traffic accident, an emergency vehicle may be forced to stage on the grassy side of a road or field. Even in an urban setting, a fire apparatus or ambulance may be forced to operate on a sidewalk or unpaved area. [EPA-HQ-OAR-2010-0162-1760.1, p.1]

The NPRM does provide exemptions for off-road vocational vehicles, but many fire apparatus and ambulances would not meet these exemptions. The NPRM would allow a vocational vehicle to be exempt only if it operates “chiefly off-road,” while many fire apparatus and ambulances must operate in “on-road” and “off-road” environments. In addition, the proposed exemption would require a 55 mph speed limitation, which would not be practical for emergency vehicles responding to an incident. [EPA-HQ-OAR-2010-0162-1760.1, p.1]

Provide a specific exemption for Airport Rescue and Fire Fighting (ARFF) vehicles to avoid conflict between the Federal Aviation Administration’s (FAA) ARFF vehicle performance requirements and the [EPA-HQ-OAR-2010-0162-1760.1, p.2]

The FAA requires that ARFF vehicles obtain FAA 10-E certifications, which require compliance with the National Fire Protection Association’s (NFPA) 414, “Standard for Aircraft Rescue and Fire-Fighting Vehicles.” ARFF vehicles are too wide to meet the “on-road” truck width regulations. However, they cannot qualify for the “off-road” exemption defined by the NPRM, because the FAA regulations and NFPA 414 require the vehicle to achieve a top speed greater than or equal to 70 mph. The NPRM’s proposed “off-road” exemption would set a 55 mph speed limitation. Because an ARFF vehicle is too wide to be an “on-road” vehicle and is required to travel faster than allowed under the “off-road” exemption, the IAFC would recommend a specific exemption for ARFF vehicles. [EPA-HQ-OAR-2010-0162-1760.1, p.2]

Organization: Spartan Motors, Inc.

The following comments will focus primarily on vocational vehicles, in particular, incomplete fire apparatus. While we support the proposed rules and its intention to reduce the dependency on foreign oil, we do so with reservation regarding the impacts on fire apparatus and the ability for this vocational vehicle to be a major contributor to such reduction. Based on the following, we recommend fire apparatus be exempt from the standards from the incomplete vehicle requirements found for vocational vehicles. [EPA-HQ-OAR-2010-0162-1612.1, p.2]

A fire apparatus is designed to transport necessary personnel and equipment to support loss mitigation activities, or medical assistance, during emergency situations. In most cases, this involves the vehicle traveling on-highway for relatively short durations which often times maybe five miles or less (one-way). While a fire apparatus may be a large consumer of diesel fuel, the majority of the fuel consumption occurs while the vehicle is at idle. [EPA-HQ-OAR-2010-0162-1612.1, p.2]

According to Fire Apparatus Duty Cycle White Paper, published by the Fire Apparatus Manufacturer's Association (FAMA) in August 2004, certain fire apparatus may idle between 61.4% - 66.6% of the time it is in use. In addition, certain apparatus may spend between 5.8% - 16.4% of the time it is in operation in pump mode, with the fire pump engaged. While demographics (urban, sub-urban, or rural) may play a large role in the fire apparatus use it is apparent this vocational vehicle does spend the majority of its time in an off-highway mode. [EPA-HQ-OAR-2010-0162-1612.1, p.2]

The proposed rule indicates Low Rolling Resistant (LRR) Tires are being mandated for incomplete vehicle manufacturers to be used as an attribute to the proposed fuel efficiency metrics. However, there are multiple concerns for use of such tire on a fire apparatus. [EPA-HQ-OAR-2010-0162-1612.1, p.3]

The emergency vehicle market has traditionally used a mix of on/off highway type tires due the topography or demographics of independent regions in which an apparatus may be operated. For example, an apparatus driven on an urban highway, in a flat area would have little need for an off-highway type tire whereas an apparatus that is driven in more rural areas that is subject to hilly terrain may need an off-highway type tire to access certain areas where an emergency situation may occur. [EPA-HQ-OAR-2010-0162-1612.1, p.3]

In general, most development by tire manufacturers for rolling resistance to date has been done for products used in line haul applications. In this application, vehicles travel primarily on open road with little need for hard stopping or sudden turning. We perceive this to be the primary opportunity for the greatest reduction in fuel consumption as opposed to a fire apparatus. To date, there does not appear to be unpaved traction comparisons between lower rolling resistance highway tires and mixed service tires. Since highway tires used by line haul vehicles do not typically spend time in an off-road environment, there has been no need for evaluating such comparisons [EPA-HQ-OAR-2010-0162-1612.1, p.3]

For this reason, tire manufacturers will most likely have to begin such comparisons in order for development of a low rolling resistant tire to be used on a fire apparatus. In addition, consideration would have to be taken with regard to the braking and cornering a fire apparatus may be subject to while responding in an emergency situation. A reduction in performance in either of these characteristics for a fire apparatus may compromise the safety of individuals in the vehicle as well as the civilians around or near the vehicle depending on circumstance. [EPA-HQ-OAR-2010-0162-1612.1, p.3]

Development costs, as well as cost of such low rolling resistant tires, may cause increase in the overall cost of a fire apparatus. Between 2007 and 2010, the price of an incomplete fire apparatus increased by more than $20,000 USD. Currently, there is a softening in the market place as a result of the economical downturn that has subsequently affected municipal budgets that typically fund new fire apparatus. With the initiative of the Environmental Protection Agency (EPA) to reduce Green House Gas (GHG), we expect a future increase beginning in 2014. There is no certainty the market will have stabilized from the recent financial increases by that time. To further increase the cost of a fire apparatus two years beyond the 2014 model year does not adhere to three years of stability. Further, the cost of a fire apparatus may not offset the savings one may generate by using low rolling resistant tires as it relates to fuel efficiency. [EPA-HQ-OAR-2010-0162-1612.1, p.3]

As a market leader in fire apparatus and other emergency vehicles, Spartan Motors, Inc. supports a cleaner environment as well as lessening our dependency on foreign oil. However, with respect to a fire apparatus, there does not appear to be a substantial impact on reducing fuel dependency. Fire apparatus are used intermittently and when they are in use, their time operated on highway is limited at best. In general, a fire apparatus spends most of its useful life idling during emergency situations. [EPA-HQ-OAR-2010-0162-1612.1, p.4]

In addition, a fire apparatus is subject to aggressive driving which includes sudden and frequent braking as well as sudden, sharp cornering. Any changes in the tires may result in loss of performance during such maneuvers which may compromise safety. Further, the tire industry would have to spend time developing such products and the associated costs with the development would certainly be passed on to the ultimate purchaser. Given today's economic climate and limited time of stability, we believe this would further slow the market, further decrease sales, both of which may result in loss of jobs. [EPA-HQ-OAR-2010-0162-1612.1, p.4]

Wherefore, Spartan Motors, Inc. respectfully asks the NHTSA to reconsider the application of its proposed fuel efficiency rules for vocational vehicles and explicitly exempt fire apparatus, as well as other emergency response vehicles, from the proposed rule. [EPA-HQ-OAR-2010-0162-1612.1, p.4]

Organization: Fire Apparatus Manufacturers' Association

One sub-set of fire apparatus are those that operate exclusively on airports. They are known as Airport Rescue Fire Fighting (ARFF) vehicles and are designed to meet NFPA 414 Standard for Aircraft Rescue and Fire-Fighting Vehicles. The Federal Aviation Administration requires that all ARFF vehicles obtain FAA 10-E certification, and this certification specifies compliance to NFPA 414.[EPA-HQ-OAR-2010-0162-1328.1, p.8]

Large ARFF vehicles are typically off-road applications because they are too wide to meet the on-road truck width regulations. As such they could fall into the Off- Road exemption if it were not for the speed limitation of 55 mph. FAA regulations and NFPA 414 require that an ARFF vehicle achieve a top speed equal to or greater than 70 mph. [EPA-HQ-OAR-2010-0162-1328.1, p.8]

Small ARFF vehicles operate mainly on airports, but are often called to support other local fire protection agencies with mutual aid. As such they must, and do, operate on public roadways in addition to airports. They are also subject to the 70 mph FAA/NFPA performance criteria so will not fall within the currently proposed off-road exemption in the NPRM. [EPA-HQ-OAR-2010-0162-1328.1, p.8]

[Pictures can be found on page 8 of this comment.]

Vocational Off-Road Exemption will Not Apply to Most Fire Apparatus

Although the proposed rule does provide an exemption for off-road vocations, few of the fire apparatus applications will meet the criteria of this category. In the words of the NPRM, a vocation will only be exempt if it operates “chiefly off-road”. Even in the case of wildland fire fighting, apparatus are required to travel for long distances on-road before reaching their area of off-road operation. The proposed exemption also mandates a 55 mph speed limitation which will not be appropriate for most emergency responses. [EPA-HQ-OAR-2010-0162-1328.1, pp.8-9]

[A picture can be found on page 9 of this comment.]

The function of a fire apparatus is to transport necessary personnel and equipment to support loss mitigation activities or medical assistance during emergency situations. In most cases, this involves the vehicle traveling on-road for relatively short durations. FAMA conducted a survey which indicates the typical fire or EMS run is between 5 and 8 miles round-trip. Calculations based on the average number of miles traveled by fire apparatus as compared to typical trucks conclude that fire apparatus represent as little as 0.05% of the annual truck road miles traveled. In comparison to the rest of the truck market, fire apparatus annual mileage is insignificant. [EPA-HQ-OAR-2010-0162-1328.1, p.9]

[A figure can be found on page 9 of this comment.]

This same survey indicates that a typical fire apparatus engine spends 60 percent of it’s time at low load. Most of this time occurs while the engine is idling at a scene. While idling, the apparatus is providing; warmth or cooling for emergency personnel; electrical power for scene lighting, communication, or extrication; stand-by water pressure; or hydraulic power for aerial functions. The fuel consumed by these functions, which accounts for 60% of the engine-on time, will not be affected by the rolling resistance of the tires. Some portion of the remaining 40% of engine-on time is spent pumping at medium or high load, another example where rolling resistance does not come into play. [EPA-HQ-OAR-2010-0162-1328.1, p.10]

The rationale that the EPA and NHTSA applied to justify the Off-Road Vocational Vehicle exemption can and should be applied here. While not chiefly off-road, the operating conditions for emergency vehicles requires special consideration. In addition, given the large percentage of time that fire apparatus spend operating while stationary at the scene of an emergency, fire apparatus, as with oil field vehicles, "will experience little benefit from low rolling resistance tires". [EPA-HQ-OAR-2010-0162-1328.1, p.10]

Therefore, FAMA requests that EPA and NHTSA expand the Off-Road Vocational Vehicle exemption to apply also to emergency vehicles. This class of vehicle can be narrowly defined using National Fire Protection Association standards, and historically represents between 3,500 and 5,500 new vehicles per year in the United States – a very small portion of commercial vehicles manufactured each year. [EPA-HQ-OAR-2010-0162-1328.1, p.10]

1) Consistent with the Off-Road Vocational Vehicle Standards in the NPRM, exclude emergency vehicles from the proposed vocational vehicle standards. Emergency vehicles would still be required to use certified engines.

2) Do not include emergency vehicles in the vehicle portion of the rule unless and until the majority of tires currently employed on fire apparatus are shown to have CRR values below the 8.0 kg/metric ton criteria.

3) Provide a specific exemption for Airport Rescue Fire Fighting vehicles to avoid conflict between FAA ARFF vehicle performance requirements and the NPRM. [EPA-HQ-OAR-2010-0162-1328.1, p.11]

Response:

The agencies considered these comments and EPA has decided to finalize standards for these individual vehicle categories as we proposed. We have taken this decision reflecting that any individual vocational vehicle segment is likely to be a small contributor to overall fuel consumption and GHG emissions on its own. As described in Section II.D of the preamble of the final rule, the agencies conducted independent testing of current tires available in the heavy-duty market. The agencies utilized this information in developing the vocational vehicle standards predicated on use of LRR tires.[81] The agencies acknowledge there can be a series of tradeoffs when designing a tire for reduced rolling resistance. These tradeoffs can include characteristics such as performance under braking and cornering conditions. However, the tire test samples were selected from those currently available on the market, and therefore have no known safety issues and meet all current requirements to allow availability in commerce; including wear, scuff resistance, braking, traction under wet or icy conditions, and other requirements. These tires included a wide array of sizes and designs intended for most all vocational vehicle applications, including those used emergency vehicles. As the test results

[81] Bachman, Joseph. Memo to Docket. Heavy-Duty Tire Evaluation. Docket EPA-HQ-OAR-2010-0162.

revealed, there are a significant number of tires available that meet or exceed the rolling resistance targets for vocational vehicles, both Light-Truck (LT) (with an adjustment factor) and non-LT tire types, while meeting all applicable safety standards. Further since the proposal, the agencies have met with a number of tire manufacturers to better understand their expectations for product availability for the 2014 model year. Based on our review of the information shared, we are convinced that tires with rolling resistance consistent with our final vehicle standards and meeting the full range of other performance characteristics desired in the vehicle market will be broadly available by the 2014 model year. Thus, we believe that the standards based on use of low rolling resistance tires are feasible for these emergency vehicles at reasonable cost.

As part of the final rule, the agencies provided provisions to allow for exemption of specific off-road capable vocational vehicles from the fuel efficiency and greenhouse gas standards. The agencies are adopting provisions to exempt any vocational vehicle having speed restricted tires rated at 55 mph or below. In addition, any vehicle primarily designed to perform work off-road such as in oil fields, forests, or construction sites and having permanently or temporarily affixed components designed to work in an off-road environment (i.e., hazardous material equipment or off-road drill equipment) or vehicles operating at low speeds making them unsuitable for normal highway operation; and meeting one or more of the following criteria:

- Any vehicle equipped with an axle that has a gross axle weight rating (GAWR) of 29,000 pounds; or
- Any truck or bus that has a speed attainable in 2 miles of not more than 33 mph; or
- Any truck that has a speed attainable in 2 miles of not more than 45 mph, an unloaded vehicle weight that is not less than 95 percent of its gross vehicle weight rating (GVWR), and no capacity to carry occupants other than the driver and operating crew.

Also, a manufacturer having an off-road vehicle failing to meet the criteria under the agencies' off-road exemptions will be allowed to submit a petition describing how and why their vehicles should qualify for exclusion. The process of petitioning for an exemption is explained in §§ 1037.631 and 535.8.

Lastly, the agencies note that based on discussions with airport rescue vehicle manufacturers, we believe that these vehicles are currently regulated by EPA as nonroad engines, and therefore are not subject to these on-highway GHG emissions standards.

.

16.4.2. **Off-road Exemptions**

Organizations Included in this Section:

National Solid Wastes Management Association

Navistar, Inc.
National Automobile Dealers Association
Oshkosh Corporation
National Truck Equipment Association
Daimler Trucks North America
Rubber Manufacturers Association
Engine Manufacturers and Truck Manufacturers Associations
Recreation Vehicle Industry Association
Volvo Group
National RV Dealers Association

Organization: National Solid Wastes Management Association (NSWMA)

The solid waste industry operates a variety of solely off-road vocational vehicles at landfills. We support the proposed exemption for off-road vocational vehicles. [EPA-HQ-OAR-2010-0162-1870.1, p.8]

We strongly urge EPA and NHTSA to defer action on solid waste industry trucks until the agencies are ready to propose standards applicable to the operating conditions of the different vehicles we use. We are eager to meet with the agencies to further expand their understanding of the unique operational and legal constraints facing solid waste industry vehicles. [EPA-HQ-OAR-2010-0162-1870.1, p.2]

Organization: Navistar, Inc.

Both EPA and NHTSA correctly recognize that vehicles that are used off-road should be excluded from any vocational vehicle and combination tractor requirements (although off-road vehicles would be required to have GHG regulated engines but they would not be required to use low rolling resistance tires). The Agencies propose to accomplish that exclusion by eliminating vehicles that "spend a majority of their operations off-road" from the definition of regulated vehicles. However, the proposed exemptions for off-road vehicles are so narrow that they would only capture a very small number of highly specialized vehicles with very specific tires. As a result, a number of vehicles that are designed for off-road use, but must be capable of onroad operation, would still fall into one of the regulated groups of vehicles. The Proposed GHG Rule must provide exemptions for vehicles that have off-road features and for which it is impractical to utilize GHG-reduction technologies. [EPA-HQ-OAR-2010-0162-1871.1, p.34]

Moreover, the reasoning behind the off-road exemption is equally applicable to other specialized vehicles. EPA suggests that the off-road exemption is appropriate because such vehicles "will experience little benefit from aerodynamics and low rolling resistance tires." That is also true for emergency vehicles (e.g., fire, rescue and ambulance) and heavy-haul applications. In neither case, will the vehicles be able to make use of the technologies that the vehicle standards would impose. For instance, heavy- haul combinations are typically speed limited by their powertrain and by existing regulations, and they have high tire count to carry loads. This makes them like off-road vehicles in their limited impact or availability for improvement. They also frequently have a lot of accessories to allow safe and efficient operation that impede aerodynamics (e.g., lights, flags, tie down points, auxiliary toolboxes, bulkheads, etc.). As a result, the Agencies must also exempt these vehicle applications. [EPA-HQ-OAR-2010-0162-1871.1, pp.34-35]

Navistar opposes the regulation of recreational vehicles (“RVs”), particularly where this sets up a difference between NHTSA and EPA. RVs are a small portion of the vehicle fleet, and we believe that including them in this rule would damage the viability of that vehicle application. In particular, the requirement for low rolling resistance (“LLR”) tires would be problematic. These vehicles are used by consumers, not for business use, and the quality of ride is particularly important. To compensate for a rougher ride that we believe would be experienced as a result of LRR tires, significant costs will have to be incurred to upgrade vehicle suspensions. Moreover, the availability of tire rolling resistance data is limited at present, as this is considered proprietary information by tire manufacturers. Thus, there will be no lead time to respond to production mix if and when the currently unavailable, confidential tire data becomes known. As a result, it is not feasible to include RVs in the proposed rulemaking. [EPA-HQ-OAR-2010-0162-1871.1, p.59]

Navistar also opposes the application of the proposed regulations to school buses for the same reasons. LRR tires may severely impact the ride quality for children in school buses. Indeed, a significant portion of the national fleet of school buses currently utilize special off-road tires such as lug tires (e.g., Kentucky). As with RVs, a switch to LRR tires would will likely require significant costs to upgrade bus suspension systems and create retread issues, and that is only in those situations where LRR tires as opposed to lug tire would be permissible. As a result, the Agencies must exclude buses from the proposed vocational vehicle rules. [EPA-HQ-OAR-2010-0162-1871.1, pp.59-60]

Organization: National Automobile Dealers Association (NADA)

The definition of vocational trucks should be revised to exclude vehicles significantly used off-road, and to categorically exclude recreational vehicles. Of course, any vehicle used exclusively off-road should be excluded from the tire mandate. [EPA-HQ-OAR-2010-0162-2705, p.9]

Organization: Oshkosh Corporation

Common carrier by motor vehicle means any person who holds himself out to the general public to engage in the transportation by motor vehicle in interstate or foreign commerce of passengers or property or any class or classes thereof for compensation, whether over regular or irregular routes. [EPA-HQ-OAR-2010-0162-1589.1, p.4]

Contract carrier by motor vehicle means any person who engages in transportation by motor vehicle of passengers or property in interstate or foreign commerce for compensation (other than transportation referred to in paragraph (b) of this section) under continuing contracts with one person or a limited number of persons either (1) for the furnishing of transportation services through the assignment of motor vehicles for a continuing period of time to the exclusive use of each person served or (2) for the furnishing of transportation services designed to meet the distinct need of each individual customer. [EPA-HQ-OAR-2010-0162-1589.1, p.4]

Private carrier of property by motor vehicle means any person not included in terms ‘‘common carrier by motor vehicle’’ or ‘‘contract carrier by motor vehicle’’, who or which transports in interstate or foreign commerce by motor vehicle property of which such person is the owner, lessee, or bailee, when such transportation is for sale, lease, rent or bailment, or in furtherance of any commercial enterprise. [EPA-HQ-OAR-2010-0162-1589.1, p.4]

Since the intent of the presidential mandate appears to address “commercial” vehicles, and EPA and NHTSA recognize this intent by specifically excluding non-commercial vehicles (recreational vehicles are explicitly excluded), we request a further clarification by explicitly excluding any vehicle that does not fall within the definition of “Motor Carrier” as defined by 49 CFR PART 202—MOTOR CARRIERS ENGAGED IN INTERSTATE COMMERCE. As we interpret this definition, several classes of vocational vehicles would NOT fall within the scope of this proposed rule as they are not engaged in the activities of commerce. [EPA-HQ-OAR-2010-0162-1589.1, p.4]

We recommend the following changes be made to part 523.6:

§ 523.6 Heavy-duty truck.

(a) A heavy-duty truck is any Class 2b through 8 non-passenger vehicle that is a commercial medium and heavy duty on highway vehicle or a work truck, as defined in 49 U.S.C. 32901(a)(7) and (19). For the purpose of this regulation heavy-duty trucks are divided into three regulatory categories as follows: [EPA-HQ-OAR-2010-0162-1589.1, p.4]

(1) Heavy-duty pickup trucks and vans;

(2) Heavy-duty vocational trucks; and

(3) Truck tractors with a GVWR above 26,000 pounds.

(b) The heavy-duty truck classification does not include: [EPA-HQ-OAR-2010-0162-1589.1, p.4]

(1) Vehicles defined as medium duty passenger vehicles in 40 CFR 86.1803-01 on December 20, 2007.

(2) Recreational vehicles including motor homes.

(3) Vehicles excluded from the definition of "heavy-duty truck" because of vehicle weight or weight rating (such as light duty vehicles and light duty trucks as defined in § 523.5). [EPA-HQ-OAR-2010-0162-1589.1, p.4]

(4) Heavy-duty off-road vehicles. [EPA-HQ-OAR-2010-0162-1589.1, p.5]

(5) Fire and rescue vehicles defined by NFPA 1901 Standard for Automotive Fire Apparatus or NFPA 1906 Standard for Wildland Fire Apparatus.

(6) Military Tactical Wheeled Vehicles specified by or sold to the U.S. Department of Defense or other U. S. governmental entity.

(7) Airport Rescue Fire Fighting Vehicles defined by NFPA 414 Standard for Airport Rescue and Firefighting Vehicles.

(8) Ambulances defined by General Services Administration KKK-A-1822F "Federal Specification for the Star of Life Ambulance". [EPA-HQ-OAR-2010-0162-1589.1, p.5]

Organization: National Truck Equipment Association (NTEA)

We recognize the benefits of lower rolling resistance tires during highway use. We support also the inclusion of an off-road exemption as many vocational trucks are built for off-road applications. As proposed the exception would apply to trucks with:

• Installed tires which are lug tires or contain a speed rating of less than or equal to 60 mph; and

• Include a vehicle speed limiter governed to 55 mph. [EPA-HQ-OAR-2010-0162-1608.1, p.8]

Organization: Daimler Trucks North America

The Agencies' Off-Road Vocational Vehicle Exemption May Inadvertently Exempt On-Road Vehicle Applications Such As Transit Buses. We Recommend (1) The EMA Definition For Vehicles Other Than Transit Buses And (2) A Bus-Specific Exemption From The Off-Road Exemption. [EPA-HQ-OAR-2010-0162-1818.1, p.85]

In §1037.630 on 75 Fed. Reg. 74396, the Agencies propose to exempt from on-road requirements vocational vehicles with tires having a speed rating at or below 60 mph and a speed limiter at or below 55 mph. Transit buses and other low speed on-road vehicles may have settings because of the infrequency with which they operate at highway speeds. In turn, they qualify for the exemption from LRR tires. So, a transit bus customer who does not want LRR tires (e.g., because he believes that they lack the durability of other tires) can simply choose not to get them. However, those vehicles by no means fit into the off-road applications for which the Agencies created this exemption. In turn, the Agencies might evaluate limiting the exemption so that it does not apply to normally low speed applications. We recommend that any vehicle designed to carry more than twelve people should not be considered an off-road vehicle, unless a manufacturer specifically petitions the Agencies. For vehicles other than transit buses, we recommend the EMA's definition of off-road vehicle. [EPA-HQ-OAR-2010-0162-1818.1, p.85]

Organization: Rubber Manufacturers Association (RMA)

In the NPRM, EPA and NHTSA discuss the fact that vehicles that spend significant portions of time in service in off-road applications would not see a remarkable fuel consumption benefit due to the use of low rolling resistant tires. RMA agrees with this assessment. Reductions in tire rolling resistance reap greater fuel consumption benefits at sustained highway speeds. In the proposed regulatory text, EPA proposes to exempt vocational vehicles and tractors with "lug tires or contain a speed rating at or below 60 mph."3 RMA supports the spirit of these criteria. However, RMA recommends that the definition focus on tires rated 55 mph or lower, rather than including lug tires in the definition. EPA and NHTSA should focus on tires rated 55 mph or below, instead of tires rated 60 mph or below, because this is consistent with the NHTSA definition of "speed restricted service" tires in 49 CFR 571.119. Indeed, there is no tire rating of 60 mph, but there is a tire rating of 55 mph and several lower than 55 mph. Furthermore, focusing on tire tread geometry is imprecise and would lead to confusion over which tires meet the definition. Rated speed of a tire is an objective criterion, and provides clear guidance to vehicle manufacturers. [EPA-HQ-OAR-2010-0162-1963.1, p.4]

Organization: Engine Manufacturers and Truck Manufacturers Associations

Both EPA and NHTSA recognize that vehicles that are used off-road should be excluded from any vocational vehicle and combination tractor requirements (off-road vehicles would be required to have GHG regulated engines but they would not be required to use low rolling resistance tires). The Agencies propose to accomplish that exclusion by eliminating vehicles that 'spend a majority of their operations off-road' from the proposed vehicle standards. (See 75 FR at 74176, 74199.) However, the proposed exemptions for off-road vehicles are so narrow that they would only capture a very small number of highly specialized vehicles with very specific tires. As a result, a number of vehicles that are designed for off-road use, but must be capable of on-road operation, would still fall into one of the regulated groups of vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.19]

The Proposed GHG/FE Standards should provide exemptions for vehicles that have offroad features and for which it is impractical to utilize GHG-reduction technologies. [EPA-HQ-OAR-2010-0162-1940.1, p.19]

Organization: Recreation Vehicle Industry Association (RVIA)

RVIA supports the goal of improved fuel economy and lower greenhouse gas (GHG) emissions for medium- and heavy-duty vehicles. There is no question that if the engines that go into motorhomes and the work trucks that pull towable RVs can be redesigned to consume less fuel, environmental benefits will be realized. However, unlike commercial vehicles, motorhomes and the vehicles that tow RV trailers are discretionary purchases. RVIA's first and foremost concern is that this rule and those to follow in the future could have a major negative impact on RV industry jobs. A separate economic impact and cost-benefit analysis is needed for non-commercial medium and heavy duty vehicles. [EPA-HQ-OAR-2010-0162-3300, p.2]

Organization: Volvo Group

Volvo Group agrees with the need for an off-road exemption, but does not believe the stringent requirements are appropriate. Indeed, when taken together as defined in this section, they define a vehicle that rarely actually exists. Elsewhere in our comments Volvo Group is proposing that, in addition to the off-road use exemption, vocationally based tractors be re-categorized from the tractor regulatory subcategories to the vocational subcategories. It is critical to understand that the vocational tractor reclassification is separate from this off-road exemption but must function in conjunction with it to enable customers to specify vehicles that are appropriate for their applications. [EPA-HQ-OAR-2010-0162-1812.2, p.42]

The definition of lug tires where the elevated portion of the tread covers less than one-half of the tread surface is not appropriate as it is unknown where this definition was derived and if such tires even exist. In addition, Volvo and Mack do not offer a tire with a speed rating at or below 60 mph. Most vehicles operating in this type of off-road environment are gear bound to speeds of 55 mph or less, so the requirement for a speed limiter is unnecessary. PTOs are primarily installed by a body builder to end user requirements, with 90% of vocational tractors bound for applications requiring PTOs leaving the factory without PTO controls or PTOs mounted. The off-road exemption for tractors also specifies a GVWR greater than 57,000 pounds AND axle configurations other than 4x2, 6x2, or 6x4, however most off-road tractors still utilize a 6x4 axle configuration, with GVWR above 57,000 lbs possible. [EPA-HQ-OAR-2010-0162-1812.2, p.42]

As noted elsewhere, the off-road exemption report due within 90 days of end of model year is unnecessary and should be incorporated into one single report at the end of each model year with the 45-day manufacturing report and the two AB&T reports. [EPA-HQ-OAR-2010-0162-1812.2, p.42]

Organization: National RV Dealers Association (RVDA)

Recreation vehicles are not commercial vehicles. Unlike commercial trucks, RV enthusiasts are not on the road in the same manner as commercial vehicle drivers. RVs driven by their owners are not subject to federal FMCSA requirements requiring special licenses, logs of hours, safety inspections and health and alcohol/drug related certifications. Individuals who purchase an RV enjoy the ability to travel to their favorite locations with their own personal belongings. RVs contain beds, bathrooms, kitchens, entertainment systems, and offer people the ability to travel with their pets and the ability to sleep in a remote location, or to camp in an RV park with all the electric and plumbing hookups. Industry estimates are that the average RV user will take four to five trips per year. This is in no way analogous to a commercial enterprise or commercial purpose for an RV. [EPA-HQ-OAR-2010-0162-1775.1, p.2]

There is a niche RV lifestyle for fulltime RV enthusiasts, nicknamed "fulltimers," who travel from place to place to enjoy different locations. Of all the RV owners, fulltimers are the individuals who travel most extensively on the nation's highways. According to a 2005 Escapees' RV Club demographic survey, the average number of miles traveled per year by their fulltimer members was only 11,821 miles (10,000 median). This is in stark contrast to the sheer number of commercial truck drivers on the road, and their annual mileage. According to the American Trucking Association, Class 8 truck drivers will average over 45,000 miles behind the wheel, and most individual long-haul drivers average from 100,000 to 110,000 miles driving per year. Therefore, the highest users of RVs, which is a very small niche of the RV industry, drive only a quarter of the annual mileage of a Class 8 Driver, and one-tenth the mileage of a long-haul driver. [EPA-HQ-OAR-2010-0162-1775.1, p.2]

Motorhome sales in 2007, 2008 and 2009 were 55,400, 28,300 and 13,200, respectively [EPA-HQ-OAR-2010-0162-1775.1, p.2]

Medium- and heavy-duty trucks sales in 2007, 2008 and 2009 were 8,668,292, 6,526,974, and 4,966,803, respectively [EPA-HQ-OAR-2010-0162-1775.1, p.2]

RVs are discretionary purchases and this is a critical difference because potential motorhome buyers are much more likely to defer or abandon purchasing a motorhome due to economics. This was evident during the recent recession when motorhome sales fell 49% in 2008 and 53% in 2009 while sales for medium- and heavy duty trucks in total fell only 25% and 24%, respectively during the same period. [EPA-HQ-OAR-2010-0162-1775.1, p.2]

The RV industry lost tens of thousands of jobs during the recession and is only now slowly refilling those positions. Creating unnecessary regulatory burdens on small businesses which produce and retail discretionary vehicles that average some 4,500 to 5,000 miles per year is unreasonable. [EPA-HQ-OAR-2010-0162-1775.1, p.2]

EPA's proposal will have an impact on a substantial number of RV manufacturers, and a substantial impact on RV sales. NHTSA has already chosen to exempt RVs from this regulation, and EPA's inclusion of RVs is very surprising considering the small size of the RV market served in comparison to the size of the commercial trucking industry. [EPA-HQ-OAR-2010-0162-1775.1, p.3]

Given the fact that EPA has decided to apply its standards to non-commercial vehicles while NHTSA has decided to do exactly the opposite, the proposal is clearly not in keeping with the President's directive that federal agencies harmonize their requirements. If the agencies are going to comply with the Executive Order, they must have a common position with respect to the treatment of non-commercial vehicles. [EPA-HQ-OAR-2010-0162-1775.1, p.3]

Response:

The agencies considered these comments and EPA has decided to finalize standards for these individual vehicle categories as we proposed. NHTSA will continue to exempt recreational vehicles. We have taken this decision reflecting that any individual vocational vehicle segment is likely to be a small contributor to overall fuel consumption and GHG emissions on its own. Absent regulations for the vast majority of vehicles in this segment, our program will fall short of its goals. Further since the proposal, the agencies have met with a number of tire manufacturers to better understand their expectations for product availability for the 2014 model year. Based on our review of the information shared, we are convinced that tires with rolling resistance consistent with our final vehicle standards and meeting the full range of other performance characteristics desired in the vehicle market will be broadly available by the 2014 model year.

Several manufacturers (IAFC, FAMA, NTEA, NSWMA, AAPC, RMA, Navistar and DTNA) requested the exemption of specific vehicle types, such as on/off-road emergency vehicles, refuse vehicles low speed transit buses or school buses, because their usage was viewed as being incompatible with LRRTs. Navistar opposed the application of the proposed regulations to school buses, arguing that LRR tires may impact the ride quality for children in school buses. However, Navistar also acknowledged that a significant portion of the national fleet of school buses already utilizes off-road tires designed with lug type tread patterns (e.g., Kentucky). IAFC, FAMA and NTEA commented that fire trucks and ambulances should also be exempted due to their part-time off-road use such as in responding to a wildland fire or hazardous materials incidents which would require operations on dirt and gravel roads, fields or other off-road environments. Commenters also contended that by requiring a 55-mph limitation, the proposed exemption would be impractical for emergency vehicles due to the need to respond quickly to life-threatening events. The refuse truck manufacturers and trade associations, NSWMA and AAPC, commented that the solid waste industry operates a variety of vocational vehicles that perform solely off-road at landfills. These comments also requested an exemption for certain refuse trucks (i.e., roll-off container trucks) that frequently go off-road at construction sites. Other commenters (FAMA, IAFC and Oshkosh) opposed compliance with the LRR standard for vocational vehicles for on/off road mixed service tires with aggressive or lug treads, stating that up to this point the industry has had very little interest in improving the LRR aspects of these tires or even to conducting testing to determine CRR values.

For the final rules, the agencies have considered the issues raised by commenters and have decided to adopt different criteria for exempting vocational vehicles and vocational tractors that primarily travel off-road than proposed. The agencies believe that the reasons for proposing the exemption are equally applicable to a wider class of vocational vehicles operating mostly off-road so that the proposals were either unsuitable for the industry or too restrictive to capture all the vehicles intended for the exemption. For example, the NPRM proposal, by using tire tread patterns and VSLs as the basis for qualifying vehicles for the exemption, was too restrictive because other non-lug type tread patterns exist in the market as well as other technologies which are equally capable of limiting the speed of the vehicle, as mentioned by Volvo. Therefore, the proposed exemption for off-road vocational vehicles will be replaced with new criteria based on the vehicle application, whether it operates at low speed and whether the vehicle has speed restricted tires. The exemption is in part based on existing industry standards established by NHTSA. As such, any vocational vehicle including vocational tractors primarily used off-road or at low speeds must meet the following criteria to be exempted from GHG and fuel consumption vehicle standards:

- Any vehicle primarily designed to perform work off-road such as in oil fields, forests, or construction sites and having permanently or temporarily affixed components designed to work in an off-road environment (i.e., hazardous material equipment or off-road drill equipment) or vehicles operating at low speeds making them unsuitable for normal highway operation; and meeting one or more of the following criteria:
  - Any vehicle equipped with an axle that has a gross axle weight rating (GAWR) of 29,000 pounds; or
  - Any truck or bus that has a speed attainable in 2 miles of not more than 33 mph; or
  - Any truck that has a speed attainable in 2 miles of not more than 45 mph, an unloaded vehicle weight that is not less than 95 percent of its gross vehicle weight rating (GVWR), and no capacity to carry occupants other than the driver and operating crew.

The agencies are also adopting in the final rules requirements to exempt any vocational vehicle that can operate in both on and off-road environments and having speed restricted tires rated at 55 mph or below.[82] The agencies' reasoning in adopting a speed restricted exemption for tires is that the majority of mixed service tires used for off-road use were identified as being restricted at 55 mph or less. Also, as identified by FMVSS No. 119, speed restricted tires at a rating of 55 mph or less are incapable of meeting the same on-road performance standards as conventional tires. The agencies acknowledge that using a speed restriction criteria could allow certain vehicles to be exempted inappropriately (i.e., low speed city delivery tractors) but the agencies believe this is preferable to creating a situation where a segment of vehicles are precluded from performing their intended applications. Therefore, the final rule includes an exemption for any mixed service off-road tire equipped vocational vehicle which tire is speed restricted at 55 mph or less.

[82] See 1037.631

Manufacturers choosing to exempt vehicles based on the above criteria will be required to provide a description of how they meet the qualifications for each vehicle family group in their end-of-the year and final year reports (see Section V).

A manufacturer having an off-road vehicle failing to meet the criteria under the agencies' off-road exemptions will be allowed to submit a petition describing how and why their vehicles should qualify for exclusion. The process of petitioning for an exemption is explained in Standards 1037.630 and 535.8.

16.5. Other flexibilities, exemptions and/or credits

16.5.1. Incentives for Alternative Fuels

Organizations Included in this Section:

American Automotive Policy Council
Ryder System, Inc.
American Trucking Associations, Inc.
Natural Gas Vehicle Interests
Waste Management
Encana Natural Gas Inc.
UPS
Green Truck Association
Robert Bosch, LLC
Energy Future Coalition
POP Diesel

Organization: American Automotive Policy Council

As the nation moves forward toward the legislatively required 36 billion gallons of renewable fuels required in the Renewable Fuels Standard by 2022, AAPC members have committed to helping to further this goal. As such, both EPA and NHTSA should consider finalizing in this rulemaking, alternative fuel vehicle credits in line with the provisions of 49 USC 32905 and 32906. [EPA-HQ-OAR-2010-0162-1762.1, p.17]

Organization: Ryder System, Inc.

The regulations should promote the development and adoption of emerging, advanced fuel efficient technologies and include mechanisms to subsequently ensure that such technologies are reflected in the applicable standards. This is particularly true with respect to Natural Gas powered vehicles. [EPA-HQ-OAR-2010-0162-1674.1, p.2]

The Advantages of Natural Gas Vehicles: There are only two ways to meet EISA's goal of reducing U.S. dependence on foreign oil: either burn less petroleum or switch to a domestically produced fuel. However, the HD Rule largely ignores the real and immediate energy security benefits available from natural gas vehicles ('NGVs') in favor of incremental improvements to petroleum fuel consumption, a distant second-best means of reducing U.S. petroleum imports. [EPA-HQ-OAR-2010-0162-1674.1, p.2]

Fuel switching is the only realistic energy-security alternative, and the most abundant, efficient and secure replacement is natural gas. The U.S. and Canada supply 99% of U.S. natural gas demand, and unlike U.S. oil reserves, U.S. gas reserves are growing. Estimates from the Potential Gas Committee and the Energy Information Administration indicate domestic supplies are sufficient to meet demand for more than 100 years; as recently as several years ago, this estimate was 65 years. [EPA-HQ-OAR-2010-0162-1674.1, p.2]

Our company is moving aggressively to purchase and deploy NGVs as part of our fleet and we look forward to the positive contribution we can make in our nation's fight for greater energy independence. [EPA-HQ-OAR-2010-0162-1674.1, p.2]

Relying on foreign oil undermines more than U.S. energy security - it undermines our economy as well. The U.S. current account deficit for the most recent quarter was $123 billion, during which time we imported $90 billion of petroleum. In contrast, producing and distributing natural gas as a transportation fuel means creating jobs here in America, which the May 21, 2010 Presidential Memo described as one of the central goals of this rulemaking. In 2008, U.S. production of 20 Tcf of natural gas created more than 1.3 million jobs (IHS Global Insight 2009, p.1); even a modest increase in demand for natural gas as a transportation fuel could create tens of thousands of jobs associated with producing natural gas. A significant push to increase the number of NGVs in the U.S. also would create hundreds of thousands of additional jobs related to manufacturing natural gas vehicles and building the relevant infrastructure. [EPA-HQ-OAR-2010-0162-1674.1, p.3]

Moreover, natural gas vehicles are as available as natural gas. Worldwide, there are more than 12 million natural gas vehicles on the road today. In the last seven years, the market for NGVs has more than tripled, thanks to a compound growth rate of over 17 percent per year. Demand for U.S. NGVs would thus give domestic manufacturers a base upon which to build an export market. And another economic opportunity exists in converting existing petroleum vehicles to run on natural gas, yet another well-established technology that can further job creation here at home. [EPA-HQ-OAR-2010-0162-1674.1, p.3]

In sum, the most effective way to meet the goal of reducing U.S. petroleum consumption is by encouraging further growth in the U.S. medium- and heavy-duty natural gas vehicle fleet, a policy which will also significantly assist the U.S. economy. Fortunately, as described below, NHTSA's failure to recognize the energy security advantages of natural gas in this rulemaking can be fixed by nothing more than incorporating into the final HD Rule the same provision for natural gas vehicles that Congress specified in the light-duty fuel economy statute. [EPA-HQ-OAR-2010-0162-1674.1, p.3]

In the original light-duty fuel economy statute, Congress wrote a specific compliance metric favoring natural gas vehicles. Recognizing that every natural gas vehicle totally eliminates the lifetime petroleum demand of a gasoline vehicle, Congress encouraged the production of natural gas vehicles by multiplying the fuel economy of a natural gas vehicle by 6.67 relative to that of an equivalent gasoline-powered one (the 'NGV Multiplier'). (See 49 U.S.C. 32905(c), which provides that in fuel-consumption calculations, '[a] gallon equivalent of gaseous fuel is deemed to have a fuel content of .15 gallon of fuel'; the effect of this is to multiply NGV fuel economy by 6.67.) [EPA-HQ-OAR-2010-0162-1674.1, p.3]

However, in the HD Rule NHTSA ignored this express Congressional policy about natural gas vehicles, saying that it did not include the NGV Multiplier 'because the HD sector does not have the incentives mandated in EISA for light-duty vehicles'. 75 FR 74198. This makes no sense. [EPA-HQ-OAR-2010-0162-1674.1, p.3]

In contrast to the detailed regime Congress created for light-duty vehicles (of which the 'NGV multiplier' is just a small part), for medium- and heavy-duty vehicles Congress simply told NHTSA - in a single sentence -- to set up a program 'designed to achieve the maximum feasible improvement' via 'appropriate test methods, measurement metrics, fuel economy standards. and compliance and enforcement protocols that are appropriate, cost-effective, and technologically feasible.' 49 U.S.C. 32902(k)(2). And the NGV Multiplier is simply the most 'appropriate, cost-effective and technologically feasible' mechanism to reduce petroleum imports. [EPA-HQ-OAR-2010-0162-1674.1, pp.3-4]

Moreover, NHTSA's belief that the HD Rule should not contain any 'incentive' that Congress did not specifically mandate is contradicted by the many such provisions in the HD Rule that NHTSA took straight out of the light-duty regime (both as originally written and as modified by EISA). For example, the HD Rule includes an 'Averaging, banking, and trading (ABT) Program' (75 FR 74446-49), which duplicates from the averaging, banking and trading provision Congress wrote for light-duty vehicles (49 U.S.C. 32903). But NHTSA's 'logic' means that there should be no such provisions in the HD Rule because Congress did not specifically mention them in its one-sentence instructions to NHTSA. [EPA-HQ-OAR-2010-0162-1674.1, p.4]

In conclusion, the NGV Multiplier that Congress specifically wrote to encourage NGVs under the light-duty fuel economy program should also be part of NHTSA's HD Rule. [EPA-HQ-OAR-2010-0162-1674.1, p.4]

Organization: American Trucking Associations, Inc. (ATA)

The proposed rule needs to address the fuel consumption conversion factors associated with the use of natural gas to not disadvantage its use. The current fuel consumption standards are based upon diesel engine data and are not specific to natural gas. Typical diesel fuel is roughly 86% carbon by mass, while natural gas is only 75% carbon by mass. Therefore, two vehicles can achieve the same fuel efficiency, yet one operated on natural gas would have a lower carbon dioxide emissions rate. A natural gas conversion factor that uses carbon content versus energy content is a more logical and desirable aim. [EPA-HQ-OAR-2010-0162-2263.1, p.14]

Organization: Natural Gas Vehicle Interests

The Advantages of Natural Gas: Fuel Economy and Energy Security: There are only two ways to meet this goal: either burn less petroleum or switch to a domestically-produced fuel. However, the HD Rule largely ignores the real and immediate energy security benefits available from natural gas engines and vehicles ("NGVs") in favor of incremental improvements to petroleum fuel consumption, a distant second-best means of reducing U.S. petroleum imports. [EPA-HQ-OAR-2010-0162-2119.1, p.2]

Fuel switching is the only realistic energy-security alternative, and the most abundant, efficient and secure replacement for petroleum is natural gas. The U.S. and Canada supply 99% of U.S. natural gas demand, and unlike U.S. oil reserves, U.S. gas reserves are growing. Estimates from the Potential Gas Committee and the Energy Information Administration indicate domestic supplies are sufficient to meet demand for more than 100 years; as recently as several years ago, this estimate was 65 years. [EPA-HQ-OAR-2010-0162-2119.1, p.2]

Relying on foreign oil undermines more than U.S. energy security – it undermines our economy as well. The U.S. current account deficit for the most recent quarter was $123 billion, during which time we imported $90 billion of petroleum. In contrast, producing and distributing natural gas as a transportation fuel means creating jobs here in America, which the May 21, 2010 Presidential Memorandum announcing this rulemaking described as one of its central goals. In 2008, U.S. production of 20 Tcf of natural gas supported nearly 3 million jobs ("The Contributions of the Natural Gas Industry to the U.S. National And State Economies", IHS Global Insight 2009, p.1, attached as Exhibit 1); even a modest increase in demand for natural gas as a transportation fuel could create tens of thousands of jobs associated with producing natural gas. [EPA-HQ-OAR-2010-0162-2119.1, p.2]

Moreover, natural gas vehicles are becoming increasingly as available as is natural gas. Worldwide, there are more than 12.5 million natural gas vehicles on the road. In the last seven years, the market for NGVs has more than tripled, thanks to a compound growth rate of over 17 percent per year. Increasing demand for NGVs would thus give domestic manufacturers a base upon which to build an export market and would create hundreds of thousands of additional jobs related to manufacturing NGVs and building the relevant infrastructure. And another economic opportunity exists in retrofitting existing petroleum vehicles to run on natural gas, a well-established technology that can further job creation here at home. [EPA-HQ-OAR-2010-0162-2119.1, p.2]

In sum, the most effective way to meet the goal of reducing U.S. petroleum consumption is by encouraging further growth in the U.S. medium- and heavy-duty natural gas vehicle fleet, a policy which will also significantly assist the U.S. economy. [EPA-HQ-OAR-2010-0162-2119.1, p.3]

The Advantage of Natural Gas: Greenhouse Gas Emissions: Heavy-duty natural gas engines have approximately 20% lower tailpipe GHG emissions than diesel engines.1 Moreover, the emissions performance of these NG engines will continue to improve because they can use the same technological advances that diesel engines will employ to meet the new standards. 75 FR 74216-30. The vast majority of the improvements described in the HD Rule can also be used on NGVs to further improve their inherently-lower GHG emissions: weight and drag reduction, low-friction lubricants, extended idle reduction, mechanical and electric turbocompounding, etc., will reduce fuel consumption and GHG emissions from NGVs just as they do for diesels. In other words, even with the mandated improvements to diesel GHG emissions, natural gas engines and vehicles will maintain their superior GHG emissions performance over their diesel counterparts. [EPA-HQ-OAR-2010-0162-2119.1, p.3]

Decades ago, in the Alternative Motor Fuels Act of 1988 (“AMFA”), Congress wrote a specific compliance metric favoring natural gas and other alternative fuels into the light-duty fuel economy statute. The Conference Report for AMFA could not have been clearer: “[t]he objective of both the House and Senate bills is to facilitate the development and use of alternative fuels in the United States for purposes of energy security” (House Report 100-929, 134 Cong Rec H 7732, September 16, 1988, p. 7736), and the first two legislative findings in the statute itself were “the achievement of long-term energy security for the United States is essential to the health of the national economy, the well-being of our citizens, and the maintenance of national security” and “the displacement of energy derived from imported oil with alternative fuels will help to achieve energy security and improve air quality.” P.L. 100-494, Section 2. [EPA-HQ-OAR-2010-0162-2119.1, p.3]

Recognizing that every NGV totally eliminates the lifetime petroleum demand of a gasoline vehicle, in AMFA Congress encouraged the production of natural gas vehicles by multiplying the fuel economy of an NGV relative to that of an equivalent gasoline-powered one (the 'NGV Multiplier'). (AMFA Section 6(a), codified at 49 U.S.C. 32905(c), providing that in fuel-consumption calculations, '[a] gallon equivalent of gaseous fuel is deemed to have a fuel content of .15 gallon of fuel'; by multiplying natural gas volume by .15, the effect of this is to discount NGV fuel consumption by 85%.) [EPA-HQ-OAR-2010-0162-2119.1, pp.3-4]

Nevertheless, when tasked with creating a medium- and heavy-duty fuel economy program, NHTSA ignored this express Congressional endorsement of natural gas vehicles, saying that it did not include the NGV Multiplier in the HD Rule 'because the HD sector does not have the incentives mandated in EISA for light-duty vehicles'. 75 FR 74198. This makes no sense. [EPA-HQ-OAR-2010-0162-2119.1, p.4]

In contrast to the detailed regime Congress created for light-duty vehicles (of which the 'NGV multiplier' is just a small part), for medium- and heavy-duty vehicles Congress simply told NHTSA –in a single sentence -- to set up a program 'designed to achieve the maximum feasible improvement' via 'appropriate test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols that are appropriate, cost-effective, and technologically feasible.' 49 U.S.C. 32902(k)(2). And the NGV Multiplier is unequivocally the most 'appropriate, cost-effective and technologically feasible' mechanism to reduce petroleum imports. [EPA-HQ-OAR-2010-0162-2119.1, p.4]

Moreover, NHTSA's apparent belief that the HD Rule should not contain any 'incentive' that Congress did not specifically mandate – in that one sentence -- is contradicted by the many incentives that NHTSA sprinkled throughout the HD Rule, including ones taken straight out of the light-duty regime (both as originally written and as amended by EISA). For example, the HD Rule includes an 'Averaging, banking, and trading (ABT) Program' (75 FR 74446-49), which duplicates the averaging, banking and trading provision Congress wrote for light-duty vehicles (49 U.S.C. 32903). And the lack of Congressional direction did not stop NHTSA from creating numerous other incentive provisions in the HD Rule, such as fleet averaging for heavy-duty pickups and vans (75 FR 74254), credits for advanced technology vehicles (75 FR 74255), early compliance credits (id.), even more credits for electric vehicles (id.), etc. But applying NHTSA's 'logic' would exclude all of these from the HD Rule, because Congress did not mention any one of them – or any incentives at all -- in its one-sentence instruction to NHTSA. [EPA-HQ-OAR-2010-0162-2119.1, p.4]

If NHTSA is serious about reducing U.S. petroleum use, then the NGV Multiplier that Congress specifically wrote to encourage natural gas under the light-duty fuel economy program must become part of the HD Rule. [EPA-HQ-OAR-2010-0162-2119.1, p.4]

Organization: Waste Management

Waste Management believes that transitioning to natural gas fueled vehicles is the best near-term solution to resolve the conflicting goals of criteria pollution reductions and increased fuel efficiency. In our comments above we described the improved environmental performance that we have achieved with our existing fleet of natural gas vehicles. In 2011 approximately 75 percent of our new vehicle purchases will be natural gas vehicles and over the next three years we hope to increase the percentage to 80%. This level of investment will only be sustainable if new natural gas engines can be certified as compliant with the GHG and fuel efficiency standards, can perform well in refuse vehicle applications, and are affordable. Given the significant environmental and national security benefits associated with increased use of domestic natural gas as a transportation fuel, NHTSA and EPA should incorporate compliance options and economic incentives to promote natural gas engines. [EPA-HQ-OAR-2010-0162-1854.1, pp.3-4]

We recommend that the HD Rule incorporate a natural gas vehicle (NGV) multiplier as was included in the light-duty vehicle standards. Congress encouraged the production of light-duty natural gas vehicles by instructing that the fuel economy of an NGV be multiplied by 6.67 relative to that of a gasoline powered vehicle. NHTSA chose not to include a NGV multiplier in the HD Rule 'because the HD sector does not have the incentives mandated in EISA for light-duty vehicles.' (75 FR 74198) We disagree with the Agency's reasoning and believe that Congress' direction to NHTSA to set up a program 'designed to achieve the maximum feasible improvement via appropriate test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols that are appropriate, cost-effective and technologically feasible' offers ample flexibility to include a NGV multiplier to promote NG engines. Further, NHTSA included other incentives for HD diesel and gasoline engines, such as an averaging, banking and trading (ABT) program that were not specifically mandated in statute. So, the Agency clearly recognizes flexibility in the Congressional directive to establish an HD truck program. [EPA-HQ-OAR-2010-0162-1854.1, p.4]

Organization: Encana Natural Gas Inc. (Encana)

Encana supports the EPA’s and NHTSA’s commitment to promoting cleaner air and reduced U.S. dependence on oil. Encana believes, however, that exclusion of a Natural Gas Vehicle (NGV) multiplier is inconsistent with Congressional intent and misses a unique opportunity to encourage utilization of a domestic clean transportation fuel. [EPA-HQ-OAR-2010-0162-1758.1, pp.1-2]

In order to reduce U.S. petroleum imports, in the 2007 Energy Independence and Security Act, Congress required the NHTSA to establish the first-ever fuel economy standards for medium- and heavy-duty vehicles. Unfortunately, the HD Rule fails to harness the power of natural gas vehicles. Building on the tens of thousands of natural gas trucks and buses on U.S. roads today is the most cost-effective way to reduce U.S. petroleum imports. [EPA-HQ-OAR-2010-0162-1758.1, p.3]

In the original light-duty (passenger car/pickup) fuel economy law (EPCA), Congress expressly favors NGVs. Recognizing that every natural gas vehicle totally eliminates the lifetime petroleum demand of a gasoline vehicle, Congress encouraged the production of NGVs by multiplying the fuel economy of a NGV by 6.67 relative to that of an equivalent gasoline-powered one (the “NGV Multiplier”). (49 U.S.C. 32905(c), which provides that in fuel-consumption calculations, “[a] gallon equivalent of gaseous fuel is deemed to have a fuel content of .15 gallon of fuel”; the effect of this is to multiply fuel economy by 6.67.) [EPA-HQ-OAR-2010-0162-1758.1, p.3]

In contrast to the detailed regime Congress created for light-duty vehicles (of which the "NGV multiplier" is just a small part), for medium- and heavy-duty vehicles Congress simply instructed NHTSA to create a program "designed to achieve the maximum feasible improvement" via "appropriate test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols that are appropriate, cost-effective, and technologically feasible." 49 U.S.C. 32902(k)(2). [EPA-HQ-OAR-2010-0162-1758.1, p.3]

The NGV Multiplier is not only the most "appropriate, cost-effective and technologically feasible" mechanism to reduce petroleum imports, but it is consistent with NHTSA's approach of utilizing incentives taken directly out of the light-duty regime (both as originally written and as modified by EISA). The NGV Multiplier is a key tool in maximizing use of domestic clean transportation fuels and is completely consistent with both Congressional intent and existing NHTSA policy. We encourage the inclusion of a NGV Multiplier in the final HD Rule. [EPA-HQ-OAR-2010-0162-1758.1, p.3]

The natural gas industry has achieved a fundamental increase in North American supply while dramatically lowering costs. This abundance of natural gas, combined with its physical properties as a low emissions transportation fuel, makes for a bright NGV future. NGVs are off to a strong start with more on the road today than EVs. We believe that natural gas will play a key role in helping achieve national emission reduction goals at the lowest cost to the consumer. With technology allowing cost-effective access to natural gas, our industry estimates current supply of more than 100 years at current consumption levels. [EPA-HQ-OAR-2010-0162-1758.1, p.3]

Encana is committed to exploring new and emerging energy technologies and strategies that allow us to minimize our impacts on the environment in the areas where we operate, live, work and drive. Our commitment to improving the environment and our energy security is evidenced in the leadership position we have taken to promote the benefits afforded by the natural gas transportation sector. In addition to an extensive community outreach and education program, Encana is piloting NGVs in our Encana affiliates' working fleet and drilling rigs. Additionally, we're partnering with several municipalities to promote the build-out of infrastructure to support natural gas vehicles especially for "return to base" fleets such as refuse trucks, buses, delivery trucks and taxis. Companies such as UPS, Waste Management, Walmart, Ryder, AT&T and Sysco are converting their fleets to natural gas, as are many municipalities. [EPA-HQ-OAR-2010-0162-1758.1, pp.3-4]

Organization: UPS

While UPS has a variety of potential alternative fuels/technologies for our light and medium trucks, we have not seen, until now, a substitute for diesel fuel that meets the range, performance, and operating cost requirements of the heavy, combination truck. This is unfortunate given that, as the proposed rule notes, these trucks generate 65% of the greenhouse gas emissions and consume 65% of the fuel of the heavy duty sector due to their large payloads and high annual miles traveled. (The UPS truck fleet, which numbers domestically in excess of 85,000 trucks, contains over 16,000 class 7 or 8 heavy tractors pulling trailers over long distances.) [EPA-HQ-OAR-2010-0162-1763.1, p.3]

UPS is very encouraged by the potential of liquid natural gas (LNG) as a heavy truck fuel to deliver diesel-like performance and efficiency with natural gas from technology developed with DOE support. UPS currently has 11 LNG heavy trucks on the road now between Las Vegas, NV and Ontario, CA and is in the process of purchasing 48 more using the latest LNG diesel engine technology. If UPS could better justify the current initial cost of these trucks, we could envision purchasing 1,000 each year for years to come. UPS believes that such heavy LNG trucks could significantly improve U.S. energy security by reducing U.S. oil imports while reducing emissions, including greenhouse gas emissions, and reducing operating costs significantly. Of course, we welcome continued research on other alternative fuels or technologies for these heavy trucks. [EPA-HQ-OAR-2010-0162-1763.1, pp.3-4]

Currently, the LNG truck is twice the cost of a new, 2010 compliant diesel truck, but we believe that the cost will come down dramatically as other engine manufacturers enter the market and economies of scale take hold. (Last year, Congress did not extend the tax credit for purchase of these trucks.) Another cost barrier has been the LNG/CNG infrastructure, but we are very much encouraged by how government, private parties and natural gas utilities are finding creative ways to address the infrastructure costs. [EPA-HQ-OAR-2010-0162-1763.1, p.4]

Our comments on LNG are not to short-change our confidence in CNG as an alternative fuel for short-haul light and medium trucks. There is great potential there and our CNG fleet is growing, but there are other alternative fuels and technologies to CNG for the light and medium delivery trucks and we are pursuing them as well. Long-haul heavy trucks do not appear to have multiple options. [EPA-HQ-OAR-2010-0162-1763.1, p.4]

The proposed rule offers special emissions and fuel economy credits for various advanced technologies in trucks, including heavy trucks, such as plug-in electric and hybrid technology. Yet none of those advanced technologies seem to offer any prospects for the heavy, long-haul truck. We wish that were otherwise. [EPA-HQ-OAR-2010-0162-1763.1, p.4]

Consequently, and inexplicably, the rule does not appear to offer any incentives or encouragement for LNG for long-haul heavy vehicles, which consume the bulk of petroleum used in all heavy trucks. Neither are such advanced technology incentives available for CNG in light or medium trucks. In short, the proposed rule appears to miss the biggest near-term opportunities for reducing petroleum consumption in trucks, and in particular heavy trucks. Worse, by channeling incentives to certain promising technologies and not others, the rule, as proposed, makes technology choices for the private sector market. [EPA-HQ-OAR-2010-0162-1763.1, p.4]

Organization: Green Truck Association (GTA)

The rule should recognize the value of alternative fuels as being both clean and a way of reducing dependence on foreign oil (Energy Independence Security Act). [EPA-HQ-OAR-2010-0162-1596.1, p.3]

Incentive credits could be crafted based on a combination of oil displacement and GHG reduction. [EPA-HQ-OAR-2010-0162-1596.1, p.3]

For instance, compressed natural gas (CNG) is a natural gas that is extracted from wells and compressed. Natural gas is a fossil fuel comprised mostly of methane and is cleaner burning than gasoline or diesel fuel (natural gas produces 22 to 29 percent less greenhouse gas emissions than traditional diesel or gasoline-powered vehicles). Increased usage of natural gas as a transportation fuel also will contribute to the EISA goal of decreasing our nation’s dependence on foreign oil. [EPA-HQ-OAR-2010-0162-1596.1, pp.3-4]

Propane autogas is the leading alternative fuel in the United States and the nation’s third-most common on-road vehicle fuel after gasoline and diesel, according to the U.S. Department of Energy. It fuels more than 270,000 vehicles in the United States, including pickup trucks, vans, shuttles, taxis, delivery vehicles, and school buses. Worldwide, the number of on-road vehicles fueled by propane autogas is more than 13 million. [EPA-HQ-OAR-2010-0162-1596.1, p.4]

Studies show vehicles fueled by propane autogas reduce greenhouse gas emissions by 17 percent, create 20 percent less nitrogen oxide, up to 60 percent less carbon monoxide, and fewer particulate emissions for the environment than vehicles fueled by gasoline. These vehicles achieve comparable horsepower, torque, and towing capacity as gasoline-fueled equivalents. In addition to emissions reductions, 90 percent of propane used today comes from domestic production sources, meaning propane autogas used to fuel vehicles plays a strong role in lowering national dependence on foreign oil. [EPA-HQ-OAR-2010-0162-1596.1, p.4]

Allowing a subsequent stage vehicle or component manufacturers to participate in the credit system further incentivizes the development of new and innovative fuel saving technologies. Such a system would need to include a simplified process by which the technology can be assessed as many new technologies are likely to be developed by manufacturers with limited resources, in comparison to an OEM. [EPA-HQ-OAR-2010-0162-1596.1, p.4]

Organization: Robert Bosch, LLC

Bosch believes that flexibility mechanisms “recogniz[ing] the benefits of” flexible fuel vehicles (FFVs) should be incorporated in the final GHG emissions and fuel consumption standards based on the approach taken by EPA and NHTSA in the LDV National Program. Such mechanisms, which should apply to all HD vehicles and not just PUVs, would incentivize the production of HD FFVs. Bosch also feels that credit mechanisms for dedicated alternative fuel vehicles (AFVs) (e.g., combination tractors, PUVs, and vocational vehicles that operate solely on CNG, liquefied natural gas, propane, or E85), mechanisms similar to those in place for dedicated light-duty AFVs, likewise are appropriate. [EPA-HQ-OAR-2010-0162-1630.1, p.33]

Although the agencies are correct in pointing out that the Energy Policy and Conservation Act's (EPCA) manufacturing incentives, particularly the 0.15 conversion factors, are not mandated for HD vehicles, whether FFVs or dedicated AFVs, it also is true that those incentives technically only apply to fuel economy calculations. Bosch notes that this latter constraint did not preclude EPA from exercising its authority and finalizing FFV and dedicated AFV credits with the 0.15 conversions as part of its LDV GHG emissions standards. Bosch contends that HD vehicles also should benefit from the fixed conversion factors, both for purposes of the GHG emissions standards and the NHTSA fuel consumption standards. For HD FFVs, use of "a 50-50 weighting of alternative and conventional fuel test results through MY 2015, and a manufacturer-determined weighting based on demonstrated fuel use in the real world after MY 2015" is not, in Bosch's view, problematic. Bosch also concurs with testing HD dedicated AFVs with the alternative fuel and calculating a petroleum equivalent fuel consumption level based on established petroleum equivalency factors found in 10 C.F.R. section 474.3 (EVs), 49 C.F.R. section 538.8 (gaseous fuels), and EPCA (one gallon of liquid alternative fuel treated as 0.15 gallon of fuel). [EPA-HQ-OAR-2010-0162-1630.1, p.34]

In addition, Bosch encourages the agencies to establish some type of credit mechanism to incentivize the HD sector's use of biodiesel, biodiesel blends, and renewable diesel. Less than one year ago, of course, EPA determined under its Renewable Fuel Standard program that biodiesel and renewable diesel, whether from soybeans, waste fats and greases, or algae oil, have lifecycle GHG emissions at least 50% lower than petroleum diesel's lifecycle GHG emissions. Bosch believes the agencies should capitalize on this threshold determination and take steps to expand the current usage rates within the HD sector of biodiesel and renewable diesel. [EPA-HQ-OAR-2010-0162-1630.1, p.35]

Organization: Energy Future Coalition

The goal, therefore, is clearly to reduce the consumption of petroleum-derived fuels (and thereby reduce greenhouse gas emissions). Both improved efficiency (fuel economy) and fuel switching (to alternative fuels) are clearly contemplated options. [EPA-HQ-OAR-2010-0162-2116.1, p.2]

Fuel switching is a readily available energy-security alternative, and the most abundant, efficient and secure replacement today is natural gas. The U.S. and Canada supply 99% of U.S. natural gas demand, and unlike U.S. oil reserves, U.S. gas reserves are growing. Estimates from the Potential Gas Committee and the Energy Information Administration indicate that domestic supplies are sufficient to meet current demand for more than 100 years; as recently as several years ago, this estimate was 65 years. [EPA-HQ-OAR-2010-0162-2116.1, p.2]

Diversification of fuels is essential to U.S. energy security – to reduce the vulnerability of the economy to volatile oil prices from unstable suppliers. Relying on foreign oil enriches our adversaries and undermines our economy, while the production and use of domestic fuels strengthen it. The nation's current account deficit for the most recent quarter was $123 billion, during which time consumers spent $90 billion on imported petroleum – creating jobs elsewhere. In contrast, producing and distributing domestic transportation fuels creates jobs in the United States, one of the central goals cited in the May 21, 2010, Presidential Memo announcing this rulemaking. In 2008, U.S. production of 20 trillion cubic feet of natural gas supported nearly 1.3 million jobs (IHS Global Insight 2009). [EPA-HQ-OAR-2010-0162-2116.1, p.2]

Encouraging the use of non-petroleum fuels and the further growth of the U.S. medium- and heavy-duty natural gas vehicle fleet is a direct and effective way to reduce U.S. petroleum consumption and thus enhance energy security and strengthen the U.S. economy. Fortunately, as described below, the failure of the proposed HD National Program to recognize the benefits of alternative fuels can be fixed by simply including the same provision for alternative-fuel vehicles that Congress specified in the light-duty fuel economy statute. [EPA-HQ-OAR-2010-0162-2116.1, p.2]

Congress Has Already Established a Fuel-Economy Multiplier for Alternative Fuels: The Alternative Motor Fuels Act of 1988 provided specific guidance for calculating the fuel economy of various alternative fuels relative to petroleum. For example, a gallon of a liquid alternative fuel used to operate a dedicated automobile was deemed to contain .15 gallon of petroleum-based fuel, and similarly, a gallon equivalent of gaseous fuel was deemed to have a fuel content of .15 gallon of fuel. The effect of these provisions was to multiply the fuel economy of alternative-fuel vehicles by 6.67 relative to that of an equivalent gasoline-powered one. (See 49 U.S.C. 32905(c).) [EPA-HQ-OAR-2010-0162-2116.1, p.2]

However, the proposed HD National Program ignores this established congressional policy, which was enacted specifically to encourage greater use of alternative fuels "because the HD sector does not have the incentives mandated in EISA for light-duty vehicles." 75 FR 74198. This reasoning does not stand up: [EPA-HQ-OAR-2010-0162-2116.1, p.2]

For medium- and heavy-duty vehicles Congress told NHTSA to set up a program "designed to achieve the maximum feasible improvement" via "appropriate test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols that are appropriate, cost-effective, and technologically feasible." 49 U.S.C. 32902(k)(2). The fuel economy multipliers already in law are the most "appropriate, cost-effective and technologically feasible" mechanism to reduce petroleum imports, and therefore they should be incorporated into the proposed HD National Program. In both underlying cases (EISA and the Alternative Motor

Fuels Act), the objective was to reduce the consumption of petroleum. [EPA-HQ-OAR-2010-0162-2116.1, p.3]

The Advantage of Alternative-Fuel Vehicles: Greenhouse Gas Emissions: The greenhouse gas (GHG) benefits of alternative fuels are well established. For example, natural gas engines have been shown to produce approximately 20% lower tailpipe GHG emissions than diesel engines. Moreover, the emissions performance of alternative-fuel vehicles will continue to improve because they can use the same technological advances that diesel engines will use to meet the new standards. 75 FR 74216-30. The vast majority of the improvements described in the proposed HD National Program can be used to further improve the inherently lower GHG emissions of alternative-fuel vehicles: Weight and drag reduction, low-friction lubricants, extended idle reduction, mechanical and electric turbocompounding, etc., will reduce fuel consumption and GHG emissions from vehicles running on biofuels or natural gas just as well as they do for diesels. [EPA-HQ-OAR-2010-0162-2116.1, p.3]

Organization: POP Diesel

While your proposed regulations would implement a fleet standard to measure and regulate greenhouse gas emissions from heavy-duty vehicles at or below 14,000 pounds GVWR (proposed 40 C.F.R. section 1037.104), you fail to impose or implement such a standard for greenhouse gas emissions from heavy duty vehicles for vocational vehicles or tractors above 26,000 pounds GVWR (proposed sections 1037.105 and 1037.106). This is a fundamental flaw and error which you need to correct by imposing a fleet standard on these heavier classes of vehicles, just as you have done for the vehicles at or below 14,000 pounds GVWR. [EPA-HQ-OAR-2010-0162-1897.1, p.2, of supplemented letter]

The reason is as follows. If you accept that the complete life cycle emissions of the fuel is the only correct way to accurately measure the true greenhouse gas emissions of various kinds of diesel fuels, including petroleum-based diesel fuel and triglyceride diesel fuel consisting of vegetable oil and animal fat, then the following sentence makes sense. A manufacturer who deploys equipment, such as the equipment that POP Diesel™ manufactures, that enables a diesel engine to run safely and cleanly on 100 percent biofuel should receive the credit and benefit of deploying such equipment on some models within its fleet and should thereby be permitted to have other models in its fleet bum more petroleum-based diesel fuel than would otherwise be the case. Such a system of fleet averaging for all GVWR weight categories would encourage the phasing-in of technology, such as POP DieseI™'s, that moves us away from the reliance on fossil fuels that your proposed regulations, with their primary focus on efficiency, perpetuate. [EPA-HQ-OAR-2010-0162-1897.1, p.2, of supplemented letter]

Plant Oil Powered Diesel Fuel Systems, Inc. (POP Diesel™) has developed equipment, an after-market auxiliary fuel system, that can enable any diesel engine to run on one hundred percent biofuel. Our experience with triglyceride fuel consisting of one hundred percent raw vegetable oils and animal fats gives us a perspective on how to reduce greenhouse gas emissions from compression ignition (diesel) engines that is altogether missing from the focus in your proposed regulations on improving efficiency. [EPA-HQ-OAR-2010-0162-1897.1, p.1, of main letter]

The enclosed article from a recent edition of The New Yorker magazine raises questions about an efficiency-based approach to reducing greenhouse gas emissions. In short, while gains in efficiency are commendable as improvements to product quality, they may have the macroeconomic effect of increasing demand for the energy resource in the aggregate over time. [EPA-HQ-OAR-2010-0162-1897.1, p.1, of main letter]

POP Diesel™ is a small company that has had a long-standing intention to submit our first application for a Certificate of Conformity under 40 C.F.R. part 86 to the United States Environmental Protection Agency (EPA). Unfortunately, the new 2008 model year test vehicle purchased for this purpose was plagued by manufacturer defects that have rendered it subject, instead, to a lawsuit against the manufacturer alleging state Lemon Law and federal Magnuson Moss Warranty Act claims. Hence, this letter is not backed by the end result of EPA certification that may fully justify our products in your eyes. [EPA-HQ-OAR-2010-0162-1897.1, p.2, of main letter]

Some background explanation will give you, at least, the theory of our approach. An auxiliary fuel system, including a secondary fuel tank, for storing and treating one hundred percent biofuel allows the engine to run, except for brief periods such as the start-up and shutdown, on such hundred percent biofuel. This arrangement provides much greater greenhouse gas emissions reduction than is possible using B-5 to B-20 biodiesel that is blended with petroleum diesel and then drawn from the single OEM tank of a vehicle. Biodiesel derives from triglyceride feedstock consisting of vegetable oils and animal fats. Leaving this feedstock in its raw state avoids costly and energy-intensive transformation of the feedstock into biodiesel. Biofuel containing less embedded energy offers greater overall reduction in the net contribution of greenhouse gasses. [EPA-HQ-OAR-2010-0162-1897.1, p.2, of main letter]

Proper management of one hundred percent biofuel is essential to avoiding harm to the engine. Starting the engine on one hundred percent petroleum diesel avoids the piston ring blow-by that presents the highest risk of biofuel entering the engine crankcase, where it may plasticize and thereby, impair lubrication. Flushing the fuel system of biofuel and shutting the engine down on one hundred percent petroleum diesel prevents biofuel from remaining in sensitive areas of the engine, such as the injectors, where residual heat may turn the biofuel into carbon deposits after shut-down. Failure to properly manage the use of one hundred percent biofuel in these ways has caused misunderstanding in the past and overstatement of the risks of raw vegetable oil fuel espoused by such entities of the Engine Manufacturers Association. [EPA-HQ-OAR-2010-0162-1897.1, p.2, of main letter]

Response:

The agencies received several comments arguing for greater crediting of NGVs than the proposed approach would have provided. NGV interests commented that the NPRM ignored Congress' intent to incentivize the use of NGVs by not including the conversion factor that exists for light-duty vehicles under EPCA/EISA. The commenters argued that Congress' intent to incentivize NGVs is evident in the formula contained in 49 U.S.C. 32905, which deems a gallon equivalent of gaseous fuel to have a fuel content of 0.15 gallon of fuel. The commenters also argued that Congress implicitly intended NGVs to be incentivized in this rulemaking, as evidenced by the incentives for light-duty vehicles fueled by natural gas.. Commenters also suggested that the agencies were not including the NGV incentive from light-duty because Congress did not explicitly include it in 49 U.S.C. 32902(k), and argued that this would contradict the agencies' inclusion of other incentives similar to those in the light-duty rule.

The agencies continue to believe that alternative-fueled vehicles, including NGVs, provide fuel consumption benefits that should be accounted for in this program. However, the agencies do not agree with the commenters' claim that the NGV incentive contained in the light-duty program is an explicit Congressional directive that must be also be applied to the heavy-duty program, nor that the light-duty incentive for NGVs should be interpreted as an implicit Congressional intent for NGVs to be incentivized in the heavy-duty program. Furthermore, the agencies believe that the fuel consumption benefits that FFVs will obtain in engine test cycles accurately reflects their energy benefits and thus provides sufficient incentives for these vehicles. The agencies would like to clarify that the decision not to include an NGV incentive was based on this determination, not on a belief that incentives present in the light-duty rule could not be developed for the heavy-duty rule if they were not explicitly included in Section 32902(k).

The American Trucking Associations expressed support for estimating natural gas fuel efficiency by using carbon emissions from natural gas rather than energy content to estimate fuel consumption. ATA explained that two vehicles can achieve the same fuel efficiency, yet one operated on natural gas would have a lower carbon dioxide emissions rate. A natural gas conversion factor that uses carbon content versus energy content is a more appropriate method for calculating fuel consumption. A number of other groups commented on the appropriate method to use in establishing fuel consumption from alternative fueled vehicles. A group of NGV interests including Ryder, Waste Management, and Robert Bosch encouraged the agencies to adopt the 0.15 conversion factor in estimating fuel consumption for FFVs and alternative fuel vehicles finalized in the LDV 2012-2016 GHG and fuel consumption standards. The incentive effectively reduces the calculated fuel consumption for FFVs and alternative fuel vehicles by a factor of 85 percent. The commenters argued that the incentive is needed for heavy-duty vehicles to encourage the use of natural gas and to reduce the nation's dependence on petroleum.

The agencies have reviewed this issue and continue to believe that the light-duty conversion factor is not appropriate for this rule. Instead, the agencies are finalizing a conversion process from CO_2 to fuel consumption that we believe accurately reflects the fuel consumption of the vehicles while at the same time providing a significant incentive for the alternative fuel use. Using the agencies' calculation, NGVs will exhibit an approximate 20 percent benefit over conventional fuel use. We believe this is a substantial enough advantage to spur the market for these vehicles. The calculation at the same time does not overestimate the benefit from this technology, which could reduce the effectiveness of the regulation. Therefore, the final rule does not include the light-duty 0.15 conversion factor for NGVs.

POP Diesel argued for establishment of fleet average GHG standards for vehicles above 26,000 lb GVWR, in order to allow manufacturers to gain credits for alternative-fueled vehicles. The Averaging, Banking, and Trading (ABT) program we are adopting for the GHG and fuel consumption standards does provide this crediting opportunity and so setting fleet average standards for larger HD vehicles, involving as it would additional compliance complexity, is not considered necessary.

16.5.2. **Upstream GHG Emissions**

Organizations Included in this Section:

Natural Gas Vehicle Interests
American Gas Association
America's Natural Gas Alliance
Energy Future Coalition
Waste Management
Sierra Club
Union of Concerned Scientists
Encana Natural Gas Inc.
American Council for an Energy-Efficient Economy
POP Diesel
Energy Future Coalition
American Trucking Associations, Inc.
Bridgestone

Organization: Natural Gas Vehicle Interests

The HD Rule Should Allow NGV Manufacturers to Include Upstream GHG Emissions Benefits in Order to Meet the Methane Standard. Because EPA has set a methane standard that cannot be met otherwise, NGV manufacturers will need to obtain and use emission reduction credits. And the most logical place to get them is from the upstream GHG emission benefits of natural gas. [EPA-HQ-OAR-2010-0162-2119.1, p.7]

The HD Rule effectively lowers not only tailpipe GHG emissions but also (by reducing fuel consumption) GHG emissions from fuel production, refining and transportation (“upstream GHG emissions”). In particular, natural gas has 30-50% less upstream GHG emissions than diesel. [EPA-HQ-OAR-2010-0162-2119.1, p.7]

Ironically, while EPA takes full credit for these upstream GHG reductions in its cost-benefit analysis of the HD Rule – and those reduced upstream emissions are approximately 20%

of the Rule's total GHG emissions reductions (75 FR 74282-83) -- EPA does not allow manufacturers to do likewise. [EPA-HQ-OAR-2010-0162-2119.1, p.7]

Not only does it make intuitive sense to allow natural gas engine manufacturers to comply with GHG emissions standards via the upstream GHG emissions benefits of natural gas, refusing to let them do so is contrary to the very purpose of the HD Rule. By excluding these upstream benefits, the Rule skews the compliance process against NGVs, vehicles which have both lower upstream and lower tailpipe GHG emissions. Even more ironically, at the same time, EPA proposes generous credit provisions for technologies that provide either minimal GHG benefits (Rankine cycle engines) or have no real prospect of being part of the heavy-duty vehicle sector (electric and fuel cell vehicles). 75 FR 74255. [EPA-HQ-OAR-2010-0162-2119.1, p.7]

Moreover, upstream GHG emissions from natural gas will actually decrease over time, as renewable natural gas (biomethane from landfills and other sources) becomes a larger share of the natural gas transportation fuel mix. Biomethane achieves nearly a 90 percent reduction in GHGs compared to diesel (CARB LCFS Carbon Intensity Lookup Table, pp. 6, 8, attached as Exhibit 3), and U.S. biomethane production is increasing, with DOE's National Renewable Energy Laboratory estimating future production of up to 16 billion gasoline gallons equivalent. 74 FR 24982. In contrast, diesel upstream GHG emissions are increasing as more diesel is refined from tar sands, which EPA agrees has a staggering increase – more than 80% -- in upstream GHG emissions. July 16, 2010 letter from EPA Assistant Administrator Cynthia Giles to Assistant Secretary of State Jose Fernandez, p. 2. [EPA-HQ-OAR-2010-0162-2119.1, p.8]

Finally, EPA's position runs counter not only to logic, but also its own formal policy – set just last year after full notice and comment rulemaking -- that upstream GHG emissions will be included in vehicle compliance calculations. In establishing the current light-duty (passenger car/pickup) GHG standards, EPA mandated that vehicles will have "compliance values calculated according to a methodology that accounts in full for the net increase in upstream GHG emissions", 75 FR 25436.3 EPA's justification was that "[t]here is a rational basis for EPA to account for this net difference, as that best reflects the real world effect on the air pollution problem we are addressing." Id. [EPA-HQ-OAR-2010-0162-2119.1, p.8]

By excluding the emissions that "best reflect the real world effect on air pollution", the HD Rule has the perverse effect of favoring vehicles that result in greater GHG emissions over vehicles that have lower emissions. EPA should follow logic (and its own policy), and allow NGV manufacturers to comply with these GHG standards using the upstream GHG emission benefits of natural gas. [EPA-HQ-OAR-2010-0162-2119.1, p.8]

Organization: American Gas Association (AGA) and America's Natural Gas Alliance (ANGA)

It should be noted that upstream GHG emissions from natural gas will actually decrease over time, as renewable natural gas (biomethane from landfills and other sources of organic waste) comes on line. Renewable natural gas achieves nearly a 90 percent reduction in GHGs compared to diesel, and U.S. biomethane production is increasing, with DOE's National Renewable Energy Laboratory estimating future production of up to 16 billion gasoline gallons equivalent. 74 FR 24982. [EPA-HQ-OAR-2010-0162-1896.1, pp.2-3]

EPA's position runs counter not only to logic, but also its own formal policy – set just last year after full notice and comment rulemaking -- that upstream GHG emissions will be included in vehicle compliance calculations. In establishing the current light-duty (passenger car/pickup) GHG standards, EPA mandated that vehicles ultimately will have "compliance values calculated according to a methodology that accounts in full for the net increase in upstream GHG emissions", 75 FR 25436. EPA's justification was that "[t]here is a rational basis for EPA to account for this net difference, as that best reflects the real world effect on the air pollution problem we are addressing." Id. [EPA-HQ-OAR-2010-0162-1896.1, p.3]

By excluding the emissions that "best reflect the real world effect on air pollution", the HD Rule has the perverse effect of favoring diesel vehicles that result in greater GHG emissions over natural gas vehicles that have lower emissions. EPA should follow logic (and its own sound policy), and allow inclusion of the upstream GHG emission benefits of natural gas in the HD Rule's compliance methodology. [EPA-HQ-OAR-2010-0162-1896.1, p.3]

Organization: American Gas Association (AGA) and America's Natural Gas Alliance (ANGA)

The HD Rule Should Allow Manufacturers to Include Upstream GHG Emissions Benefits in Compliance Determinations (Comparing Natural Gas to Diesel). The proposed HD standards effectively lower not only tailpipe GHG emissions but also (by reducing fuel consumption) GHG emissions from fuel production, refining and transportation ("upstream GHG emissions"). In fact, EPA's cost-benefit analysis of the HD Rule prominently features reduced upstream GHG emissions – approximately 20% of total GHG emissions reductions -- among the Rule's benefits. 75 FR 74282-83. [EPA-HQ-OAR-2010-0162-1896.1, p.2]

Unfortunately, even though EPA takes full credit for these upstream benefits, it does not then allow truck and van engine manufacturers to do likewise. Specifically, even though natural gas has 30-50% less upstream emissions than diesel, the HD Rule does not let NGV manufacturers include those significant benefits in their compliance calculations. This makes no sense. Contrary to the purpose of the HD Rule, by excluding these upstream benefits, the HD Rule skews the compliance process against natural gas trucks and vans, which have both lower upstream and lower tailpipe GHG emissions compared to diesel trucks and vans. Ironically, at the same time, EPA proposes generous credit provisions for technologies that provide either minimal GHG benefits (Rankine cycle engines) or have no real prospect of being part of the heavy-duty vehicle sector (electric and fuel cell vehicles). 75 FR 74255. [EPA-HQ-OAR-2010-0162-1896.1, p.2]

We are not suggesting the removal of incentives for electric vehicles in the HD rule. Nor have we suggested doing so in the rule for light duty passenger cars that took effect this month. There is an important role for both electric and natural gas vehicles to help displace foreign oil and reduce greenhouse gas emissions. We are simply asking that EPA allow incentives in a manner that creates a level playing field for alternative fuel vehicles, including natural gas, and there is no reason EPA could not do so. In particular, we believe it is possible to allow natural gas truck and van manufacturers to include the upstream GHG emission benefits in their compliance calculations under the HD rule for comparing the emission of natural gas and diesel heavy duty trucks, without undermining the electric car incentive EPA allowed in the current light duty rule. The light duty rule establishes a policy of looking at upstream GHG emissions to evaluate vehicles, but allows a waiver for up to 300,000 electric cars per manufacturer. We certainly understand the need for such incentives to jump start the manufacture of alternative vehicles in an emerging market.

Organization: Energy Future Coalition

The proposed standards effectively lower not only tailpipe GHG emissions but also (by reducing fuel consumption) GHG emissions from fuel production, refining and transportation (“upstream GHG emissions”). In fact, EPA’s cost-benefit analysis of the proposed HD National Program prominently features reduced upstream GHG emissions – approximately 20% of total GHG emissions reductions – among the program’s benefits. 75 FR 74282-83. [EPA-HQ-OAR-2010-0162-2116.1, p.3]

However, the proposed program does not allow manufacturers to take full credit for these upstream benefits. For example, even though natural gas has 30-50% less upstream emissions than diesel, the proposed rules do not let vehicle manufacturers include those significant benefits in their compliance calculations. This contravenes the intent of the program. By excluding these upstream benefits, the proposed regulations skew the compliance process against alternative-fuel vehicles that have both lower upstream and lower tailpipe GHG emissions. Yet EPA proposes generous credit provisions for technologies that provide either minimal GHG benefits (Rankine cycle engines) or have no real prospect of being part of the heavy-duty vehicle sector (electric and fuel cell vehicles). 75 FR 74255. [EPA-HQ-OAR-2010-0162-2116.1, p.3]

In the case of natural gas vehicles, upstream GHG emissions will decrease over time as renewable natural gas (biomethane from landfills and other sources) comes on line. Biomethane achieves nearly a 90 percent reduction in GHGs compared to diesel, and U.S. biomethane production is increasing: DOE’s National Renewable Energy Laboratory estimates future production of up to 16 billion gasoline gallons equivalent. 74 FR 24982. In contrast, while natural gas is getting cleaner, upstream GHG emissions from diesel are increasing as more diesel is refined from tar sands – which, as EPA knows, produces a staggering increase of more than 80% in upstream GHG emissions. July 16, 2010, letter from EPA Assistant Administrator

Cynthia Giles to Assistant Secretary of State Jose Fernandez, p. 2. [EPA-HQ-OAR-2010-0162-2116.1, p.4]

Organization: Waste Management

We recommend that NGV manufacturers be allowed to include upstream GHG emissions benefits in compliance determinations. The California Air Resources Board's (CARB) February 2009 analysis 'Detailed California-Modified GREET Pathway for Compressed Natural Gas from North American Natural Gas' and similar September 2009 analysis for liquefied natural gas showed natural gas has 30-50 percent less upstream emissions than diesel. As more renewable natural gas (biomethane from landfill gas and other organic waste-based materials) is developed, upstream GHG emissions will decrease even further. WM is already powering a fleet of about 300 collection trucks using liquefied natural gas produced from our Altamont, CA landfill. CARB has certified the fuel as having the lowest upstream carbon intensity under the CA Low Carbon Fuel Standard. Only by including those upstream emissions reductions in compliance analyses will the Agencies obtain a true 'wells to wheels' life-cycle assessment of GHG emissions.[EPA-HQ-OAR-2010-0162-1854.1, p.4]

Organization: Sierra Club, Ms. Coplon-Newfield

There should be a robust plan for the electrification of trucks and to address the upstream emissions from charging electric vehicles. The Sierra Club will join together with others to ensure that a massive shift to electric vehicles, with no tailpipe emissions, will dramatically reduce global warming pollution and our dependence on oil. While electrification of heavy-duty trucks is not currently feasible, in the vocational truck category, there could be increasing potential for plug-in trucks that may well come to the market during the years covered by this rule. Sierra Club continues to urge that EPA fairly account for the emissions associated with charging electric cars and trucks. While there are no tailpipe emissions from electric vehicles, there are certainly emissions associated with the electricity that charges these vehicles. Despite what the Nissan Leaf television commercial shows us, those of us who receive our electricity from a coal-heavy grid will be getting no hugs from polar bears. I don't know if any of you have seen the commercial? Large electric trucks may not be on the road in 2014, but when they do come, they need to be accurately treated to account for electricity emissions. If the final rule does not account for the upstream emissions, we urge that credits for electric vehicles be clearly limited.

Of course, we are advocating for a cleaner grid, so that the electricity that powers electric vehicles comes from clean, renewable sources. Before the grid is cleaned up, however, upstream emissions from EV charging will be part of the global warming pollution problem and need to be addressed.

Organization: Union of Concerned Scientists, Mr. Bell

Upstream emissions should be included in evaluating the credit for electrical vehicles. Particularly in the heavy-duty sector, where natural gas and biofuels are certainly a viable technology, we feel that this accounting for upstream emissions places electric vehicles, natural gas and biofuels on an equal playing field.

Organization: Encana Natural Gas Inc. (Encana)

Encana also believes that meaningful vehicle emissions measurements must include an assessment of the full fuel life-cycle emissions generated by fuel extraction, generation and processing for all vehicle types, in addition to emissions measured at the tailpipe. [EPA-HQ-OAR-2010-0162-1758.1, p.2]

On November 30, 2010, EPA published its proposed regulations (the "HD Rule"), jointly with NHTSA's proposed fuel economy standards for these vehicles. 75 FR 74152. These standards lower not only tailpipe GHG emissions but by also reducing fuel consumption, cut emissions from fuel production, refining and transportation ("upstream GHG emissions"). [EPA-HQ-OAR-2010-0162-1758.1, p.2]

Unfortunately EPA does not allow manufacturers to consider these upstream emission reductions when demonstrating compliance with the HD Rule. Specifically, even though natural gas has 30-50% less upstream emissions than diesel, the HD Rule does not let NGV manufacturers include those significant emissions benefits in their compliance calculations. Contrary to the very purpose of the HD Rule, excluding these upstream benefits skews the compliance process against NGVs, which have both lower upstream and lower tailpipe GHG emissions. [EPA-HQ-OAR-2010-0162-1758.1, p.2]

The HD rule runs counter to EPA policy, that upstream GHG emissions be included in vehicle compliance calculations. In establishing the current light-duty (passenger car/pickup) GHG standards, EPA mandated that vehicles will have "compliance values calculated according to a methodology that accounts in full for the net increase in upstream GHG emissions", 75 FR 25436.1 [EPA-HQ-OAR-2010-0162-1758.1, p.2]

It is inequitable to ignore the upstream emissions for different fuels especially since upstream emissions make up a disproportionate share of emissions associated with using certain types of vehicles. The California Air Resources Board (CARB) produced the "California Well to Wheel Analysis" in 2009, detailing life-cycle transportation fuel GHG emissions clearly showing the emissions advantage of natural gas over diesel. [EPA-HQ-OAR-2010-0162-1758.1, p.2]

Renewable Natural Gas - landfill (Higher when converted to CNG or LNG) 16.4 gCO2e/MJ

Biodiesel (Midwest soybeans / waste cooking oils) 25.4 gCO2e/MJ

Compressed Natural Gas 68.6 gCO2e/MJ

Liquefied Natural Gas (Imported & domestic averaged) 83.1 gCO2e/MJ

Corn Ethanol (Midwest dry/wet mill / CA dry mill) 90.9 gCO2e/MJ

Gasoline 95.0 gCO2e/MJ Diesel 95.3 gCO2e/MJ

Electricity (CA average electricity mix) 124.1 gCO2e/MJ

Hydrogen (NG + liquefaction, re-gasification) 142.2 gCO2e/MJ [EPA-HQ-OAR-2010-0162-1758.1, p.2]

EIA data and studies such as the CARB well to wheels effort represent data sources which could be employed to approximate the total emissions of vehicles for compliance under the HD rule. Failing to consider life-cycle emissions will result in suboptimal emissions reductions under the HD rule. [EPA-HQ-OAR-2010-0162-1758.1, p.3]

Organization: American Council for an Energy-Efficient Economy (ACEEE)

The agencies propose treating electric vehicles as zero emissions vehicles for purposes of the standards (p.74364). ACEEE and others commented on potential adverse effects of treating electric vehicles as zero emissions vehicles in the 2010 light-duty fuel economy and GHG emissions rule. These adverse effects, including the loss of the incentive to maximize the energy efficiency of electric vehicles and the net increase in total GHG emissions due to non-electric vehicles' ability to emit more, apply equally to the heavy-duty vehicle sector. The standards should instead account for full fuel-cycle emissions from these vehicles, adjusted as needed to reflect the fact that the standards for gasoline and diesel vehicles apply to 'in-use' emissions only. [EPA-HQ-OAR-2010-0162-1894.1, pp.23-24]

Organization: POP Diesel

As for considering the complete life cycle emissions of a fuel, I believe that a vehicle or engine manufacturer should have to provide data to you on the complete life cycle emissions for any fuel that the manufacturer certifies its vehicle or engine to operate on. The complete life cycle includes the cost of mining petroleum or coal; planting, fertilizing, and harvesting biological feed stock such as vegetable oil-bearing plants; transporting the petroleum or vegetable oil feedstock to the refinery; refining it; transporting it to the dispensing station or facility; and combusting it in the engine (tailpipe emissions). The complete life cycle includes the benefit of the amount of greenhouse gasses that the feed stock takes out of the atmosphere, which should be subtracted from the total cost enumerated in the preceding sentence. In the case of petroleum and coal, this benefit would be zero. In the case of biofuels, this benefit would be quite high. [EPA-HQ-OAR-2010-0162-1897.1, p.2, of supplemented letter]

The absence of consideration of the complete life cycle emissions of fuel in your analysis of alternatives is a fundamental omission, if the goal of your proposed regulations is actually to reduce net greenhouse gas emissions. Efficiency gains are chimeric if they rely on fossil fuel consumption, be it petroleum or coal used to produce electricity to power engines. [EPA-HQ-OAR-2010-0162-1897.1, p.1, of main letter]

Organization: Energy Future Coalition

Finally, this position runs counter to EPA's formal policy – set just last year after full notice-and-comment rulemaking – that upstream GHG emissions will be included in vehicle compliance calculations. In establishing the current light-duty GHG standards, EPA required that vehicles have "compliance values calculated according to a methodology that accounts in full for the net increase in upstream GHG emissions."3 75 FR 25436. EPA's justification was that "[t]here is a rational basis for EPA to account for this net difference, as that best reflects the real world effect on the air pollution problem we are addressing." Id. [EPA-HQ-OAR-2010-0162-2116.1, p.4]

By excluding the emissions that "best reflect the real world effect on air pollution," the proposed HD National Program has the perverse effect of favoring vehicles that will result in greater GHG emissions over vehicles that have lower emissions. EPA should follow logic (and its own policy) and allow inclusion of the upstream GHG emission benefits in its compliance methodology. [EPA-HQ-OAR-2010-0162-2116.1, p.4]

Organization: American Trucking Associations, Inc. (ATA)

Fuel-efficient tires need to improve wear rates such that our industry is not adversely impacting the environment by way of putting more casings into landfills and increasing natural resource use and fuel consumption in manufacturing their replacements. For example, wide base single tires have shown poor tread wear in tighter turning conditions of urban operations. This may result in higher wear out rates if the rule encourages the use of wide base single tires in these types of operations. When measuring efficiency improvements, it must be done with consideration of cradle-to-grave costs and consequences. [EPA-HQ-OAR-2010-0162-2263.1, p.7]

Few disciplines are as unforgiving as tire design. Engineer a tire for maximum grip and it may wear too rapidly; specify rubber that will deliver the best fuel economy and it may impact traction. With about 25 million new truck tires sold in the U.S. every year, extending the useful life of fuel-efficient tires not only represents a substantial savings of natural and synthetic rubber, but also reduces the fuel consumption and GHG emissions associated with production of their replacements. [EPA-HQ-OAR-2010-0162-2263.1, p.7]

Organization: Bridgestone

Retreadability of various tires cited in the EIS needs to be studied. Some tire types may not be able to be retreaded as many times as other tire types. Bridgestone Americas recommends that NHTSA and the EPA conduct a total life cycle analysis study to fully understand the environmental impacts of:

Tires with various performance levels, and any trends discovered using data from recommendation #1. Retreadability of various tire options cited in the EIS.

We highly recommend the use of a globally recognized total cycle analysis such as ISO14040:2006 and ISO 14044:2006. Bridgestone Americas is willing to support and participate in any way we can. [EPA-HQ-OAR-2010-0162-2120.1, p.4-5]

Response:

The proposal solicited comment on the handling of upstream GHG emissions. Some commenters argued that EPA should maintain its traditional focus in mobile source rulemakings on vehicle tailpipe emissions and leave the consideration of GHG emissions from upstream fuel production and distribution-related sources such as refineries and power plants to EPA regulatory programs that focus specifically on those sources. Others argued that, since EPA accounts for upstream GHG emissions in its benefits assessments, the agency should reflect upstream GHG emissions impacts (as well as other life cycle emissions impacts such those from tire production and scrappage) in vehicle compliance values as well. After considering these comments, we have decided to maintain consistency with past practice for setting vehicle emissions standards under Clean Air Act section 202(a)(1), whereby we treat all vehicles equally, based on tailpipe-only emissions performance. The agencies recognize that the 2012-2016 light-duty vehicle standards partially modified this approach in considering upstream emissions associated with electrification in the event certain sales volumes of electric vehicles are surpassed. We also recognize that the ongoing EPA/NHTSA rulemaking to reduce GHGs and fuel consumption in MY 2017 and later light-duty vehicles is also further examining this issue, and may yield information and policy direction relevant to the planned follow-on rulemaking for the heavy-duty sector.

16.5.3. Hybrid Regulatory Flexibilities

Organizations Included in this Section:

Eaton Corporation
Engine Manufacturers and Truck Manufacturers Associations

Organization: Eaton Corporation

We believe that requiring OBD in the current Rule will stall commercialization of Medium Duty and Heavy Duty hybrids. Eaton recommends that the Agencies provide Heavy Duty hybrid vehicles with exemption from all OBD requirements until the 2020 model year. Future regulatory opportunities will provide the Agencies with the opportunity to re-evaluate HD hybrid market viability and technology solutions for OBD in 2016 to determine if additional OBD lead time is required for the 2018 rulemaking. [EPA-HQ-OAR-2010-0162-1649.1, p.13]

• Heavy Duty hybrids and Heavy Duty OBD are evolving in parallel – Heavy Duty OBD phase-in needs to be complete before HD hybrid impacts on OBD can be assessed;

• Heavy Duty hybrid system manufacturers do not manufacture engines or have access to OBD system data;

• OBD “Infrastructure” for hybrids e.g. J1939 messages, engine and Heavy Duty system communication protocols, does not exist;

• Hybrid suppliers and OEM’s need time to address HD hybrid system effects on full HD engine OBD performance. [EPA-HQ-OAR-2010-0162-1649.1, pp.13-14]

Manufacturers already have a strong commercial incentive to hold fuel consumption low throughout the life of a vehicle. Adding costly regulatory-driven sensors and diagnostics is a cost burden without a benefit. OBD requirements are incompatible with the current stage of commercialization and development of HD hybrids in that Heavy Duty hybrid is an emerging technology in an industry that is not vertically integrated. [EPA-HQ-OAR-2010-0162-1649.1, p.14]

We request that the Agencies provide the time necessary for the Heavy Duty hybrid vehicle market to evolve rather than having OBD requirements put Hybrid adoption at risk. [EPA-HQ-OAR-2010-0162-1649.1, p.14]

Hybrid Warranty

The proposed rule states that hybrid systems have to meet the same warranty and performance standards that exist in the rule for other regulated components. However, little is known about the long term performance of battery and hybrid sub-components since commercial availability in low volume production did not begin until late 2007. Therefore, we suggest the Agencies defer this requirement until the next rule making in 2018 to provide the time necessary to evaluate the useful life requirements and use this opportunity to collect hybrid system performance data over time. In the meantime the manufacturers will provide normal commercial warranties to their products. The Agencies and industry should work together to address these issues before the next rulemaking in 2018. [EPA-HQ-OAR-2010-0162-1649.1, p.14]

We ask that the Agencies consider including Plug-in Hybrid Vehicles (PHEV) in the Final Rule as they represent the natural product bridge between HEV and All Heavy Duty Electrical Vehicles (EV) and are now being introduced in low volume production into the market. [EPA-HQ-OAR-2010-0162-1649.1, p.14]

Organization: Engine Manufacturers and Truck Manufacturers Associations

Given the advanced and developing nature of hybrid vehicle technology, and the Agencies' desire to incentivize its commercialization and acceptance in the heavy-duty vehicle marketplace, the Agencies must not apply all of the elements of the traditional criteria pollutant control program to GHG/FE standards. In particular, the durability of various hybrid system components has not been proven and many of those components will not have the same durability and robustness as basic engine components. As such, the GHG/FE standards for hybrid systems should not be subject to the same useful life periods as those for heavy-duty engines. Similarly, manufacturers should not be required to conduct a durability demonstration and establish a DF for hybrid components. Instead, the Agencies should specify an additive DF of 'zero,' or a multiplicative DF of 'one,' for engines used in HD hybrid powertrains, as well as for associated hybrid system components. [EPA-HQ-OAR-2010-0162-1940.1, p.31]

In the Preamble, the Agencies note that they are not proposing GHG/FE emission standards based on the mandated use of hybrid powertrain technologies or on a specified hybrid vehicle penetration rate. (See 75 FR at 74156.) EMA and TMA agree. The high up-front cost of hybrid vehicles and the lack of consistently available tax credits or other financial incentives currently make hybrids prohibitively expensive for many MD and HD vehicle customers. Consequently, any requirements in the GHG/FE final rule that would mandate the purchase of hybrid technologies would not be feasible or workable. [EPA-HQ-OAR-2010-0162-1940.1, p.30]

However, hybrid technologies do have the potential to significantly reduce GHG emissions and improve fuel efficiency. As such, the final rule should provide incentives for hybrid technologies in order to help spur the market for such advanced technologies. Incentives are a critical component to developing a sustainable market for hybrids. Thus far, incentives have been restricted to federal tax credits and various state and local funding programs designed to seed the market with hybrids. However, the inconsistency with respect to funding availability on a state or regional level has forced customers to delay or forego purchases. [EPA-HQ-OAR-2010-0162-1940.1, p.30]

Even when incentives are available for customers to purchase a hybrid vehicle, those incentives have little impact on the significant manufacturing costs associated with hybrids, including development, validation, testing, certification and warranty costs. Accordingly, and in addition to purchaser-directed incentives, manufacturer-directed incentives in the form of increased regulatory flexibility, and relief from certain regulatory obligations, also are needed to accelerate the development and deployment of hybrid technologies in the HD vehicle market. [EPA-HQ-OAR-2010-0162-1940.1, p.30]

Response:

The agencies received comments from engine manufacturers, hybrid system manufacturers, and related trade groups which broached concerns regarding the feasibility of applying on-board diagnostics to hybrid applications starting in 2013. The commenters stated that engine manufacturers would need several years to adapt their engine OBD systems to hybrids, and therefore requested a delay of OBD requirements for hybrid applications until 2020 with a phase-in of enforcement liability starting that same year. Details, which the agencies believe have merit, are set out below. In response, EPA is taking an approach that is consistent with certain provisions of the existing final action for heavy-duty OBD, finalized in 2009. To that end, manufacturers who certify hybrid systems will continue to have the responsibility of implementing compliant diagnostic systems, however, we are extending the OBD phase-in for engines with hybrid systems to allow time for manufacturers to be able to address communication protocol development concerns (e.g. SAE J1939, communication with diagnostic scantools), component development concerns (e.g. hardware and software), and to address the availability of heavy-duty OBD compliant engines with sufficient lead-time for additional hybrid diagnostic system development given resource constraints as engine manufacturers are focused on meeting the 2013 requirements for conventional products at this time.

Since publication of the NPRM, the EPA has undertaken extensive outreach to hybrid manufacturers, engine manufacturers, and related industry groups to further understand the technical issues involved with the implementation of full OBD on engine-hybrid systems.[83] Hybrid manufacturers have indicated that the interaction between hybrid systems and OBD compliant engines is not well understood at this time, for example, if the system shuts down the vehicle at idle (as is common), the OBD idle diagnostics cannot run. In addition, there are many different hybrid systems being developed which make much of this technology both immature

[83] See EPA Docket EPA-HQ-OAR-2010-0162 for memos describing meetings held as a part of this outreach.

and low volume, and engine manufacturers are concerned that this will result in high costs due to frequent design changes that could occur as this technology develops and have asked for flexibility for unique hybrid applications. Consistent with the goal to incentivize the development of hybrid designs (systems designed to capture wasted energy and reduce fuel consumption) the EPA is allowing hybrid manufacturers time to develop their systems while simultaneously developing the capability to meet HD OBD requirements.

Communication protocol development is an integral part of developing hybrid OBD capability for the heavy-duty industry which is not vertically integrated. There are different protocols required to be used for OBD communication in a vehicle depending on the type of engine (gasoline or diesel). These protocols are developed in part to standardize the transmission of electronic signals and control information among vehicle components. The J1939 communication protocol is developed by committee through SAE and is required for use with diesel engines. J1939 defines communications messages, diagnostic messages for communications between a module and diagnostic scantool, and fault codes. Messages sent through a J1939 network contain a series of information (e.g. an identifier, message priority, data, etc.) and these parameters must be agreed upon through the SAE committee and tailored to work for all manufacturers. The development of this communication protocol includes developing criteria for the messages, and determining a single set of fault codes that can work for all manufacturers and all hybrid system configurations; this is expected to take a substantial amount of time and collaboration. OBD cannot exist without fault codes to report, therefore development of this protocol is critical. Hybrid manufacturers have stated that until such time as a ‘plug and play scheme’ is available, hybrid volumes will not be able to increase significantly. At this time, there are only a few such messages that have been developed for use in hybrid systems, and there is much additional development that needs to take place. The type of messages needed must first be identified once 2013 HD OBD compliant engines are available for use in HD hybrid OBD system development. After needed messages are identified, the content of each message must be developed and agreed upon through a ballot process. Manufacturers have stated that this will be an iterative process and will likely take at least two years to develop the protocol for use with different variations of hybrid systems and architectures, different types of energy storage systems, and for systems used in the wide variety of applications in the heavy-duty market, and we agree with this assessment. While a level of communication exists today between engines and transmissions for this industry, the level of control and impact on engine system operation becomes much more significant once hybrid technology is introduced. The purpose of the hybrid energy system is to supplement overall vehicle power demands. As such, the methods used for integrating the energy from the hybrid system into overall vehicle operation vary from allowing additional internal combustion engine lower power operation to potentially decreasing the amount of engine “on” time. This range of performance impacts will serve to reduce GHG emissions by reducing demands on the engine. Conventional transmission systems and other powertrain components do not exercise the level of control the hybrid will need to exercise to effectively reduce GHG emissions and improve fuel consumption performance for internal combustion engines; therefore, hybrid OBD systems can reasonably be expected to be more complicated as well.

Component development concerns raised by hybrid manufacturers include both changes that may be required to software and/or hardware systems on both existing hybrid products and on hybrid systems currently under development. Software systems in existing products have been developed that provide proprietary diagnostic capability (as no standardized system such as J1939 had been developed for these systems), however, these software systems are not OBD complaint. These products will likely require entirely new software systems developed for them which may result in hardware changes as well. Manufacturers have stated that a complete software system can take up to 2 years to develop and validate. Hardware may also need to be changed to accommodate OBD on hybrid systems. In particular, hardware changes would affect current production systems which may not have controllers that can support full OBD. The low volume sales and high cost of a controller program (which can reach into the millions of dollars) means that most companies cannot justify the cost of a hardware change for hybrids alone, rather, existing hybrid systems will have to wait until such a hardware upgrade is planned for other reasons. In addition, new hardware programs, such as developing a new ECU can take 3-4 years to complete. While it is possible for some of this work to be done concurrently, how much can be done this way is dependent on the configuration of each individual system. Finally, manufacturers may have contractual agreements with hardware and software suppliers that will have to be reconfigured to address a complete OBD program.

Hybrid manufacturers have stated that they will be unable to produce hybrid systems that will be OBD complaint in 2013. Given the concerns discussed above and the general lack of availability of OBD compliant engines until the completion of the HD OBD phase-in, to require manufacturers of systems that depend on the availability of those OBD compliant engines to then be able to immediately implement additional requirements may be impractical or infeasible in many instances. Given the phase-in of HD OBD requirements that already exists however, we do not believe a delay to 2019 or 2020 is warranted. While not all of the engines that would potentially have hybrid systems incorporated into their design are available in their final OBD configuration at the time of this action, it is clear that some engine systems will be available. Additionally, there is an expectation that engine manufacturers, their suppliers and customers will have to continue to work cooperatively to deliver products for the market. This cooperation must include a level of concurrent engineering prior to products being brought to market. At this time we believe a delay to 2016 for the phase-in of OBD for heavy-duty engines equipped with hybrid systems should provide the requisite lead time from the date of this action to the date of implementation for development of components and protocols necessary for successful integration of complete OBD systems for engines equipped with hybrid systems.

Manufacturers will be required to implement feasible controls for these hybrid systems that do not adversely impact emissions performance in 2013 and by 2016-17, all systems must be fully compliant with OBD requirements. The phase in period takes into account that current production systems are likely to be smaller in terms of sales volumes than newly developed systems, and may require more hardware and software development as some of these systems have been in production for nearly a decade and have developed a proprietary system diagnostic capability that does not meet OBD requirements. Therefore, this extended phase-in provides them an additional year of time to comply with the heavy-duty OBD regulations. Hybrid systems put into production after January 1, 2013 will be required to meet the 2009 heavy-duty OBD requirements in 2016 consistent with the next phase-in date for heavy-duty OBD, while those hybrid systems released prior to January 1, 2013 have until 2017 to be compliant with these OBD requirements.

If a manufacturer certifies an engine-hybrid system with CARB OBD in California prior to the required phase-in date (2016 or 2017), and its diagnostics meet or exceed the requirements for full 2013 OBD, the manufacturer must either use the CARB certified package for Federal release or phase in the package and certify it with full EPA OBD.

In the interim, engine system diagnostics must show that they meet or exceed CARB's Engine Manufacturer Diagnostic Systems Requirements (EMD) including system monitoring requirements for NO_X aftertreatment, fuel systems, exhaust gas recirculation, particulate matter traps, and emission-related electronic components.[84] Specific EMD requirements will be considered met if they are redundant due to the installed engine's fully functioning OBD content. Most manufacturers have already certified their engines with EMD for the 2011 model year, and full OBD as required in 2013 exceeds EMD requirements, therefore no new cost burden is expected as a result of this provision. In addition, new engines may be introduced in 2013 for hybrid-only use and, in lieu of meeting full OBD, meeting EMD would result in cost savings because of the flexibility in scan-tool reporting and diagnostic content.

In addition, the engine-hybrid system must maintain existing OBD capability for engines where the same or equivalent engine (e.g. displacement) has been OBD certified. An equivalent engine is one produced by the same engine manufacturer with the same fundamental design, but that may have no more than minor hardware or calibration differences, such as slightly different displacement, rated power, or fuel system. Though the OBD capability must be maintained, it does not have to meet detection thresholds and in-use performance frequency requirements; for example, a manufacturer may modify detection thresholds to prevent false detection.

As stated earlier, existing hybrid systems sold today have proprietary diagnostic capability that is non-OBD compliant, but nonetheless will notify the driver of potential problems with the system. Hybrid manufacturers must also continue to maintain this existing diagnostic capability to ensure proper function consistent with the performance for which the hybrid system is certified as well as, safe operation of the hybrid system.

Finally, during the interim part of the phase-in, manufacturers that are not fully-OBD compliant must also submit an annual pre-compliance report to the EPA for model years 2013 and later. The engine manufacturers must submit this report with their engine certification information. Hybrid manufacturers that are not certifying the engine-hybrid systems must also submit an annual pre-compliance report to the EPA. The report must include a description of the

[84] California Air Resources Board, Final Regulation Order for EMD, Section 1971 of Title 13, California Code of Regulations, effective December 30, 2004. Available here; http://www.arb.ca.gov/regact/emd2004/fro.pdf

engine-hybrid system being certified and related product plans, information as to activities undertaken and progress made by the manufacturer in achieving full OBD certification including monitoring, diagnostics, and standardization; and deviations from an originally certified full-OBD package with engineering justification.

16.5.4. Other

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Recommendation (publicly available compliance data): Publish an annual report describing manufacturer credit balances within each compliance category and the use of any credit flexibility mechanisms, such as advanced and innovative technology credits. [EPA-HQ-OAR-2010-0162-1894.1, p.5]

Response:

The Agencies recognize the importance of transparency to help ensure effective implementation of the compliance program so the Agencies and the public can both have confidence that the reductions anticipated in the rulemaking accrue. The Agencies will work to develop practical methods to make non-confidential information generally available for public consumption.

Organization: California Air Resources Board (ARB)

ARB staff urges the agencies to establish a program for sleeper cab tractors that would incentivize the use of technologies that reduce thermal load, such as improved cab insulation, reflective window coatings, insulated curtains, etc. By reducing the thermal load on such vehicles, less energy would be required to maintain a comfortable temperature within the cab during rest periods, which would reduce fuel consumption and emissions of both greenhouse gases and criteria pollutants. Additionally, it would also drive the penetration of cleaner idle-reduction technologies, such as battery-powered APUs, thermal energy storage systems, etc., which have only seen limited application in the past due to their relatively limited cooling and/or heating performance. [EPA-HQ-OAR-2010-0162-2354.1, p. 7]

Response:

The Agency welcomes innovation and the use of advanced technology to achieve greater greenhouse gas emission reductions and improved fuel consumption performance. To that end, the Agency has provided for additional incentive for the use of Advanced Technology Credits, as well as Innovative Technology Credits which have the intent of providing an additional incentive for those market participants that choose to innovate to achieve reductions beyond those technologies that the Agency identifies as readily available. The advanced technologies include hybrid systems, as well as engines equipped with Rankine cycle strategies, all electric vehicles, and fuel cell vehicles. For those technologies which offer improvements and benefits that are not currently reflected by or included in the existing test cycles, manufacturers may choose to obtain innovative technology credits.

Organization: Hasenour, Stephen R.

These standards should be dependent on the number of hours that an engine operates in a given period of time. For example, stationary engines (such as the one that we own) that drive generators used for emergency backup and electrical load peak shaving should be exempt if they are run under a certain number of hours per year. As I understand the proposed regulations, engines on generators used strictly for emergency backup are exempt. However, if they are over a certain size and are used to lower demand by the utility during peak periods, they are not exempt. Many of these generators are used a very limited number of hours per year, yet they serve a critical need in avoiding expensive infrastructure that would need to be put into place by the utilities if they were not available. They may only run less than 1% of the time, making their contribution to air pollution miniscule compared to the amount of polution (and expense) that would be necessary to construct the additional plant and equipment infrastructure necessary to fill their void. If the regulation is allowed to stand as proposed, many of these units would have to be taken out of service, creating very negative global consequences. I don't believe those who created the proposed rules took this aspect into consideration and were proposing the rules primarily to apply to engines that run on regular basis such as those used in trucks and construction equipment. The proposed regulations need to exempt those engines that only run a small percentage of the time. Some common sense needs to prevail here. [EPA-HQ-OAR-2010-0162-1515-cp, p.1]

Response:

The agency is regulating GHG emissions from on-highway engines and vehicles in today's action. The stationary engines mentioned by the commenter are not included in today's action and therefore do not have any requirements due to this HD National Program.

Organization: Institute for Policy Integrity

The agencies are not proposing air conditioning efficiency credits, a credit system for the uncovered air conditioning emissions from vocational vehicles, or credits for those who exceed the air conditioning leakage standards. They should consider all these options. [EPA-HQ-OAR-2010-0162-1895.1, p.13]

Response:

EPA did not propose indirect emissions credits for improvements to air conditioning (A/C) efficiency due to the complexity of the heavy-duty market, which makes it difficult to estimate with any degree of precision what the actual impact of indirect emissions are across the vastly different applications and duty cycles of heavy-duty trucks. Also, indirect A/C emissions from vocational vehicles and combination tractors are very small relative to total GHG emissions from these vehicles. EPA did, however, request comment on the applicability of an indirect emissions credit for A/C system efficiency improvements specifically in the heavy-duty pickup trucks and vans, as they are most closely related to light-duty counterparts that have an indirect emissions credit program established under the light-duty GHG rule, and it is likely that the light duty and heavy-duty vehicles can share components used to improve the A/C system efficiency and reduce indirect A/C emissions. Commenters did not provide a convincing rationale for taking on the added complexity of a credit program for indirect A/C emissions, involving as it would additional vehicle testing to exercise A/C systems in a way that accounts for (modest) real world benefits. We also did not receive comments on how to adjust the fleet average CO_2 target standards to reflect expected A/C efficiency improvements similar to the approach used in the light duty rule. EPA expects to reconsider this potential source of GHG reductions in its future HD GHG rulemaking action.

The agency is also not adopting an A/C credit program for improvements made to vocational vehicle air conditioning systems. While the technology solutions to control HFC leakage from vocational A/C systems are the same as for combination tractors determining the regulated party and creating the appropriate regulatory structure for vocational vehicles creates a number of problems. The A/C systems for vocational vehicles may be installed at a number of different steps through the manufacturing process quite likely by different manufacturing entities the majority of which are likely to be small businesses already exempted from the regulation. Given the difficulty to determine the regulated entity and the high likelihood that the entity will be a small business exempted from the regulations at this stage, we have concluded that the incremental reductions in HFC emissions that might be realized through regulation of vocational vehicle A/C systems is likely to be quite small in comparison and not worth the additional regulatory complexity necessary to effectively control this segment. EPA intends to continue to study the best ways to regulate the incredibly diverse vocational truck market and will revisit this decision in a future rulemaking action.

Finally, the agency is not adopting a credit program for those who exceed the A/C leakage standards because it would add unnecessary complexity to the program with little benefit to manufacturers. Any benefits in allowing such credits in the fleet average CO_2 would be mitigated by the fact that the corresponding fleet average fuel consumption standard would still have to be met without benefit of these EPA-only credits. Benefits from allowing such credits only for HFC leakage compliance also do not justify the added complexity of calculating and tracking such credits, as manufacturers did not show that the modest changes in A/C system design needed to meet the leakage standard cannot be made for all affectd vehicles by the 2014 model year[, with the exception of low-capacity systems for which are adopting a gram per year alterantive to the proposed percentage-based standard].

Organization: National School Transportation Association (NSTA)

Additionally, as indicated above, school buses already help conserve energy by taking cars off the road. We recommend that the agencies consider developing credits for fuel savings and GHG reductions associated with (1) improved efficiency in how buses are used or (2) for future net increases in school bus usage. For any documented net increase in school bus efficiency or ridership, manufacturers should be given credit for the fuel saved and GHG emissions reduced as a result of fewer cars on the road. For example, at current rates of usage, an increase of 10,000 in the total number of school buses on the road translates to 360,000 cars taken off the road and 48 million gallons of fuel saved. Similarly, if average ridership can be increased so more cars are taken off the road, those savings should be factored into the rule. While we recognize the difficulty of calculating and documenting those benefits, we believe they are real and need to be encouraged. We would be happy to work with manufacturers and the agencies in developing such a crediting mechanism. Such an approach not only improves national fuel economy and reduces GHG emissions, but provides a powerful economic incentive to promote safety through increased school bus use. [EPA-HQ-OAR-2010-0162-1751.1, p. 3]

Response:

The HD National Program regulates the GHG emissions and fuel consumption from new heavy-duty vehicles and engines. The agency recognizes many opportunities exist to improve the GHG emissions from existing vehicles in-use, however, these are outside the scope of our clean air act regulatory authority. Instead, EPA will continue to expand and develop the SmartWay transportation program to help reduce fuel consumption and GHG emissions from existing as well as new vehicles in use.

Organization: Parker Hannifin Corporation

Parker Hannifin believes the demand for more fuel efficient technologies will be driven by the fleet owners. The Proposed Regulatory Flexibility Provisions in Section IV of this proposed rule do not offer strong incentives for fleet owners to try innovative technology. Fleet owners cannot generate credits for employing fuel efficiency measures. We believe that if the rule is truly attempting to develop innovative fuel reduction technology, there should be incentives beyond emission credits (tax credits, preferred status for government contracts, grants, etc.) for fleet operators that pioneer new fuel efficient vehicle concepts. These incentives should be tied to the technology a fleet chooses and be dependent on reductions in fuel consumption and emissions. To receive these incentives each year a fleet must report their fuel consumption to EPA and NHTSA. These reports will allow EPA and NHTSA to verify the real world reduction in fuel consumption and emissions, benefiting both the government and the fleets. [EPA-HQ-OAR-2010-0162-2405-cp, p.1]

Response:

The HD National Program regulates the GHG emissions and fuel consumption from new heavy-duty vehicles and engines. The agency recognizes many opportunities exist to improve the GHG emissions in-use, however, these are outside the scope of this program.

Organization: Institute for Policy Integrity

For example, the agencies should broaden the use of credits, but should be careful to avoid awarding undeserved windfalls, such as by treating electric vehicles as producing zero emissions. Though such improvements could enhance the net benefits of the regulations, the proposed program in its current form is still cost-benefit justified, as social benefits alone should likely be sufficient to outweigh technology costs. [EPA-HQ-OAR-2010-0162-1895.1, p.1]

Response:

The agencies agree that certain restrictions on use of ABT which were proposed are unnecessary. The proposed ABT program for engines was somewhat more restrictive, in its definition of averaging sets, than EPA's parallel ABT program for criteria pollutant emissions from the same engines. The final rule conforms to the ABT provisions for GHG heavy duty engine emissions to be consistent with the parallel ABT provisions for criteria pollutants with same weight engines treated as a single averaging set regardless of the vehicles in which they are installed. We have applied this same principle with respect to combination tractors and vocational vehicles: treating like weight classes as an averaging set. The agencies have determined that these additional flexibilities will help to reduce manufacturing costs further and encourage technology implementation without creating an unfair advantage for manufactures with larger portfolios including engines and vehicles. EPA's experience in administering the ABT program for heavy duty diesel engine criteria pollutant emissions supports this conclusion. Therefore, the agencies have decided to allow credit averaging within and across vocational vehicle and tractor subcategories within the same weight class groups, as well as credit averaging across the same weight class vocational and tractor engine groups. This added flexibility beyond what was proposed in the NPRM will not be extended to the HD pickup truck and van category because this group of vehicles is comprised of only one subcategory and is not broken down like the other categories and corresponding subcategories into different weight classes, and the standard applies to the entire vehicle, so that there are no separate engine and vehicle standards. In essence, the HD pickup truck and van category is one large averaging set that will remain as proposed.

However, the agencies are maintaining the restrictions against averaging vehicle credits with engine credits or between vehicle weight classes or engine subcategories. EPA and NHTSA believe that the use of credits beyond these designated averaging sets could create an advantage that currently does not exist in the market for large integrated manufacturers. For example, a manufacturer that produces both engines and heavy-duty highway vehicles could mix credits across engine and vehicle categories to gain an advantage over competitors that are not integrated. Limiting credit ABT to within each engine averaging set and not allowing it between engines and vehicles will help prevent a competitive advantage due solely to the regulatory structure.[85] Similarly, large volume manufacturers of engines could shift credits between heavy heavy-duty diesel engines and light heavy-duty diesel engines to gain an advantage in one subcategory over other manufacturers that may not have multiple engine offerings over several regulatory engine subcategories. Finally, relating credits between averaging sets would be problematic because of the diversity of applications involved. This diversity creates large differences in the real world conditions that impact lifetime emissions -- such as actual operating life, load cycles, and maintenance practices. In lieu of conducting extensive and burdensome real world tracking of these parameters, along with corrective measures to provide some assurance of parity between credits earned and credits redeemed, averaging sets provide a reasonable amount of confidence that typical engines or vehicles within each set have comparable enough real world experience to make such follow-up activity unnecessary._The agencies believe this approach will ensure that CO_2 emissions are reduced and fuel consumption is improved in each engine subcategory without interfering with the ability of manufacturers to engage in free trade and competition. Again, EPA's experience in administering its ABT program for criteria pollutant emissions from heavy duty diesel engines confirms these views. The agencies also note that no commenter offered an explanation of why the restrictions on this ABT program should differ from the parallel ABT program respecting criteria pollutants. As part of the planned follow-up rulemaking, the agencies intend to re-evaluate the appropriateness of the ABT averaging sets and credit use restrictions we are adopting here for the HD GHG and fuel consumption programs.

After considering the comments on electric vehicle emissions, we have decided to maintain consistency with past practice for setting vehicle emissions standards under Clean Air Act section 202(a)(1), whereby we treat all vehicles equally, based on tailpipe-only emissions performance. The agencies recognize that the 2012-2016 light-duty vehicle standards partially modified this approach in considering upstream emissions associated with electrification in the event certain sales volumes of electric vehicles are surpassed. We also recognize that the ongoing EPA/NHTSA rulemaking to reduce GHGs and fuel consumption in MY 2017 and later light-duty vehicles is also further examining this issue, and may yield information and policy direction relevant to the planned follow-on rulemaking for the heavy-duty sector.

[85] These concerns were not present in the 2012-2016 MY light-duty vehicle rule, where most manufacturers offer diverse product lines because there are no separate vehicle and engine standards (with differing manufacturers of each) and there is not as much disparity among vehicle useful lives. That rule consequently does not restrict CO_2 credit trading opportunities between light-duty vehicle sectors.

17. Certification, Compliance, and Regulations

17.1. Compliance, Vehicle or Engine Certification

Organizations Included in this Section:

Volvo Group
Engine Manufacturers and Truck Manufacturers Associations

Organization: Volvo Group

EPA's rule must maintain a level playing field during the transition to new emissions standards, and must ensure technology is introduced into the marketplace expeditiously, taking into account transition needs

Volvo Group believes that the intent of both the Clean Air Act and EPA's existing guidance is to ensure there is a level playing field among vehicle and engine manufacturers subject to new emissions standards during a transition period. Additionally, the Act and the guidance are intended to ensure that the introduction of new engines into the market is not unnecessarily delayed, while taking into account the need by manufacturers for flexibility in transitioning to often complex new technologies. While Volvo Group maintains that the existing guidance clearly specifies the illegality of stockpiling practices, certain manufacturers have not heeded the Agency's policy or the requirements of the Clear Air Act. In addition to bolstering its enforcement against such manufacturers, EPA should unambiguously repeat in the rule that inventory and stockpiling practices allowing a manufacturer to gain a competitive advantage through the sale of older engines, regardless of the manufacturer's intent, is illegal. Likewise, EPA should clarify that the sale of vehicles with older, higher-emitting engines is not permitted where such sale will significantly undermine the market for new engines that comply with current-year standards. [EPA-HQ-OAR-2010-0162-1812.2, p.19]

These principles are in keeping with the spirit and intent of the Clean Air Act, which requires manufacturers who are unable to introduce compliant technologies due to technological challenges to pay nonconformance penalties (NCPs) designed to remove any competitive advantage they might realize by continuing the sale of older engines. The statute requires that EPA establish such NCPs through a rulemaking that ensures the penalties are "increased periodically in order to create incentives for the development of production vehicles or engines which achieve the required degree of emission reduction" and which "remove any competitive disadvantage to manufacturers whose engines or vehicles achieve the required degree of emissions reductions…" CAA § 206(g), 42 U.S.C. § 7525(g). As Congress further noted: [EPA-HQ-OAR-2010-0162-1812.2, p.19]

In developing this formula, the Administrator is given some flexibility for the penalty to vary by pollutant and by class of vehicle or engine. However, the formula must be such as will reflect the degree of nonconformity, create incentives for compliance with the revised standards, and prevent competitive disadvantage for manufacturers which do meet revised standards. The Committee does not intend to encourage non-compliance with the revised standards. For example, if a manufacturer opts to pay the penalty and to design or tune the vehicle or engine to higher emission levels, the nonconformance penalty would probably be inadequate and should be revised. - H.R. Rep. No. 95-924, 95 Cong. House Report 294, 276. [EPA-HQ-OAR-2010-0162-1812.2, pp.19-20]

Thus, where flexibility is provided under the Statute, Congress was unequivocal that such flexibility may not create a competitive advantage or undermine efforts by companies to introduce compliant technologies. Left unchecked, a manufacturer's stockpiling practices could have precisely the effect Congress intended to avoid. [EPA-HQ-OAR-2010-0162-1812.2, p.20]

With the increasing stringency of new emissions standards for heavy-duty diesel engines, engine manufacturers are employing more complex, more expensive engine technologies. For instance, due to their increased cost, engines that complied with the latest 2010 emission limits were less desirable from a cost standpoint in 2010 than less expensive 2009 engines – thus creating an incentive for manufacturers to stockpile older engines, and a disincentive for them to introduce new ones. Vehicle manufacturers that prepared for timely introduction of 2010 technology, therefore, were placed at a competitive disadvantage compared to manufacturers that delayed introduction and relied on continued sale of 2009 engines for a longer period of time. [EPA-HQ-OAR-2010-0162-1812.2, p.20]

Moreover, the mere hint of availability of 2009 engines generated a chill in market demand for 2010 engines, with customers refusing to place orders for the new technology as long as they knew the older technology was still available. As a result, vehicle and engine manufacturers offering 2010 technologies were forced to discount their engines significantly to generate interest from customers while still suffering from a dearth of sales early in 2010. EPA's failure to timely enforce its anti-stockpiling policy, therefore, was precisely the opposite of what the Clean Air Act envisions – it resulted in the imposition of a penalty on the technological leader as opposed to the laggard. In addition, although all manufacturers will eventually have to transition to using 2010 engines at some point – and thus the manufacture of vehicles using 2009 engines is temporary – the operation of these engines will continue for many years. As such, excessive stockpiling, although temporary, resulted in considerable additional emissions when total emissions over the lifetime of the engine are considered. [EPA-HQ-OAR-2010-0162-1812.2, p.20]

In a previous proposal, EPA attempted to codify the stockpiling prohibition by focusing primarily on the practices of individual manufacturers, and their "normal inventory." See 74 FR 44442,44527-28 (August 28, 2009) If EPA continues with this approach, the Agency should use this opportunity to clarify what it intends by this term through the use of objective standards that will apply equally to all manufacturers. Use of a "normal inventory" standard absent objective standards as to what constitutes normal inventory has created some uncertainty for manufacturers who are, in good faith, attempting to implement new technologies as rapidly as possible. Without a clear understanding of how to account for variables such as changes in market demands, unforeseen production disruptions, and other unpredictable factors, manufacturers will be left guessing as to what constitutes acceptable "normal inventory" in marginal situations. Volvo Group recommends that EPA enunciate a standard that applies equally to all manufacturers, and sets a presumption as to whether stockpiling has occurred. Manufacturers who are truly unable to meet the standard should then be permitted to rebut this presumption by demonstrating to EPA that they meet certain clearly defined criteria. [EPA-HQ-OAR-2010-0162-1812.2, pp.20-21]

Volvo Group believes that in an emissions-change year (such as in 2010), most vehicle manufacturers will require additional time to transition to new standards, but can reasonably be expected to complete this task within the first quarter. As such, the installation of previous year engines in vehicles prior to March 31 of the year new standards take effect represents a reasonable transition period. Likewise, the installation of previous year engines after March 31 should be presumed to be stockpiling, and should only be permitted upon a demonstration by the manufacturer that such relief is necessary, taking into consideration factors addressed below. [EPA-HQ-OAR-2010-0162-1812.2, p.21]

In considering whether a manufacturer's continued manufacture of vehicles with previous year engines after March 31 constitutes stockpiling, EPA should consider the following factors:

- Whether the installation and sale of engines have a significant impact on the demand for new engines, and thus harm the market for these engines;

- Whether the manufacturer gains a competitive advantage by selling older engines, regardless of the manufacturer's intent;

- Whether the need for the engines is based on circumstances beyond the control of the vehicle manufacturer and were not reasonably foreseeable or avoidable;

- Whether the manufacturer has actively marketed the availability of older engines meeting earlier standards; and

- Whether the manufacture of vehicles with previous year engines after March 31 represents a significant portion of the manufacturer's total annual production, taking into account possible changes in market conditions and demands in the first quarter. [EPA-HQ-OAR-2010-0162-1812.2, p.21]

Through this approach, Volvo Group believes that EPA can achieve both certainty for the industry with respect to what is required of it and a single objective standard that applies equally to all manufacturers, while preserving the ability of manufacturers facing true transition hurdles to obtain relief. [EPA-HQ-OAR-2010-0162-1812.2, p.21]

EPA's previous proposal tied the model year of the engine to the model year of the vehicle for purposes of determining whether a stockpiling event has occurred. This approach does not make sense in light of the substantial variation among manufacturers in how vehicle model years are determined. This variability renders the vehicle's model year less meaningful for purposes of determining whether a previous year engine has been appropriately installed in a given vehicle. Moreover, it will create unnecessary confusion, since most vehicles will have model years that begin well in advance of January 1, and therefore can legitimately contain previous model-year engines. A much simpler and straightforward approach would be to regulate the installation of previous-year engines based on the vehicle's actual build date. EPA must make it clear that it is not necessary for a vehicle to use an engine of the same model year as the vehicle model year. For purposes of defining a vehicle's build date, and for sake of consistency with other federal regulations, Volvo Group recommends EPA define the vehicle build date as the date at which a vehicle meets the definition of an "incomplete vehicle," as set forth in Department of Transportation regulations. See 40 CFR § 565.12(f). [EPA-HQ-OAR-2010-0162-1812.2, p.22]

As EPA previously confirmed, the prohibition on stockpiling applies to both the vehicle manufactures and engine manufacturers. Volvo Group considers this to be a fundamental component of any antistockpiling policy, and the success of such policy depends on addressing both types of manufacturers. This is especially true in the context of GHG regulation, which more clearly implicates both engine and vehicle manufacturers. However, such a policy should apply for all emissions standards. [EPA-HQ-OAR-2010-0162-1812.2, p.22]

As noted, EPA previously proposed language codifying the stockpiling provisions. With some modification, Volvo Group believes this language can be workable. Taking into consideration the concepts set forth above, Volvo Group suggests adoption of that language as modified below. We believe this language captures and codifies the intent of EPA's existing guidance, while simultaneously providing manufacturers with clarity and direction regarding illegal stockpiling practices. [EPA-HQ-OAR-2010-0162-1812.2, p.22]

§85.2306 Inventory and stockpiling provisions related to new emission standards for heavy-duty engines.

(a) If new heavy-duty emission standards apply in a given engine model year, a new vehicle manufactured in that same engine model year must be powered by an engine that is certified to the new standards, except that a vehicle manufacturer may use up its inventory of prior model year engines that were built before the date of the new standards. The engine and vehicle manufacturers must not build up an inventory of prior model year engines in excess of the vehicle manufacturer's production lead time requirements. The vehicle manufacturer's production lead time requirements may accommodate the quantity of engines associated with the manufacturer's prevailing vehicle production build rates, plus a quantity of engines as necessary to accommodate a manageable changeover of manufacturing processes to install engines certified to the new standard within a reasonable transition period. Neither the vehicle nor the engine manufacturer may avoid compliance with the new standards through the stockpiling and installation of the prior model year's engines beyond the reasonable transition period, except that a vehicle manufacturer may continue to install up to 1,000 of the prior model year's engines after the reasonable transition period regardless of the installation date. If emission standards do not change in a given model year, a vehicle manufacturer may install engines from the previous model year without restriction. Note that the prohibition in this paragraph (a) does not apply to vehicles certified to vehicle-based standards that include an integrated engine. [EPA-HQ-OAR-2010-0162-1812.2, pp.22-23]

(b) The Administrator may permit an extension beyond the reasonable transition period only if the manufacturer can demonstrate that circumstances exist that render completion of the manufacturing changeover within the reasonable transition period infeasible or impractical. The Administrator shall generally find the extended transition period permissible only if:

(i) The continued installation of prior model year engines will not result in a significant impact to the environment,

(ii) The continued installation of prior model year engines is limited to the extent necessary under the circumstances

(iii) the continued installation of the prior model year engines does not substantially displace new model year engines that would otherwise be sold into the market by any manufacturer, and

(iv) other manufacturers are not put at a significant competitive disadvantage [EPA-HQ-OAR-2010-0162-1812.2, p.23]

(c) A heavy-duty engine manufacturer may not knowingly cause or otherwise aid a vehicle manufacturer to fail to comply with paragraph (a) of this section. [EPA-HQ-OAR-2010-0162-1812.2, p.23]

(d) Exemptions from certification requirements are described in subpart R of this part and apply as appropriate to this section. [EPA-HQ-OAR-2010-0162-1812.2, p.23]

Organization: Engine Manufacturers and Truck Manufacturers Associations

The proposed selection of engine families aligns with the engine families that are used in connection with the regulation of criteria pollutants under 40 CFR Part 86. That alignment is an efficient and workable approach for GHG emissions. However, the proposed provisions for selecting vehicle families in §1037.230 is unworkable, as it would potentially require manufacturers to certify more than 100,000 families per vehicle sub-category. The need for customization in the commercial vehicle marketplace dictates that manufacturers offer a tremendous number and variety of possible vehicle configurations available for purchase. For example, for one sub-category, the number of sub-families may be the number of aerodynamic bins in which the manufacturer sells vehicles (up to 5), times the number of weight reduction options (up to 28), times the number of idle reduction options (2), times the number of vehicle speed limiter settings (up to 11), times the number of drive tire makes and models offered (dozens), times the number of steer tire makes and models offered (dozens). [EPA-HQ-OAR-2010-0162-1940.1, pp.14-15; This comment can also be found at section 6.b.i of this comment summary]

The Preamble estimates that vehicle manufacturers' burden from the proposed testing, reporting and recordkeeping requirements will be 25,052 hours per year, spread across 35 manufacturers, or approximately 700 hours per manufacturer per year. (See 75 FR 74357.) That estimate of approximately 113 of a person at each manufacturer to address the reporting requirements is totally inconsistent with the incredible number of vehicle families' for which reporting would be required. In fact, for engine certification alone, manufacturers already employ multiple people to address engine-related certification reporting. If the Proposed GHG/FE Standards require certification reporting based on the proposed method of selecting vehicle families, the resulting burden on manufacturers will make it impossible to implement the rule. [EPA-HQ-OAR-2010-012-1940.1, p.15]

More specifically, the vehicle certification program that the Agencies have proposed (see 75 FR at 74387, et seq.) will require a veritable mountain of paperwork, without any corresponding benefit. Specifically, the Agencies would require certification applications for each family of vehicles, in a program where manufacturers must identify all sub-families, yet cannot take credit for emission reductions except with respect to the worst vehicle in the family. At the same time, because of the stringency of the Agencies' standards, the Agencies have created a program where manufacturers will have to certify all sub-families separately. And, even if a manufacturer chooses not to certify some sub-families, the manufacturer must still describe each one in its certification application. The net result will be tens of thousands of certification documents with no new or relevant information added by any of them. This unreasonable burden will be further compounded by having both Agencies receive, review, and approve each manufacture's voluminous submissions. Thus, the likely outcome from this aspect of the Agencies' proposal will be unwarranted expense, potential errors, and unacceptable delays in the processing and issuance of certifications -- an outcome that could easily jeopardize the· viability of the Proposed GHG/FE Standards. [EPA-HQ-OAR-2010-0162-1940.1, p.15]

The Agencies must develop a greatly simplified vehicle certification procedure. That procedure should specify that families may be as large as the vehicle sub-categories, with allowances for a manufacturer to divide a subcategory into smaller families. Further, instead of requiring that the representative (cir parent) configuration have the highest CO_2 emission rate as modeled in GEM, the Agencies simply should require the submission of a minimum number of GEM results that adequately represent the manufacturer's expected production of vehicles in the family. [EPA-HQ-OAR-2010-0162-1940.1, p.15]

That revised simplified approach to selecting vehicle families also should allow for more manageable reporting requirements. For example, the proposed reporting and recordkeeping provisions in §1037.250 require a report of the 'production volume of vehicles you produced in each vehicle family during the model year,' and a report of the production figures for each family by assembly plant. (See 75 FR at 74390.) The proposed provisions further require the manufacturer to '[r]eport the volumes by vehicle configuration, and identify the transmission, axle ratio, and engine in addition to subfamily identifiers.' (See rd.) The requirements for reporting, by assembly plant, the identification of vehicle transmission, axle ratio, and engine, are unnecessary and excessively burdensome and should be deleted, particularly once the vehicle family selection is modified and simplified as recommended above. [EPA-HQ-OAR-2010-0162-1940.1, pp.15-16]

Response:

Selection criteria for vehicle families have been modified since the NPRM to address concerns such as those raised by the commenter. The final rule requires a minimum of one vehicle family per regulatory subcategory, with separate families being required for vehicles utilizing advanced technologies. Manufacturers may create additional families as they deem necessary, although this is not required.

To address the multitude of vehicle configurations, each family can be divided into sub-families, each with a unique GEM inputs and FELs. GEM results for at least ten configurations are required (or all configurations if there are less than 10 in the subfamily). For manufacturers wishing to subdivide families according to each permutation of equipment, batch processing functionality will be available in GEM which will allow a for a spreadsheet of vehicle configurations. GEM will calculate emission results for each configuration and the resulting spreadsheet will be submitted for certification. The agencies do not believe this will place undue burden on manufacturers. The agency did not propose specific stockpiling provisions in the NPRM for this action. We may address commenters' concerns through a future action.

Organization: American Automotive Policy Council

We support a streamlined certification process for the pick-up and van standards that balances testing burden without compromising the precision needed to accurately assess manufacturer performance. [EPA-HQ-OAR-2010-0162-1762.1, Cover Page 2]

EPA has proposed that manufacturers of complete and cab-complete heavy-duty vehicles with gross vehicle weight ratings less than 14,000 pounds be required to comply with the provisions of the light-duty greenhouse gas requirements set forth in 40 CFR Part 86 in order to demonstrate compliance to the proposed heavy-duty CO2 standards. [EPA-HQ-OAR-2010-0162-1762.1, p.11]

We believe that this is an appropriate approach. However, due to the complexity of the current Part 86 (and Part 600) regulations, we do not believe that the proposed regulatory language is sufficient to address the many detailed and intricate questions that will arise with regard to this new regulation. Primary among these questions is the amount of actual heavy-duty vehicle testing that would be required to be performed in order to meet the current Part 86/600 minimum test requirements. [EPA-HQ-OAR-2010-0162-1762.1, p.11]

The light-duty GHG compliance regulations are based on the fundamental CAFE premise of dividing vehicles into model types, base levels, vehicle configurations and sub-configurations and then testing a minimum amount of vehicles based on these subdivisions. Specifically, manufacturers must provide test data that covers a minimum of 90% of production volume by configuration and must also have at least one test in each base level. This results in manufacturers having to supply test data for hundreds of light duty vehicle configurations for each model year. EPA has recognized the enormous test burden that this has placed on the lightduty manufacturers and has developed methods that give the manufacturers the ability to limit the amount of actual tests that need to be performed. One of these methods is analytically derived fuel economy ("ADFE"). Based on differences in test weight, road load horsepower and N/V ratio, the ADFE process allows manufacturers to mathematically adjust the fuel economy data from an actual test performed on one vehicle sub-configuration to represent the fuel economy that would be achieved by another vehicle sub-configuration. However, EPA has placed limitations on the use of the ADFE method for light-duty CAFE and GHG compliance demonstration. [EPA-HQ-OAR-2010-0162-1762.1, pp.11-12]

Using the light-duty subdivision definitions, we estimate that we would be required to maintain and track hundreds of heavy-duty vehicle configurations and, if EPA were to require the same minimum test requirements as light-duty, it could result in up to double the amount of testing that is currently performed for light-duty CAFE and greenhouse gas compliance. We believe that this is an inordinate amount of testing to essentially represent two generic vehicle types, full-size vans and pickups. [EPA-HQ-OAR-2010-0162-1762.1, p.112]

In order to avoid this unwarranted testing burden, AAPC recommends that EPA not use the light-duty vehicle subdivisions or minimum test requirements for heavy-duty GHG compliance. [EPA-HQ-OAR-2010-0162-1762.1, p.12]

We suggest that the minimum test requirement be that the manufacturer must provide at least one set of city and highway tests for the high-volume "work class" within each test group and that they may voluntarily supply any additional "work class" data that may be required to demonstrate compliance to the HD CO2 and fuel consumption standards. Note that "work class" would be a newly defined vehicle subdivision that would apply to heavy-duty vehicles and it would be only loosely based on the current light-duty vehicle sub-configuration definition. In addition, we suggest that EPA allow expanded use of analytically derived CO2 and fuel consumption data within a test group compared to what is currently allowed for light duty CAFE. Implementation of these suggestions would also align the testing burden for class 2b-3 heavy-duty vans and pickups more closely with that of Class 2b-8 HD vocational vehicles and tractors. [EPA-HQ-OAR-2010-0162-1762.1, p.12]

The timing of this rule has not allowed us to thoroughly develop a heavy-duty ADFE methodology. Further investigation and detail development will be necessary to create compliance demonstration methodologies that insure robust compliance with CO2 and fuel consumption requirements without creating an unreasonable testing burden on manufacturers. [EPA-HQ-OAR-2010-0162-1762.1, p.12]

AAPC recommends that EPA and NHTSA collaborate with stakeholders to develop an appropriate methodology for the determination of tested configurations and the calculation of fleet compliance for complete and cab-complete Class 2b-3 vans and pick-up trucks. AAPC further recommends that EPA and NHTSA collaborate with stakeholders to determine the appropriate calculation methods for and rules for applicability of analytically derived CO2 and fuel consumption values for complete and cab-complete Class 2b-3 vans and pick-up trucks. [EPA-HQ-OAR-2010-0162-1762.1, p.12]

The preamble to the rule contains some factually incorrect information with respect to emissions warranties. Regarding vocational vehicles, it states that the emissions warranty 'covers the failure of emission related components for the useful life of the vehicle.' [See NPRM at 74277]. Elsewhere, EPA indicates that a manufacturer's emissions warranty 'must ensure that the vehicle remains in this configuration throughout its useful life.' [See NPRM at 74273]. These statements are not accurate. First, the warranty period for heavy-duty vehicles is not the 'useful life' of such vehicles. CAA sections 207(a) and 207(i) make it clear that for MY 1995 and later vehicles, the warranty period is set forth in regulations promulgated by the Administrator. Under 40 CFR Part 86, EPA has established a 5 year/50,000 mile warranty period for heavy duty engines. In the final rule EPA should clarify that 5 years/50,000 miles is the warranty period for heavy-duty engines, and not the useful life. [EPA-HQ-OAR-2010-0162-1762.1, p.13]

Response:

The commenter was correct in pointing out these errors. They have been corrected for the final rule.

Organization: American Automotive Policy Council

Second, EPA's emissions warranties do not require manufacturers to 'ensure that the vehicle remains in 'this configuration' throughout its useful life,' or for any period of time. Manufacturers are not in a position to ensure that the hundreds of thousands of vehicles they sell remain in any particular configuration after they are out in the field. Once a vehicle is sold, the purchaser owns the vehicle and has the right to make modifications to it. CAA section 203 prohibits the owner from tampering with the vehicle in a way that would compromise the emissions control system. If a vehicle owner does tamper with a vehicle in violation of CAA 203, this would likely be grounds for a manufacturer to deny an emissions warranty claim, but it would not constitute a violation on the part of the manufacturer. [EPA-HQ-OAR-2010-0162-1762.1, p.14]

Response:

The commenter was correct in pointing out these errors. They have been corrected for the final rule. Evaporative Emission Standards [EPA-HQ-OAR-2010-0162-1762.1, p.22]

Organization: American Automotive Policy Council

Inclusion of All Test Results in Application for Certification [EPA-HQ-OAR-2010-0162-1762.1, p.22]

EPA proposes that, for the purposes of demonstrating compliance with evaporative emission standards, that manufacturers "…Report all test results, including test results from invalid tests or from any other tests, whether or not they were conducted according to the test procedures of subpart F…" (proposed 40 CFR 1037.205(n), NPRM at 74388; emphasis added). This represents a new and burdensome requirement. Although AAPC recognizes that EPA provides for manufacturers to report less information (See40 CFR 1037.201(c)), this is at the agency's sole discretion. [EPA-HQ-OAR-2010-0162-1762.1, p.22]

In addition, the proposed 40 CFR 1037.243(b) states, in part, that an "…emission family is deemed not to comply if any vehicle representing the family has test results showing emission levels above any of the standards in § 1037.103, with or without deterioration factors…" (NPRM at 74390; emphasis added). This provision, combined with the required conclusion of all test results including those deemed invalid, places a manufacturer at greatly increased risk depending on a Designated Compliance Officer's interpretation of these two requirements. AAPC believes that it is not the intent of the agency to potentially deny certification based on the results of testing which does not meet the criteria for inclusion as a valid certification test. [EPA-HQ-OAR-2010-0162-1762.1, p.22]

Accordingly, AAPC recommends the following changes to the proposed regulatory text, which will remove ambiguity and reduce the amount of paperwork which must be submitted to the agency at the time of certification: [EPA-HQ-OAR-2010-0162-1762.1, p.23]

40 CFR 1037.205(n) [EPA-HQ-OAR-2010-0162-1762.1, p.23]

Present evaporative test data to show your vehicles meet the evaporative emission standards we specify in subpart B of this part, if applicable. Report ~~all~~ valid certification test results, ~~including test results from invalid tests or from any other tests, whether or not they were~~ conducted according to the test procedures of subpart F of this part. We may ask you to send other information to confirm that your tests were valid under the requirements of this part and 40 CFR part 86. [EPA-HQ-OAR-2010-0162-1762.1, p.23]

Response:

Regulatory language has been updated with the commenters concerns in mind.

Organization: American Automotive Policy Council

40 CFR 1037.243(b) [EPA-HQ-OAR-2010-0162-1762.1, p.23]

Your evaporative emission family is deemed not to comply if ~~any vehicle representing the~~ ~~family has~~ valid certification test results ~~showing~~ exceed the emission standard levels ~~above any of the standards~~ in ~~§ 1037.103~~, with or without deterioration factors… [EPA-HQ-OAR-2010-0162-1762.1, p.23]

Response:

We plan to address evaporative emissions standards in a subsequent regulatory action.

Organization: American Automotive Policy Council

40 CFR 1037.243(b) – also acceptable [EPA-HQ-OAR-2010-0162-1762.1, p.23]

Your evaporative emission family is deemed not to comply if any vehicle representing the family has valid certification test results showing exceed the emission standard levels above any of the standards in § 1037.10340 CFR § 86.1810 or § 86.1816, where applicable, with or without deterioration factors… [EPA-HQ-OAR-2010-0162-1762.1, p.23]

Response:

We plan to address evaporative emissions standards in a subsequent regulatory action.

Organization: American Automotive Policy Council

In the proposed 49 CFR 535.8(c)(2), NHTSA specifies that pre-certification compliance reports must identify the final fuel consumption standards and final production volumes. [EPA-HQ-OAR-2010-0162-1762.1, p.24]

The required pre-certification compliance report is, by definition, submitted prior to building any vehicles. Although manufacturers will have planned volumes and expected fuel consumption values, "final" fuel consumption standards and production volumes cannot be provided until after the close of the model year. [EPA-HQ-OAR-2010-0162-1762.1, p.24]

Response:

This section has been revised to reflect the fact that such values are projections rather than final values pre-certification.

Organization: American Automotive Policy Council

Non-Compliance Penalties [EPA-HQ-OAR-2010-0162-1762.1, p.24]

NHTSA and EPA penalty provisions for the medium- and heavy-duty greenhouse gas and fuel consumption programs should be coordinated. [EPA-HQ-OAR-2010-0162-1762.1, p.24]

AAPC believes that the regulatory text pertaining to non-compliance penalty provisions should be modified to clearly state that both agencies will coordinate any civil penalty action such that a manufacturer will not be held to civil penalties by both agencies for the same infraction. Such a provision would protect manufacturers from a double jeopardy penalty situation. [EPA-HQ-OAR-2010-0162-1762.1, p.25]

Response:

Both NHTSA and EPA are charged with regulating medium-duty and heavy-duty trucks; NHTSA regulates them under EISA and EPA regulates them under the CAA. Both agencies also have compliance review and enforcement responsibilities for their respective regulatory requirements. The same set of underlying facts may result in a violation of EISA and a violation of the CAA. The agencies recognize the above concerns, and intend to address them through appropriate consultation. The details of the consultation and coordination between the agencies regarding enforcement will be set forth in a memorandum of understanding to be developed by EPA and NHTSA.

Organization: American Council for an Energy-Efficient Economy (ACEEE)

Recommendation (heavy-duty "Trends" report): Publish an annual report describing vehicles and engines sold, including fuel efficiency and GHG performance and the use of technologies.

The rule should require the preparation of an annual report similar to EPA's publication "Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends." The report would allow the tracking of the success of the program and would enhance public understanding of actual technology adoption. [EPA-HQ-OAR-2010-0162-1894.1, p.4]

In other to ensure the transparency in the implementation of the standards, certification and compliance information should be compiled by the agencies and made available to the public. Efforts to improve the reporting of corresponding information for light-duty vehicles are already underway. [EPA-HQ-OAR-2010-0162-1894.1, p.5]

Response:

The agencies will make every effort to publish such a report on a frequent basis. However, until the practical aspects of the implementation of this rule are fully understood and appropriate resource constraints have been satisfied, we cannot commit to publishing such a report on an annual basis.

Organization: American Trucking Associations, Inc. (ATA)

In February 2009, EPA issued a final rule requiring On-Board Diagnostic (OBD) systems on diesel highway heavy-duty vehicles. The rule requires the emission control systems of large highway diesel and gasoline trucks to be monitored for malfunctions using onboard diagnostic systems similar to those required on passenger cars since the mid-1990s. For highway applications over 14,000 pounds, EPA requires that one engine family per manufacturer be certified to the OBD requirements in the 2010 through 2012 model years. Beginning in 2013, all highway engines for all manufacturers will have to be certified to the OBD requirements. [EPA-HQ-OAR-2010-0162-2263.1, pp.9-10]

In 2010, the federal government requires these "detection sensors" indicate when emissions reach five times the acceptable level. In 2013, that threshold gets ratcheted down to three times the acceptable level – with the thresholds continuing to drop through 2019. CARB wants to speed up that timetable, hence the debate between EPA and CARB. [EPA-HQ-OAR-2010-0162-2263.1, p.10]

The current OBD schedule is already an aggressive schedule for OEM's to meet. To add another element into the current OBD platform at this time would be costly to design and difficult to achieve, if even practical. [EPA-HQ-OAR-2010-0162-2263.1, p.10]

While the agencies do not "anticipate the necessity of having any unique on-board diagnostic provisions" to wrap in GHG emissions, ATA requests the agencies include language in the final rule confirming that the OBD requirements will not be expanded to include GHG emissions. In addition, ATA further requests EPA and CARB agree to exclude the monitoring of GHG's from any future OBD requirements in California as well. [EPA-HQ-OAR-2010-0162-2263.1, p.10]

In the Agencies preamble, OBD requirements are discussed and comments invited regarding the Agencies approach. The Agencies note that consistent with the light duty vehicle GHG rule, they believe that monitoring of components and systems for criteria pollutant emissions will have an equally beneficial effect on CO2 emissions. Therefore, the Agencies do not anticipate the necessity of having any unique onboard diagnostic provisions for heavy-duty GHG emissions. Daimler agrees with the Agencies rationale that OBD requirements beyond those already established are not necessary. Existing OBD rules require thorough monitoring of virtually every system and component used by manufacturers for emissions control including emissions critical inputs from the vehicle to the engine control system. Effectively the OBD system monitors the same elements that ensure normal efficient engine operation. Therefore it follows that the Agencies not require additional OBD features in its rulemaking either for the engine or for the vehicle. [EPA-HQ-OAR-2010-0162-1818.1, p.29]

Response:

No additional and/or unique OBD requirements related to GHG emissions have been finalized for this final rule.

Organization: American Trucking Associations, Inc. (ATA)

Penalty Provisions Should not be Duplicative

EPA's and NHTSA's penalty provisions are duplicative. Both agencies should not be allowed to penalize a manufacturer for the same act of non-compliance. Given the bifurcation of the proposed rule into separate engine and vehicle requirements, a tractor having engine and vehicle deviations could face anywhere from two to four separate violations if both EPA and NHTSA were to both pursue their enforcement actions. [EPA-HQ-OAR-2010-0162-2263.1, p.15]

ATA was pleased to read in the Preamble that it is not the intent of either agency to impose duplicative civil penalties and that each agency "intends" to give consideration to civil penalties imposed by the other. ATA urges the agencies to include definitive language in the final rule regarding the imposition of non-duplicative civil penalties for non-compliance. [EPA-HQ-OAR-2010-0162-2263.1, p.15]

Response:

Both NHTSA and EPA are charged with regulating medium-duty and heavy-duty trucks; NHTSA regulates them under EISA and EPA regulates them under the CAA. Both agencies also have compliance review and enforcement responsibilities for their respective regulatory requirements. The same set of underlying facts may result in a violation of EISA and a violation of the CAA. The agencies recognize the above concerns, and intend to address them through appropriate consultation. The details of the consultation and coordination between the agencies regarding enforcement will be set forth in a memorandum of understanding to be developed by EPA and NHTSA.

Organization: ArvinMeritor, Inc.

The Simulation program has been “streamlined” to require only a limited number of input parameters. A number of the vehicle parameters that can affect fuel efficiency and emissions have been assigned “standard values.” The approach allows OEMs to group model variations into a fewer categories, thereby limiting the total number of certifications that must be submitted. The reduced complexity makes the certification process more manageable for the OEMs. As will be discussed later, however, there are some downsides to this more simplified approach. [EPA-HQ-OAR-2010-0162-1605.1, p.2]

Response:

No response is necessary.

Organization: Bendix Commercial Vehicle Systems LLC (Bendix)

Certainly, Bendix recognizes that the agencies were purposefully vague so as to permit them maximum discretion and latitude when innovative technologies are submitted to them for review and credit eligibility. In lieu of a definition, which, we concede, would be limiting and potentially counterproductive, at a minimum, therefore, the agencies should prescribe a specific process/procedure in the final rule by which innovative technologies can be submitted for eligibility review and consent. Having a process outlined will provide a clear path for all involved parties to follow. This way, suppliers, OEMs, engine manufacturers, and, indeed, the regulators themselves can have confidence in a uniform process to manage the eligibility review for “unconventional” innovative technologies. [EPA-HQ-OAR-2010-0162-1888.1, p.6]

A suggested approach is for the agencies to provide a formal means for suppliers to submit technical justification directly to the agencies. Successful review of the data would lead to some form of provisional certification for the technology. This evaluation process would need to be conducted only once, even if multiple OEMs eventually include the innovative technology in their vehicle certification packages. [EPA-HQ-OAR-2010-0162-1888.1, p.6]

It is recognized that the agencies may not be receptive to the idea of "certifying" technologies separate from a complete vehicle certification. Providing a forum for suppliers to present the technical justification would at least allow the agencies to become familiar with a technology prior to submission by the OEM's in the vehicle certification package, which should facilitate and accelerate the approval process. [EPA-HQ-OAR-2010-0162-1888.1, p.6]

To allow the agencies to gage industry interest in a proposed innovative technology, the supplier/owner of the technology could be asked (or required) to present letters from one or more OEMs that expresses OEM interest in the technology. Such informal endorsements would be an indication that there is indeed sufficient interest in a technology to warrant a detailed review. [EPA-HQ-OAR-2010-0162-1888.1, p.6]

Bendix urges that agencies consider these alternate approaches for certifying "innovative technologies." [EPA-HQ-OAR-2010-0162-1888.1, p.6]

Response:

We agree with Bendix that there may be circumstances in which such technical evaluations outside of the normal certification process. However, because such evaluations would be outside of the normal certification process, we do not believe that formal regulatory text is necessary at this time.

Organization: BlueGreen Alliance

Given the complexity of these vehicle classes, the agencies should implement a program as part of the final rule to collect data, actual vehicle configurations sold and their performance as estimated by simulation modeling, which will provide information required to develop a full-vehicle program in the future. This should include developing and refining test cycles that more accurately reflect actual drive cycles for medium- and heavy-duty trucks. [EPA-HQ-OAR-2010-0162-2117.1, p.3]

Response:

To the degree that manufacturers sub-divide their vehicle families, the Agencies will collect information regarding individual vehicle configurations and their associated modeled GHG emissions. This will be done both at the time of certification (with estimated sales volumes) as well as after the end of the model year (with actual sales volumes).

Organization: Center for Biological Diversity

The Agencies have also requested comments on the size of the fines to be set for noncompliance. Notably, they have reported that in the context of the light duty vehicle market, over the years some manufacturers have consistently chosen to pay fines rather than comply with the nation's mileage standards. Fines that are insufficiently high to prevent non-compliance fail to promote the statutory intent. Thus, they should be set at levels that exceed a reasonable estimate of what manufacturers must spend to comply with the standards. [EPA-HQ-OAR-2010-0162-2506.1, p.13]

Response:

The agencies are adopting provisions whereby fines can be paid for non-compliance but only as a last step if compliance cannot otherwise be achieved. In the final rule, provisions are adopted requiring manufacturer's to plan for each engine and vehicle family to meet or exceed the applicable standard in each regulatory subcategory when applying for certificates of conformities. If the manufacturer finds that during the course of the model year several model types within certain families are tested and found to have test results exceeding the category standards, the EPA and NHTSA ABT programs offer flexibilities for resolving any credit deficits with credits gained in subsequent model year for up to three years. However, anytime a manufacturer has a verified credit deficit in any of its regulatory categories at the end of the model year, the agencies will meet with the manufacturer at the beginning of the next model year and review its plan for resolving the deficit from the prior model year. If after the third model year, the manufacturer cannot resolve its credit deficits through earned or traded credits, then it will be subject to penalties for non-compliance.

Organization: Clean Air Task Force (CATF)

We acknowledge that if EPA were to set standards under this rule-making which require more than a token number of hybrids, it would need to change the proposed certification procedures for vocational trucks. The current proposal relies on simulation modeling to certify compliance of these vehicles with CO2 standards, but EPA's proposed GEM simulation model does not simulate hybrids. However, EPA has proposed alternative test methods to generate credits for hybrids under ABT; with some refinements these methods could be used to certify all vocational vehicles. [21] [EPA-HQ-OAR-2010-0162-2734.1, pp.9-10]

Furthermore, appropriate certification procedures for vocational trucks would allow the standards to capture additional savings of 3-5% from weight reduction and improved transmissions. [EPA-HQ-OAR-2010-0162-2734.1, p.10]

Similarly, EPA has seemingly chosen simplicity over accuracy in designing its testing and certification procedures for the proposed MY 2014-18 HD program. While this has some advantages in terms of ease of implementation and minimizing the burden on manufacturers, it also has significant disadvantages. The most significant disadvantage is that the proposed vehicle certification procedures cannot measure the effects of some significant approaches to increase efficiency, especially for vocational trucks. These approaches include hybridization and other advanced drive train technologies such as advanced transmissions, engine down-sizing, optimization of transmission and rear end gear ratios, and weight reduction. Because the proposed certification procedures cannot measure the effects of these approaches the proposed standards will not mandate or even encourage their adoption. [EPA-HQ-OAR-2010-0162-2734.1, p.11]

Thus, while EPA proposes to certify Class 2b pick-ups and vans using full vehicle chassis testing (consistent with certification of light duty vehicles), it proposes to rely on simulation modeling for certification of other heavy duty vehicles, both combination trucks and vocational trucks. This approach is reasonable for combination trucks, since the majority of efficiency gains for these trucks will come from reduced rolling resistance, improved aerodynamics, more efficient conventional engines, and to a lesser extent weight reduction and idle reduction. All of these approaches are relatively easy to model. [EPA-HQ-OAR-2010-0162-2734.1, p.11]

---

[21] EPA discusses three potential options for HD hybrid certification. We prefer the first option (chassis dynamometer evaluation), although we believe that the third option (post-transmission power pack-testing) could be adopted utilizing the chassis test cycles and cycle weightings proposed for the first option. The second option (pre-transmission power-pack testing) is inappropriate as it cannot be used for post-transmission systems or other advanced drivetrain technologies. 75 Fed. Reg. at 74256-57. See also, EPA and NHTSA, Draft Regulatory Impact Analysis, “Proposed Rulemaking to Establish Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles,” EPA-420-D-10-901(October 2010), at 3-30—3-41. [EPA-HQ-OAR-2010-0162-2734.1, p.10]

Response:

We believe that provisions relating to vehicles with innovative or advanced technologies afford enough flexibility for manufacturers seeking recognition for technologies which provide a significant GHG emissions reduction. Concurrently, we also believe this represents a relatively small subset of vehicle families and it is unnecessary to impose a burdensome test requirement for vehicles utilizing conventional GHG reducing technologies. The use of comparison testing allows the agencies to assess performance benefit associated with various technology options not currently represented by the GEM approach.

Organization: Cummins, Inc.

The Agencies propose the use of existing criteria pollutant certification test cycles for GHG/FC certification. Specifically, they propose that the steady-state SET will be used to evaluate tractor engines, and the transient FTP cycle will be used to evaluate vocational engines. As shown in the Cummins paper “Framework for the Regulation of Greenhouse Gases from

Commercial Vehicles"6, these test cycles correlate well to the real-world duty cycles of engines in tractors and vocational vehicles and are appropriate. [EPA-HQ-OAR-2010-0162-1765.1, p.19]

Cummins agrees with the Agencies' position that there should be no additional OBD monitors required for GHG/FC. [EPA-HQ-OAR-2010-0162-1765.1, p.21]

The standards were set without considering the impacts of Infrequent Regeneration Adjustment Factors (IRAFs). Cummins agrees with the Agencies that there already exist sufficient incentives for manufacturers to limit regeneration frequency. For these reasons, we agree with excluding IRAFs. [EPA-HQ-OAR-2010-0162-1765.1, p.22]

In the Preamble, the proposed regulation excludes IRAFs. Consistent with the HD engine program, Cummins requests that the Agencies include specific regulatory language noting that IRAFs are excluded when determining compliance to the standards for HD pickups and vans. [EPA-HQ-OAR-2010-0162-1765.1, p.35]

The regulatory framework for hybrids will have significant implications for the development and adoption of hybrid technology. Cummins has worked with the Agencies and a broad group of stakeholders to develop our comments. In particular, we worked with Daimler on hybrid certification issues and are in alignment on the following comments in Section VI. [EPA-HQ-OAR-2010-0162-1765.1, p.35]

The Agencies provide for a 2% compliance margin to be used for Selective Enforcement Audits (SEA) and in-use testing. The primary justification given by the Agencies for including the compliance margin is to address measurement system variation (see Draft Regulatory Impact Analysis (RIA) 3.1.2.3). The data provided in Table 3-1 of the RIA represents the measurement variation of single engines run across two laboratories. Inclusion of the compliance margin illustrates that the Agencies realize that variation is a significant issue which must be addressed, but Cummins believes that an important source of variation was not considered. Only facility-to-facility and measurement system variation was included. Cummins believes it is appropriate to also consider the effects of engine-to-engine variation. A compliance margin of 2% may not be sufficient. Cummins commits to work with the Agencies in order to develop a compliance margin that considers all relevant variation sources in order to achieve a standard that is reflective of existing product and measurement system capabilities. [EPA-HQ-OAR-2010-0162-1765.1, p.22]

As proposed, the compliance margin discussed above only applies to CO2, not CH4 and N2O. However, there is significant uncertainty and measurement system variation associated with these constituents. It is important that a compliance margin for CH4 and N2O also be included in the rule, and Cummins will work with the Agencies to develop an appropriate level. [EPA-HQ-OAR-2010-0162-1765.1, pp.22-23]

In the Preamble, the Agencies propose that HD engines with similar hardware and emission characteristics throughout their useful life may be grouped together in families including “parent” and “child” ratings for the purposes of compliance demonstration and certification, consistent with current criteria pollutant certification procedures (see 75 FR 74263-74264). The Agencies also propose the same criteria for the selection of the parent rating for GHG/FC as that of criteria pollutants. However, unlike the criteria pollutant regulations where child ratings are subject to compliance testing, the Agencies are proposing that for CO2 and fuel consumption, only the parent rating be subject to this testing. The Agencies explain that this is for administrative convenience in dealing with the difficulties that arise from the lower child ratings in a family having higher CO2 and fuel consumption levels than the parent when reported on a brake specific basis. The higher brake specific CO2 and fuel consumption levels of child ratings result from the combination of lower brake work in the denominator of the emissions calculation and the more dominant impact of friction and pumping losses on the lower ratings. [EPA-HQ-OAR-2010-0162-1765.1, p.26]

Cummins recognizes the challenges in dealing with child ratings in the GHG/FC program. However, to ensure robust certification and compliance, the Agencies must subject child ratings to compliance testing. Cummins will work with the Agencies and industry to evaluate approaches to setting standards for child ratings that could be used for compliance testing. [EPA-HQ-OAR-2010-0162-1765.1, p.26]

The Agencies propose that the families chosen for certification to the proposed GHG/FC standards be the same as the families chosen for certification to the criteria pollutant requirements. Since the standards for the criteria pollutants are the same for the FTP as they are for the SET, Cummins and other manufacturers combine current vocational and tractor ratings into the same families. However, the GHG/FC proposal has different standards for engines used in vocational applications than for engines used in tractor applications. As a result, there will be a desire on the part of manufacturers to split vocational and tractor applications. Requiring a common family structure will therefore likely result in the creation of many more families, unnecessarily increasing a manufacturer's testing and administrative burden. [EPA-HQ-OAR-2010-0162-1765.1, p.26]

Allowing families for criteria pollutants to be independently set from families for GHG/FC will provide manufacturers needed flexibility without compromising the effectiveness of either program. Cummins will work with the Agencies and industry to consider this approach. [EPA-HQ-OAR-2010-0162-1765.1, p.27]

Cummins is keenly interested in the vehicle speed limiter (VSL) and idle shutdown timer as these elements of the vehicle program will be handled by the engine. [EPA-HQ-OAR-2010-0162-1765.1, p.30]

The Agencies should change the regulatory language to clarify that the VSL and idle shutdown trims should be tamper-resistant rather than tamper-proof. [EPA-HQ-OAR-2010-0162-1765.1, p.30]

Cummins proposes that the trim for tire size remain outside the OEM password umbrella. Not allowing fleets to reset tire size at the time of tire replacement would result in increased service costs and potentially increased GHG/FC if only OEMs could access this trim. [EPA-HQ-OAR-2010-0162-1765.1, p.30]

For some time, there has been an interest by fleet customers to make the vehicle speed signal tamper-resistant, and anti-tampering algorithms have been put in place to support this desire. Due to insufficient leadtime to redevelop these algorithms, the Agencies should consider the current anti-tampering feature functionality sufficient. [EPA-HQ-OAR-2010-0162-1765.1, p.31]

Often during times of fuel price spikes, fleets choose to reduce the VSL. To facilitate this fleet flexibility and enable a GHG/FC reduction post-build, Cummins proposes that vehicle speed remain trimmable by the fleets at a value set below the VSL. [EPA-HQ-OAR-2010-0162-1765.1, p.31]

The markets served by the commercial vehicle industry are extremely diverse in nature, leading to the need for significant original equipment manufacturer (OEM) flexibility in setting up electronic features. OEMs need access for setting appropriate trims for managing the VSL and idle shutdown, otherwise significant supply chain issues could be created through an increase in inventory and part numbers. The Agencies should allow tamper-resistant trims to be managed by the vehicle OEM. This would include protecting the trims via a password used by the OEM. [EPA-HQ-OAR-2010-0162-1765.1, p.30]

Presently, there exists the capability for fleets to allow drivers a temporary increase in the VSL for a short distance or time. This is done to improve safety by limiting road congestion and enabling passing maneuvers. It is recommended that this feature be maintained and that the impacts of utilizing such a feature be accounted for in the GEM. Cummins commits to work with the Agencies in support of developing such flexibility. [EPA-HQ-OAR-2010-0162-1765.1, p.31]

Cummins supports requiring both GHG/FC and criteria pollutants to be measured and regulated using the same method (i.e., either chassis or engine dynamometer certification), consistent with our core principal of building upon and aligning with existing programs. The regulation should not allow for a mixed certification situation where criteria pollutants and GHG/FC are measured on different cycles. This mixed certification creates an unclear situation for certification data with different units (g/bhp-hr and g/mi), cycles and test requirements. [EPA-HQ-OAR-2010-0162-1765.1, p.33]

Additionally, the significantly different operating speed/load zone and hot-to-cold weighting differences in the chassis operation versus that of the engine dynamometer operation create a real opportunity for inconsistent operation between criteria pollutant emissions and GHG/FC controls. This is in contrast to the engine program where the Agencies are specifically aligning GHG/FC and criteria pollutant certification cycles. [EPA-HQ-OAR-2010-0162-1765.1, p.34]

The high cost of hybrid technology has so far prevented widespread application. Given uncertainties in future component costs and fuel costs, predicting future hybrid volume is challenging. However, even optimistic projections suggest that hybrid volumes will be small until at least 2018, as shown in Figure 2. Because volumes are expected to be low, basing GHG/FC standards on hybrid capability would not be appropriate. Hybrid technology has the potential to significantly reduce GHG/FC, and there are a variety of ways the Agencies could encourage the adoption of hybrid technology including credit generation and modifying DF, useful life and OBD requirements. These incentives can play a critical role in encouraging the development of lower cost, HD-appropriate hybrid technology. [EPA-HQ-OAR-2010-0162-1765.1, p.35]

[Figure 2 can be found on page 36 of this comment.]

Assigning additive DFs of zero (or multiplicative DFs of one) for hybrid systems will help promote the introduction of hybrid technology. In § 1037.241, the proposed rule suggests that a DF may need to be applied in cases where performance could be expected to deteriorate – as in the case of a hybrid electric battery. However, while hybrid volumes are low and technology is evolving, requiring a DF for hybrid systems could place a significant burden on manufacturers as this testing is expensive and time consuming. Additionally, ensuring DFs are applied consistently could be challenging for the Agencies as there is not yet consensus on appropriate DF testing for hybrid technology. [EPA-HQ-OAR-2010-0162-1765.1, p.36]

The application of hybrid technology to HD vehicles is relatively new, and manufacturers are still learning how HD cycles will interact with component technologies – particularly in the case of energy storage devices. Requiring the development of a DF test for hybrids would add cost and potentially limit innovative applications of technology. [EPA-HQ-OAR-2010-0162-1765.1, p.37]

The Agencies propose that useful life for engines and vehicles with respect to GHG/FC be set equal to the respective useful life for criteria pollutants. In some cases, this approach could unnecessarily burden hybrid powertrain development with unrealistic requirements. [EPA-HQ-OAR-2010-0162-1765.1, p.37]

Useful life requirements for HD engines are divided into three categories: LHD - 110,000 miles, MHD - 185,000 miles and HHD - 435,000 miles. These requirements are defined in the proposal for vehicles primarily by vehicle mass, as shown in Figure 3 and Figure 4. [EPA-HQ-OAR-2010-0162-1765.1, p.37]

[Figures 3 and 4 can be found on page 37 of this comment.]

For conventional vehicles, this will generally align GHG/FC useful life requirements with engine criteria pollutant useful life requirements. For hybrid powertrains that reduce fuel consumption by downsizing the engine, this could lead to an overly burdensome requirement because the engine is applied to a heavier vehicle than is typical. For example, an 8 liter MHD engine might be applied to a Class 8 vehicle which typically uses HHD engines. However, under the proposal, the MHD engine would have to meet the HHD useful life requirements. This is problematic as the hybrid duty cycle for the downsized engine is less aggressive than is typical for a conventional engine due to torque management by the hybrid system. Meeting more stringent useful life requirements will unnecessarily increase development cost, particularly in the low volumes expected for hybrids in the timeframe of this rule. [EPA-HQ-OAR-2010-0162-1765.1, p.38]

For hybrid powertrains, Cummins proposes following the alternative useful life provision developed for criteria pollutants at § 86.094-21(f). This would allow certification for GHG/FC to an alternative useful life as defined by the useful life of the engine. For example, if a MHD engine were selected for use in a hybrid HHD application, the hybrid useful life would be MHD. Any credits generated would be HHD credits, but the MHD useful life of 185,000 miles would be applied in the calculation of credits. [EPA-HQ-OAR-2010-0162-1765.1, p.38]

This provision would allow manufacturers the flexibility to optimize hybrid powertrains for cost and for fuel consumption and would ensure a consistent approach to credit generation. [EPA-HQ-OAR-2010-0162-1765.1, p.38]

Cummins proposes that the Agencies include language in the GHG/FC rule recognizing the need to delay the introduction of OBD requirements for hybrid powertrains. Hybrid technology has the potential to enable dramatic reductions in GHG/FC. Although OBD for hybrid criteria pollutants may be outside of the scope of this proposed rule, it is important that the Agencies address all potential impediments to the introduction of hybrid technology. [EPA-HQ-OAR-2010-0162-1765.1, p.38]

Current rules require OBD for all HD engines in 2013. Hybrid powertrains are included, meaning that electric motors, power electronics and energy storage components would all be required to meet OBD. Today engine manufacturers have experience with OBD, but hybrid integrators generally do not. Hybrid integrators will have to develop OBD capability, in addition to developing OBD for new components like batteries. Even for engines used in hybrids, additional OBD work will be required because of the differences in hybrid engine duty cycles as compared to conventional engine duty cycles. [EPA-HQ-OAR-2010-0162-1765.1, pp.38-39]

Meeting OBD requires significant development expense, which for conventional powertrains can be spread across a large volume. Hybrid volumes in the timeframe of this rule are likely to be quite low in comparison, resulting in a significant OBD expense per unit. This cost will add to the high price of hybrid technology and discourage its adoption. The added cost will be particularly difficult to manage for hybrid integrators with small volumes. [EPA-HQ-OAR-2010-0162-1765.1, p.39]

Delaying the introduction of OBD for low volume, specialty technologies is not without precedent. OBD for alternative fuel engines has been delayed until 2020. A delay for hybrid OBD will allow more time for hybrid integrators to develop monitors for emerging technologies.

In the future, OBD costs will be spread across a larger hybrid volume. Delaying the introduction of OBD requirements will help encourage the adoption of hybrid technology by reducing development costs. [EPA-HQ-OAR-2010-0162-1765.1, p.39]

A family certification structure would allow manufacturers to avoid proliferation of certifications and reduce development cost while at the same time meeting the Agencies' GHG/FC objectives. A clear definition of hybrid family compliance requirements for parent and child ratings would ensure that all hybrid systems in a family achieve at least a minimum GHG/FC improvement. Cummins will work with the Agencies and industry to develop an appropriate family definition and compliance mechanism that ensures a fair and manageable framework for hybrid parent and child ratings. [EPA-HQ-OAR-2010-0162-1765.1, p.39]

The Agencies have appropriately proposed three different certification options for hybrids. Cummins agrees that all three options should be available but proposes more definition and the use of functionally equivalent cycles (i.e., engine and vehicle FTP) to ensure fair evaluation. [EPA-HQ-OAR-2010-0162-1765.1, p.41]

Although this rule is focused on GHG/FC, there are important interactions between criteria pollutants and GHG/FC which have been well documented in conventional vehicles and hybrids. Given this relationship, a misalignment of certification cycles has the potential for unintended consequences. [EPA-HQ-OAR-2010-0162-1765.1, p.44]

The Agencies' proposal to use the engine FTP and SET cycles for GHG/FC evaluation ensures alignment with the criteria pollutants for conventional engines. However, in the case of hybrids, the Agencies have not aligned GHG/FC and criteria pollutants. The use of a conventionally certified engine will not necessarily ensure that criteria pollutant emissions from the hybrid powertrain will be as low as criteria pollutant emissions from a conventional powertrain.8 The reason for this potentially unintended result is that hybrid engine duty cycles can differ significantly from conventional engine duty cycles. According to the proposed rule, hybrid engines will be evaluated for criteria pollutants over a cycle that is not consistent with real world hybrid engine operation and evaluated for GHG/FC over a different cycle. [EPA-HQ-OAR-2010-0162-1765.1, p.44]

Criteria pollutant certification should be allowed using the hybrid engine dynamometer evaluation. This approach is consistent with the conventional program and would serve several objectives:

- Reduce GHG emissions and fuel consumption beyond what is possible today through additional engine optimization

- Ensure equivalent criteria pollutant emissions for hybrid powertrains as compared to conventional engines

- Enable learning about interactions between GHG/FC and criteria pollutants

- Lay groundwork for a future rule [EPA-HQ-OAR-2010-0162-1765.1, p.44]

Although manufacturers who want to certify a hybrid engine using an alternative procedure could petition the Agencies under existing provisions in Part 1065, Cummins proposes that the Agencies explicitly allow criteria pollutant certification using the GHG/FC hybrid engine dynamometer test. This will help facilitate the implementation of hybrid technologies that effectively reduce GHG/FC and criteria pollutants. [EPA-HQ-OAR-2010-0162-1765.1, p.45]

Response:

Use of the FTP and SET test procedures for vocational vehicles and tractors, respectively, has been finalized. There are no additional OBD requirements as a result of this final rule for greenhouse gas emissions.

There are no IRAF requirements for this final rule as we continue to believe that heavy-duty vehicle and engine manufacturers are already very well motivated to extend the regeneration frequency to as long an interval as possible and to reduce the during of the regeneration as much as possible. Both of these actions significantly reduce the impact of regeneration on CO_2 emissions and fuel consumption. We do not believe that adding an adjustment factor for infrequent regeneration to the CO_2 or fuel efficiency standards would provide a significant additional motivation for manufacturers to reduce regenerations.

Upon further review of the data, the agencies believe that a 3% compliance margin is appropriate for this final rule, which adequately accounts for production variation from engine-to-engine as well as lab-to-lab. The agencies will continue to collect relevant data for revisiting this compliance margin for future rulemaking activities.

The agencies have not finalized NTE limits for GHG emissions.

The agencies recognize that current Criteria Pollutant-based engine families contain engines used in both vocational vehicles as well as tractors, which would now be required to meet separate requirements for certification to GHG standards. Rather than allowing a single engine to be associated with two family identifiers (one for criteria pollutants and one for GHG) we have finalized provisions allowing for both FTP and SET-certified engines to remain in the same family for GHG purposes. Under this scenario, there would be separate subfamilies; one for the vocational truck applications and one for tractor applications. We believe this approach provides the requested flexibility while still maintaining a single, unique engine family identifier per engine.

Provisions relating to VSLs can be found at 40 CFR 1037.640 and provisions relating to idle shutdown features can be found at 40 CFR 1037.660

NHTSA and EPA have added a number of requirements in the final rule relating to the VSL control features. Manufacturers must ensure that the governed speed limit programmed into the VSL be verifiable through on-board diagnostic scanning tools, and must provide a description of the coding to identify the governed maximum speed limit and the expiration mileage both at the time of the initial vehicle certification and in-use. The agencies believe both manufacturers and fleets should work toward maintaining the integrity of VSLs, and the agencies may conduct new-vehicle and in-use random audits to verify that inputs into GEM are accurate. However, the agencies will hold certificate holders (generally manufacturers) responsible for ensuring vehicles remain as certified to CO2 emissions and fuel consumption standards over their useful lives, and therefore it is expected that manufacturers will control the reprogramming of VSLs. To ensure that only legitimate changes are made to VSLs, the agencies are also requiring that manufacturers use password-protected coding or anti-tampering algorithms to secure the VSL control feature and calibrations. Vehicle manufacturers must also provide fleets with methods to reprogram PCMs to adjust for any vehicle component changes that could affect the accurate determination of vehicle speed (e.g., modifying tire radius, axle ratio, transmission gearing) and that, if changed, could allow a vehicle to travel at speeds higher than those limited by the VSL or that would cause the odometer to operate inaccurately. Without this functionality, fleets may be in danger of violating NHTSA's requirements under the Motor Vehicle Cost Information Act, 49 U.S.C. Sections 32703 and 32704, Federal Odometer Fraud Law, which makes it unlawful for a person to act with intent to defraud, operate a motor vehicle on a street, road, or highway if the person knows that the odometer of the vehicle is disconnected or not operating correctly.

For this first program, NHTSA has chosen to enforce its fuel consumption standards for new vehicles prior to first commercial sale. Therefore, if NHTSA determines that a claimed VSL value is inaccurate, the vehicle manufacturer would be required to recertify its fuel consumption performance for the particular vehicle(s) and remove any benefit gained by the claimed inaccurate value. EPA is using its authority to include the same enforcement approach for new vehicles emissions, as well as in-use tampering enforcement of fleets or independent owners. For the next phase of the program, NHTSA may reassess how it enforces the regulations and may choose to include in-use enforcement.

For the final rule, some adjustments to the maximum speed limit governed by VSLs are appropriate to accommodate operating flexibilities desired by the trucking industry. We believe that these flexibilities would not significantly decrease the anticipated fuel consumption/CO_2 benefits of VSLs. Issues identified by the commenters, including the need for different governed speeds when delivery routes change or when a fleet's business practices change are not in conflict with the purpose and benefit of VSLs. As such, the agencies have decided to allow a manufacturer to allow its fleet customers to set their own lower maximum VSL speed limits, but the agencies have decided to not allow compliance to be recalculated if the VSL speed limit is lowered. In this case, the agencies will not allow additional benefit in GEM to a manufacturer for allowing a lower governed speed than the certified maximum limit for this first phase of the HD National Program. The agencies will continue to monitor the performance of the fleets and will consider giving further benefits in the next phase of the program.

Both agencies agree that manufacturers can provide a "soft top" feature to be programmed into PCMs. Although the agencies considered limiting the soft top maximum level due to safety and fuel consumption/GHG benefit concerns, we have decided to allow the soft top maximum level to be set to any level higher than the maximum speed governed by the VSL. This approach will provide drivers with the ability to better navigate through traffic. However, the agencies are requiring that manufacturers providing a soft top feature must design the system so it will not decrement the vehicle speed limit causing the vehicle to decelerate while the driver is operating a vehicle above the normal governed vehicle speed limit. For example, if a manufacturer designs a vehicle speed limiter that has a normal governed speed limiter setting of 62 mph, and a "soft top" speed limiter value of 65 mph, the algorithm shall not cause the vehicle speed to decrement causing the vehicle to decelerate while the driver is operating the vehicle at a speed greater that 62 mph (between 62 and 65 mph). The agencies are concerned that a forced deceleration when a driver is attempting to pass or maneuver could have an adverse impact on safety. The algorithm may resume using the normal vehicle speed limiter of 62 mph after the driver has decelerated the vehicle to 62 mph, or a lower speed.

In response to comments from engine manufacturers, hybrid system manufacturers, and related trade groups which broached concerns regarding the feasibility of applying OBD systems on heavy-duty hybrid applications starting in 2013 and requesting a delay until 2020 to implement OBD on these systems, the EPA is extending the OBD phase-in for these systems until 2016/2017 depending on the application. We believe the additional phase-in time is necessary to allow these manufacturers time to work together to develop the appropriate communication protocol, address any hardware and/or software issues, and to provide sufficient lead-time for additional hybrid diagnostic system development given resource constraints as engine manufacturers are focused on meeting the 2013 OBD requirements for conventional products at this time. Manufacturers will be required to implement feasible controls for these hybrid systems that do not adversely impact emissions performance in 2013. In 2016, hybrid systems that were in production after January 1, 2013 must meet full OBD requirements, and those put into production prior to January 1, 2013 must be in compliance by 2017. Additionally, manufacturers will be required to provide annual documentation of their progress toward meeting the OBD requirements for 2016 and 2017. See Section 16 of this document for further details.

Organization: Daimler Trucks North America

Second, NHTSA should accept EPA certification and vice versa. But manufacturers should not be burdened with duplicative and unnecessary dual certification procedures. Thirdly, there should be one set of precertification meetings, one set of certification applications, and one approval. No one agency should be allowed to tie up a certification while the other has granted cert. Similarly, no one agency should be allowed to block an exemption when the other agrees. There is no value added in double certification procedures, duplicative talks with Agencies, etc. [EPA-HQ-OAR-2010-0162-1818.1, p.17]

Similarly, there should be no double jeopardy on enforcement actions. If a manufacturer has been subject to an inquiry or an enforcement action, or assigned a penalty, for any infraction or alleged infraction by either Agency, the other should not be able to reopen the inquiry or reassign penalties. We understand the Agencies' statement that "[i]t is not the intent of either agency to impose duplicative civil penalties…." (75 Fed. Reg. 74280.) We appreciate that, and we think that it is only fair given the unified nature of the program. However, this rulemaking must comply with the statutory authority given to the agencies. [EPA-HQ-OAR-2010-0162-1818.1, p.17]

EPA's authority to assess penalties for violations of emissions standards is specifically provided for and circumscribed under the CAA. (See CAA §205; 42 U.S.C. §7524). The opportunity for hearings under the Administrative Procedures Act ("APA")(5 U.S.C. §554, et.al.) and for judicial review of any EPA-imposed penalties also is specifically provided for. (See 42 U.S.C. §7524(c).) [EPA-HQ-OAR-2010-0162-1818.1, p.18]

The basis of NHTSA's authority to impose civil penalties, if it exists at all (see EMA comments) must fall within the preexisting provisions of 49 U.S.C. Chapter 329. As the agency acknowledges, Congress did not expressly specify civil penalties when authorizing medium- and heavy-duty fuel efficiency standards in the Energy Independence and Security Act of 2007 (49 U.S.C. §32902(k).) Instead, Congress specified that DOT and NHTSA implement through regulation a fuel efficiency improvement program and promulgate standards under §32902(k). Congress did not create a separate statutory scheme for medium and heavy-duty vehicles, but rather embedded the statutory authorities for that program within the 49 U.S.C. Chapter 329. [EPA-HQ-OAR-2010-0162-1818.1, p.18]

Significantly, Congress did not alter the preexisting statutory provision for civil penalties, 49 U.S.C. § 32912. That provision specifies civil penalties for violations of standards promulgated under 49 U.S.C. §32902, which would include standards promulgated under §32902(k). In developing a wholly new civil penalties program, the proposal ignores the fact that Congress specifically inserted the medium- and heavy- duty vehicle standards into the preexisting statutory scheme. [EPA-HQ-OAR-2010-0162-1818.1, p.18]

Congress may have intended §32912 to provide the civil penalty mechanism for a violation of §32902. Accordingly, NHTSA could argue that it has the authority to apply §32912 as currently set forth to the medium- and heavy- duty fuel efficiency improvement standards issued under §32902. If necessary, NHTSA could conduct a rulemaking to determine whether in this context the term "automobile" should be read to include medium- and heavy-duty vehicles and, if not, the appropriate civil penalty calculation to apply to these vehicles under §32912. [EPA-HQ-OAR-2010-0162-1818.1, p.18]

A better option, to be consistent with the core principles set forth for this rulemaking process, NHTSA should make the process consistent with the CAA. The agencies state that their intent is not to impose duplicative civil penalties, 75 Fed. Reg. at 74280, suggesting that each company would be subject to one set of civil penalties collectively subject to the maximum allowable penalty under the CAA. Contrary to the intent to create a harmonized program and to take into account penalties otherwise assessed under the CAA, NHTSA proposes an entirely independent and separate process and creates the potential for not only duplicative but excessive civil penalties under its program. [EPA-HQ-OAR-2010-0162-1818.1, p.18]

NHTSA's civil penalty proposal fails in many respects. First, the agency adopts an inconsistent approach in that it adopts the CAA maximum potential civil penalty but does not adopt the CAA process for determining an appropriate civil penalty amount. As the Agencies are aware, the CAA specifies that the assessment of a civil penalty under the CAA be made on the record after a hearing in accordance with 5 U.S.C. §§554 and 556. See 42 U.S.C. §7524(c). That provision is not included in EISA or the underlying statute (49 U.S.C. Chapter 329). As noted above, this may be because Congress intended a different civil penalty scheme consistent with the preexisting provisions of §32912 for failure to meet standards promulgated under §32902. On the other hand, to the extent that NHTSA develops a separate program, that program should be consistent with the CAA program. The Administrative Procedure Act provision specified in the CAA does not preclude its application to programs that do not overtly specify its application. It merely makes clear that the provisions automatically apply to any program when specified by statute. Nothing bars NHTSA from adopting the Administrative Procedure Act provision in order to promote harmonization and consistency for violations of the NHTSA and EPA regulations. [EPA-HQ-OAR-2010-0162-1818.1, pp.18-19]

Second, a civil penalty program distinct from the EPA program creates the possibility of inconsistent determinations and disparate treatment if the EPA process and the NHTSA process reach different conclusions. Each manufacturer should be subject to one set of considerations and one assessment of the civil penalty attaching to any failure to meet the jointly considered and promulgated standards. Because the EPA process is specified by statute, the agencies should defer to that process and NHTSA should specify in its regulations that the final assessment (after all legal appeals have been exhausted) determined through the CAA procedure will be equally applicable under NHTSA's fuel efficiency improvement program. [EPA-HQ-OAR-2010-0162-1818.1, p.19]

Third, NHTSA should specify that the payment of a civil penalty assessed under the CAA constitutes payment of a civil penalty for purposes of NHTSA's fuel efficiency improvement program. This not only avoids duplicative civil penalties, but also ensures that the civil penalty assessment will take into account the fact that it will be able to cover violations of both statutes and both sets of standards. As such, the civil penalty assessment will be able to consider all violations in one setting and assess an appropriate civil penalty. [EPA-HQ-OAR-2010-0162-1818.1, p.19]

Finally, if the program is not combined with the EPA enforcement program, then NHTSA must provide sufficient rationale for determining the maximum applicable civil penalties. NHTSA has merely adopted the civil penalty amounts from the CAA, without the procedural protections provided for by the CAA, and has not set forth any reasoning for its proposed regulation as required by the Administrative Procedure Act. [EPA-HQ-OAR-2010-0162-1818.1, p.19]

DTNA strongly encourages NHTSA to reconsider its approach to civil penalties. The agency must provide sufficient rationale for each aspect of the civil penalties program, including the potential maximum civil penalty amounts. Otherwise, the stage will be set for legal challenges to the Proposed GHG/FE Standards, which otherwise were intended by all stakeholders to be implemented on an accelerated timetable in accordance with a common core of agreed-upon principles. Having a single nationwide program is key to Daimler's support of a program. A single program must include a single certification procedure, a single reporting procedure, and a single enforcement program. [EPA-HQ-OAR-2010-0162-1818.1, p.19]

NHTSA Precertification Compliance Reports Will Provide No Value, Are Impractical And Need Clarification. [EPA-HQ-OAR-2010-0162-1818.1, p.22]

The NHTSA requirement in 49 CFR §535.8(a)(2)(ii) creates an impractical burden that adds no value for the Agencies, manufacturers, or society in general. Unlike in the light-duty vehicle market, which is a push market, HDV manufacturers operate in a pull market and cannot predict their sales in advance. Much less can they predict sales in the huge number of vehicle families that the Agencies require. Any sales numbers will necessarily be guesses (e.g., mere assumption that one year's sales will be exactly the same as the last year's, which is never the case). In turn, estimates of sales required in the precertification reports will necessarily be inaccurate in many crucial respects. A better solution is to require reporting only of factors that manufacturers can predict or control, such as the vehicle characteristics (e.g., Cd, weight reduction options) and technologies that will be offered in the various vehicle classes. [EPA-HQ-OAR-2010-0162-1818.1, p.22]

With respect to precertification reporting requirements for heavy-duty engines as detailed in 49 CFR §535.8(c)(3), the above stated concerns are of the same or greater magnitude. In the timeframes proposed for submission of the described report (for model year 2016, a pre-certification report would be due no later than December 31, 2003 – for early certifiers under this rule the deadline would have already passed), this detailed amount of information is simply not available. Moreover, any information manufacturers supply would, at best, be rough estimates. In particular, NHTSA requests that manufacturers: [EPA-HQ-OAR-2010-0162-1818.1, p.22]

(ii) Identify the projected final U.S.- directed production volumes for: [EPA-HQ-OAR-2010-0162-1818.1, p.22]

(A) The manufacturer's combined fleet of heavy-duty engines for the model year; [EPA-HQ-OAR-2010-0162-1818.1, p.22]

(B) Each regulatory subcategory of heavy-duty engines for the model year; [EPA-HQ-OAR-2010-0162-1818.1, p.22]

(C) The vehicles in each vehicle family used to determine the manufacturer's fleet average fuel consumption value for the model year; and [EPA-HQ-OAR-2010-0162-1818.1, p.22]

(D) Attest to the authenticity and accuracy of each projected final production volume and provide the signature of an officer (a corporate executive of at least the rank of Vice President) designated by the corporation. The signature of the designated officer shall constitute a representation by the required attestation. Such attestation shall constitute a representation by the manufacturer that the manufacturer has established reasonable, prudent procedures to ascertain and provide production data that are accurate and authentic in all material respects and that these procedures have been followed by employees of the manufacturer involved in the reporting process. [EPA-HQ-OAR-2010-0162-1818.1, p.22]

NHTSA needs to recognize that, given the limited information available at the time of submittal, manufacturers simply cannot give the Agency this information with the level of accuracy the Agency seeks. DTNA proposes instead that manufacturers supply a general product plan that includes a description of the engine families it intends to certify, the applicable regulatory categories and sub-categories, and a statement of intention to comply with fuel consumption standards. Moreover, in 49 CFR §535.8(c)(vi), NHTSA requests descriptions of engine technologies for each of the manufacturers engine families. This information is of the nature that is already included in engine manufacturers Large Engine Technical Descriptions submitted to EPA in its certification application, so we should not have to submit it a second time. We believe that our suggestion should suffice for both Agencies' purposes and will not force a manufacturer to generate data of little accuracy or value. [EPA-HQ-OAR-2010-0162-1818.1, pp.22-23]

In the proposed 49 CFR § 535.8(b)(4) on page 75 Fed. Reg. 74450, NHTSA describes what appears to be a very burdensome and repetitious procedure for manufacturers to protect trade secrets and CBI: manufacturers will need to fill out multiple forms, often repeating the same material about why certification materials should be kept confidential. Little value is created for manufacturers, the Agencies, or the country by requiring manufacturers to submit repeated forms and requiring the Agencies to review them. Accordingly, we request a more cost-effective manner for confidentiality protections. Manufacturers could submit one general request for confidentiality at the start of the Agencies' regulatory program establishing specific categories of materials that the agencies would confirm are presumptively eligible for exemptions under FOIA. Then, on each subsequent document or electronic submission that a manufacturer makes and wants to protect as confidential, the manufacturer could mark the document as "Confidential," and reference the agencies' prior class determination regarding materials expected to be submitted by manufacturers under this program. Additional detailed support for the confidentiality determination could be provided if and when a FOIA request for the documents was received by the agencies. [EPA-HQ-OAR-2010-0162-1818.1, pp.25-26]

NHTSA does not have authority for engine certification. EISA Section 102, which gives NHTSA authority for the heavy-duty program, specifically authorizes vehicle certification.

Nowhere does it authorize engine certification. Accordingly, the only acceptable approach is for the Agencies to use one certification program, with one set of certification documents and one approval process. [EPA-HQ-OAR-2010-0162-1818.1, p.28]

EPA proposed an approach for certification that essentially follows the current certification process for criteria pollutants. This requires that manufacturers submit certification applications, that EPA reviews and approves the application and issues a certificate of conformity prior to introduction of engines into commerce. EPA proposes that the certificate of conformity for GHG be issued as a single document that certifies conformity of both criteria pollutants and GHG. NHTSA would assess compliance with its fuel consumption standards based on the results of EPA's assessment. We agree that it is appropriate for manufacturers to combine in one submittal their application for GHG and criteria pollutant certification. Doing so reduces the number of applications that a manufacturer must submit and facilitates the integration of certain documents that are required for both applications. It is critical also that the agencies streamline the certification process by coordinating their review of the applications so that EPA's certificate of conformity will also represent NHTSA approval. This will avoid the potential delay and confusion that could result from requiring manufacturers to separately navigate their multiple certification applications through each agency. Additional comments are provided below regarding certain data that are required to be included in manufacturers' certification applications. [EPA-HQ-OAR-2010-0162-1818.1, p.29]

EPA's current certification program for heavy-duty engines allows that when no significant changes to models are made, manufacturers can carry certification test data across from one model year to the next eliminating the need to generate new emissions data for each model year. EPA also allows that engine families having common architectures and aftertreatment systems, DFs may be carried over between families. EPA is proposing to also allow application of these same provisions to CO_2, N_2O and CH_4 certification test data. For consistency with provisions available to criteria pollutants, and in view of reduced testing burden we support EPA's proposal. [EPA-HQ-OAR-2010-0162-1818.1, p.30]

NHTSA and EPA requested comment on numerous aspects of early credit generation provisions. First we agree that the agencies should include provisions for early generation of GHG credits. Manufacturers should be encouraged with incentives to introduce GHG reducing technologies as early as practicable to maximize CO_2 reductions and gain early customer acceptance of new technologies. As such, provisions for early GHG credit generation should be available one year earlier than the currently proposed 2013 model year. A credit multiplier of 1.5 is an appropriate incentive. [EPA-HQ-OAR-2010-0162-1818.1, p.30]

In its proposal, §1036.150 requires that within the averaging set that includes the early credit generating family, all families must be certified to the GHG standards. This provision discourages manufacturers from introducing to the market place its low emitting family (ies) when all families are not ready for introduction. In this industry it is not uncommon, due to resource constraints, to not release new technologies or models simultaneously. We recommend that EPA modify the provisions to allow a single engine family to be certified below the standard and to generate credits ahead of their other families that are within the averaging set. This increases the probability that a manufacturer that is capable of complying with the standards on at least one of his engine families will take the opportunity to do so, thus more effectively encouraging early compliance. [EPA-HQ-OAR-2010-0162-1818.1, p.31]

EPA proposes to apply a multiplication factor of 1.02 to the Family Certification Level to establish the Family Emissions Limit for CO2. We agree that it is appropriate to apply a multiplier considering test cell CO2 measurement variability from test to test, test cell to test cell, and engine to engine. EPA should however revisit the basis upon which they established the multiplier value to ensure that it is truly reflective of industry's assessment of measurement capabilities and variability. Daimler is prepared to work together with the Engine Manufacturers Association and the Agencies to investigate this critical concern. [EPA-HQ-OAR-2010-0162-1818.1, p.34]

EPA must recognize the new paradigm in criticality of measurements driven by the GHG rule. Historically 2% variability between facilities might not have been considered significant relative to criteria pollutants, where manufacturers had the ability to alter control variables to dial in large compliance margins. The GHG rule sets a higher level of importance in minimizing variability since the levels of improvement and the measurement variability that must be dealt with are very similar, and the manufacturer does not have the design capability to simply dial in more margin to accommodate variability by tuning down fuel consumption. Continued government and industry effort must be applied to minimizing the acknowledged variability issue and in the meantime sufficient allowances must be provided both for SEA purposes and for confirmatory testing, the latter of which the Agencies currently do not propose to provide. Again, Daimler is prepared to work together with the Engine Manufacturers Association and the Agencies to investigate this critical concern. [EPA-HQ-OAR-2010-0162-1818.1, pp.34-35]

It is understood that the measurement and reporting of CO2 emissions during manufacturer's in-use compliance testing will be required but for reporting purposes only. As such there is no practical necessity for establishing a multiplier to define an FEL or measurement error allowances for the purpose of in-use compliance testing. Should the Agencies consider future in-use compliance limits it would be necessary to establish appropriate error allowances through a comprehensive government/industry program as had been conducted for criteria gaseous and particulate in-use measurements. [EPA-HQ-OAR-2010-0162-1818.1, p.35]

§535.4 definitions refer to FCL as Family Certification Limit and should state Level rather than limit to avoid confusion. [EPA-HQ-OAR-2010-0162-1818.1, p.35]

EPA proposes in §1036.501 that IRAF adjustments not be applied to testing for GHG emissions compliance. EPA includes in its rationale that manufacturers are incentivized to minimize the frequency of infrequent regenerations in order to reduce fuel consumption. Daimler supports the Agencies' conclusion that the impacts of DPF regeneration do not need to be considered when assessing the appropriate levels for the Proposed GHG/FE Standards. Similarly, the Agencies should not include or make separate adjustments to account for IRAFs in assessing the appropriate levels for the Proposed GHG/FE Standards. Any current effect of IRAFs on CO2 emissions is likely to be reduced over time as manufacturers develop more fuel efficient approaches to particulate filter regeneration. Since the net effect of IRAFs would be insignificant and diminishing, it is far more reasonable to eliminate the very significant testing and data-processing burdens that would be occasioned by the need to consider and separately account for IRAFs [EPA-HQ-OAR-2010-0162-1818.1, pp.37-38]

EPA proposes that the same selection criteria, as outlined in 40 CFR part 86, subpart N, be used to define a single engine family designation for both criteria pollutant and GHG emissions. Further, EPA proposes that for fuel consumption and CO2 emissions only, any selective enforcement audits, in-use, confirmatory, or other compliance testing would be limited to the parent rating for the family. We agree that EPA apply common criteria for selection of the GHG parent rating as used for selection of the parent rating for criteria pollutant testing. In the context of in-use testing, we agree that if EPA seeks in its in-use testing programs to generate in-use CO2 data for comparison to engine dynamometer generated CO2 data, it is most appropriate to test the parent rating. For manufacturer in-use testing we suggest that EPA, in its selection of engine families that manufacturers are required to test, does NOT also specify that testing be performed only on the parent rating. In-use test experience has demonstrated that recruiting of customers for in-use testing is burdensome even without constraints on the rating to be tested. Additional constraints of testing only, what for many engine families may be, a lower volume parent rating should be avoided. [EPA-HQ-OAR-2010-0162-1818.1, p.38]

In addition, we suggest EPA address the possibility that manufacturers game the regulation by creating a “mock rating” designed to maximum CO2 emission s of their model year 2011 base line rating, or to artificially minimize CO2 emissions for compliance testing during model years 2013 and later.. Currently no provisions exist to ensure that a parent rating actually is produced by the manufacturer. We recommend that EPA require that the manufacturer submit end of year sales volume data for their designated parent rating that demonstrates actual production of the certified parent rating. [EPA-HQ-OAR-2010-0162-1818.1, p.39]

The Agencies propose that for GHG certification, manufacturers must submit numerous data elements additional to those currently required to be submitted and in many cases data beyond that required for compliance demonstration. In the proposal manufacturers’ submittal of composite transient FTP test results for GHG emissions must be supplemented with GHG emissions results from each the cold-start and hot-start FTP test cycles. Then, in addition to the GHG emissions data from the ramped modal cycle (RMC) test manufacturers must submit modal GHG test results from the individual modes of the RMC. Considering that EPA’s proposed rule requires demonstration of compliance with N2O and CH4 emissions standards only on the composite FTP test cycle, the requirement of submitting data beyond that required for demonstration of compliance poses additional burden on what has already grown to be an extremely burdensome certification test process. EPA should modify its requirements for superfluous data, i.e. that data which is not necessary for demonstration of compliance. Requests for data beyond that required for compliance demonstration can be informally requested by EPA at any time and are generally responded to by industry in a cooperative spirit. Rather than encumbering an already burdensome certification process with additional unnecessary data, EPA should separately request these data. Should EPA persist in requiring these data to be submitted at time of certification application, then at the least, manufacturers should be permitted to submit discrete modal and RMC GHG emissions data on an “as available” basis. i.e. should RMC emissions certification tests encounter technical difficulties that preclude submitting results for modal N2O and/or CH4 emissions, the Agencies will consider the test results for criteria pollutants to be valid and manufacturers be allowed to submit data summaries with N2O and CH4 data fields populated with data not available notation. [EPA-HQ-OAR-2010-0162-1818.1, pp.40-41]

EPA requires per §86.1362-2010 that starting in the 2014 model year, manufacturers must determine gaseous emissions rates at each test mode during the ramped-modal test cycle and describes how for compression-ignition engines continuous sampling is to be used to determine modal emission rates. [EPA-HQ-OAR-2010-0162-1818.1, p.41]

Daimler recommends that for clarity the language be modified to include an example of good engineering judgment as applied to the measurement of modal emissions. We suggest the following language. [EPA-HQ-OAR-2010-0162-1818.1, p.41]

“For compression-ignition engines, use continuous sampling to determine separate emission rates at each test mode during the test run over the ramped-modal cycle for each pollutant except PM. Perform this emission sampling using good engineering judgment by measuring emissions during the whole mode or, for example, by taking an average data log for the last 60 seconds of each mode or integrating over the last 60 seconds of each mode; do not measure emissions during the transitions between modes. Calculate emission results for each mode using the procedures of 40 CFR Part 1065.” [EPA-HQ-OAR-2010-0162-1818.1, p.41]

EPA proposes that during their in-use compliance testing, manufacturers’ report CO2 emissions test results and that for certain applications NTE limits would not be applicable to CO2 emissions levels. [EPA-HQ-OAR-2010-0162-1818.1, p.43]

First, EPA proposes that manufacturers be required to submit CO2 data from in-use testing with results reported in units of grams/bhp-hr and grams/ton-mile. EPA is correct that CO2 emissions are normally recorded by portable emissions measurement equipment (PEMS) and therefore the reporting of brake specific CO2 emissions is not a significant additional burden. However, past experience has proven that in the course of testing customer’s vehicles in-use it is most often the case that actual vehicle weight data is not available. In many commercial operations, vehicles are loaded to well below the allowable gross vehicle weight and as such the operators are often not required to weigh the vehicle prior to starting their delivery run. Additionally, during the normal course of their daily operation it is often the case that the load will change with drop-off and/or pickup of goods. Consequently, the vehicle weight data reported in manufacturers’ final in-use test reports is permitted to be based estimated. It is therefore recommended that reporting of CO2 emissions on a grams/ton-mile basis be allowed to be based on estimated vehicle weight. [EPA-HQ-OAR-2010-0162-1818.1, p.43]

EPA describes that because of the drive cycle dependence of CO2 emissions, establishing an NTE limit for in-use testing is impractical, and that EPA is therefore not proposing an NTE-based in-use testing program for Class 7 and 8 combination tractors during this proposal. We agree with EPA's rationale for not establishing NTE limits for CO2 emissions. Further, we believe that the rationale EPA applied for not establishing NTE limits for the named applications are equally applicable to other Heavy-duty vehicle classes. Specifically, CO2 NTE limits should not be applied to engine dynamometer certified engines used in Class 7 and 8 vocational trucks or to engines used in Class 4-6 vocational trucks. Within these additional applications, duty cycles also highly variable and CO2 emissions are equally dependant on the duty cycle. Consequently we recommended that EPA make clear in its rule that NTE CO2 limits are not applicable to these applications. [EPA-HQ-OAR-2010-0162-1818.1, p.43]

We support NHTSA's position of not intending to implement an in-use compliance program for fuel consumption. We are also in agreement with its assessment that a notable deterioration of fuel consumption over the useful life of an engine is not anticipated. [EPA-HQ-OAR-2010-0162-1818.1, p.43]

Finally, EPA is proposing that the in-use standards for heavy-duty engines installed in tractors be established by adding an adjustment factor to the full useful life emissions and fuel consumption results projected in the EPA certification process. (75 Fed. Reg. 74179) EPA is proposing a 2 percent adjustment factor for the in-use standard to provide a reasonable margin for production and test-to-test variability that could result in differences between the initial emission test results and emission results obtained during subsequent in-use testing. EPA and NHTSA request comments on the magnitude and need for an in-use adjustment factor for the engine standard. This language suggests that EPA considered applying limits to in-use CO2 emissions. However, we also understand that (per the discussion above) EPA does not propose CO2 NTE limits as part of this regulation, but that the requirement to report CO2 data from the in-use testing program will be helpful to EPA in future rulemaking efforts. Should EPA in the future evaluate potential CO2 NTE limits, appropriate CO2 measurement allowances must be defined. The Agencies and industry have developed robust protocols for defining criteria pollutant measurement allowances which should be emulated in the development of appropriate CO2 measurement allowances (refer to EPA-420-B-10-901, August 2010, and EPA420- R-08-005, February 2008 40CFR1065.915). [EPA-HQ-OAR-2010-0162-1818.1, pp.43-44]

EPA is seeking public comment on what devices and/or systems may need to be added to the critical emissions-related component list to adequately address GHG emissions components. EPA is concerned that there may be instances where the failure of a component or system, not included on the existing critical criteria emissions-related component list, may reduce the efficiency of the engine while not increasing criteria pollutant emissions and that in this case, and that such components should therefore be added to the list. [EPA-HQ-OAR-2010-0162-1818.1, p.44]

We agree with EPA's assessment that the existing list of commonly defined critical components is adequately addresses GHG emissions. The list is comprehensive and essentially includes most if not all components and systems that impact engine performance and emissions, which essentially also impact the engine's fuel efficiency. During the certification application review process, §1036.205 requires that manufacturers describe in detail all system components for controlling GHG emissions. During this review, components that are introduced specifically for GHG emissions reduction will be identified and where appropriate, added to the emissions-related components list. We believe that it would not be appropriate to include on this list components that serve primary functions unrelated to GHG emissions control but which may have features whose improvement may lead directionally to improved GHG emissions. For example a design modification to a main bearing that reduces its friction, thus influencing GHG emissions, should not result in its addition to the critical component list since the primary purpose of the component is not to control GHG emissions. [EPA-HQ-OAR-2010-0162-1818.1, p.44]

The Agencies propose that if the manufacturer determines that maintenance is necessary on critical emission-related components within the useful life period, they must have a reasonable basis for ensuring that this maintenance will be completed as scheduled. We agree that in general it is appropriate to apply periodic maintenance requirements that are consistent with those applied to components controlling criteria pollutants. It should be recognized that typical diesel engines require that ancillary components be installed that are typically serviced frequently during the useful life period and which can measurably impact fuel consumption. Specifically, engine installations require that the vehicle manufacturer equip the vehicle with air filters that will require periodic replacement at intervals more frequent than the useful life period and are typically cleaned or replaced at predetermined service intervals as influenced by the nature of the duty cycle and operating environment. Operators recognize this basic maintenance as a necessity for prolonging engine life and for maintaining efficient operation. Since such maintenance is essentially engrained in the normal practice of operating commercial vehicles, there should be no necessity for manufacturers to be required to provide additional information supporting the likelihood of such maintenance being performed. [EPA-HQ-OAR-2010-0162-1818.1, p.45]

The Agencies specify what might go onto emission control labels and ask for comments. 75 Fed. Reg. 74272, 74273. While we don't recommend it, more information will be required for the label than the Agencies specify if the Agencies intend for this label to be of any use in field inspections. Merely listing "LRR" does not describe which tires, and in turn the tires affect compliance. Additionally, an enforcement officer is unlikely to know by looking at a tire and at a label marked 'LRR' that the correct tire is on the vehicle. Additionally, "ARM" does not specify adequately whether the proper mirrors are on a vehicle, in that a field inspector would have to use his judgment about whether the mirrors are aerodynamic. Moreover, the mirrors are but a small portion of the whole vehicle's aerodynamics. Do the Agencies intend that the emission control labels read LRR, ARM, ASF (for aerodynamic side fairings), AH (for aerodynamic hood), AUT (for aerodynamic underbody treatment), AUH (for aerodynamic underhood), and so on for all of the components that contribute to overall vehicle aerodynamics? And if so, how can an inspector gauge if there is (for example) an AUH? [EPA-HQ-OAR-2010-0162-1818.1, p.46]

Similarly, the Agencies say that vocational vehicles will need labels that list the range of allowable tire rolling resistances, “allowing field inspectors to identify whether a vehicle is certified, and if so, whether it is in the certified configuration.” 75 Fed. Reg. 74277. Tires do not generally carry information about their tested rolling resistance. In turn, unless field inspector happens to know the rolling resistance of the tires that are on a particular vehicle, he or she will not be able to use the Agencies’ proposed label to determine if the vehicle is certified or if it is in its certified configuration. The emission control label can only be used to convey information about a vehicle’s compliance if the label can impart information about all of the components that impact aerodynamics, both visible to an inspector and invisible, plus tires, plus engine shutdown timer (invisible to an inspector), plus speed limiter (invisible to an inspector), and so on. In the end, the label will have to describe every external and many internal components of the vehicle, and an inspector will be unable to verify a large fraction of them. This is an unworkable solution. The only proper solution is for a label to state simply that the vehicle complies because the manufacturer has constructed its fleet in such a way as to comply. [EPA-HQ-OAR-2010-0162-1818.1, pp.46-47]

The Agencies’ Proposal To Extend Part 1066 Testing Requirements To Additional HDVs Is An Unclear Proposal Without Enough Details For Us To Comment On. [EPA-HQ-OAR-2010-0162-1818.1, p.51]

On page 75 Fed. Reg. 74279, the Agencies state that they consider applying new Part 1066 requirements to HDV testing. However, the Agencies give too few details. In turn, we cannot adequately comment on what the Agencies propose. [EPA-HQ-OAR-2010-0162-1818.1, p.51]

The Provisions For Voiding A Certificate Ab Initio Are Unclear. [EPA-HQ-OAR-2010-0162-1818.1, p.51]

In §1037.745(c), the EPA proposes that a certificate with a credit deficit at the end of three years will be partially void ab initio. The provision for certificates being void ab initio is unclear. Until we understand these details, we cannot adequately comment on the EPA’s proposal. [EPA-HQ-OAR-2010-0162-1818.1, p.51]

On page 75 Fed. Reg. 74357, the Agencies state that they believe that the total estimated burden for reporting requirements for the HD program will be 25,052 hours per year, spread across 34 manufacturers, or approximately 700 hours per manufacturer per year. In other words, the Agencies estimate that about each manufacturer will require approximately 1/3 of a person for certification paperwork. For engine certification paperwork alone, DTNA already employs six people for the engine-related certification paperwork, and those six people do not have time enough for a second regulatory program. Assuming that the engine and vehicle certification programs are approximately equivalent in terms of reporting burden, the Agencies err by an order of magnitude in their estimates of reporting burdens. And if the Agencies require the amount of certification documents that they have suggested in the NPRM, the burden for vehicle certification will dwarf that for engine certification. [EPA-HQ-OAR-2010-0162-1818.1, p.52]

The vehicle certification program that the Agencies have created (page 75 Fed. Reg. 74387 et seq.) requires a mountain of paperwork, and it adds no value for the manufacturers, for the Agencies, nor for the country in general. Specifically, the Agencies require certification applications for each family of vehicles, in a program where manufacturers must identify all sub-families yet cannot take credit for emission reductions except in the worst vehicle of the family. Because of the stringency of the Agencies' standards, in turn, the Agencies have created a program where manufacturers have to certify all sub-families separately. And even if the manufacturer chooses not to certify some sub-families, the manufacturer must still describe each one in its certification application. The number of sub-families for any regulatory sub-category is the number of aerodynamic bins in which the manufacturer sells vehicles (between one and five), times the number of weight reduction options (seven, making seven to thirty-five families), times the number of idle reduction options (two, making fourteen to seventy families), times the number of vehicle speed limiter options (realistically: 65 mph, 64 mph, 63 mph, … 55 mph, or eleven options, making 154 to 770 families), times the number of drive tire makes and models offered (dozens, making approximately 3,000 to 15,000 families), times the number of steer tire makes and models offered (again, dozens, making 60,000 to 300,000 families), times the number of axle widths (which may be as few as one or as many as a dozen, depending how precise a measurement the Agencies require). In turn, a manufacturer will have to certify between 60,000 and approximately 3,000,000 families per averaging sub-category. [EPA-HQ-OAR-2010-0162-1818.1, p.52]

And for each family, the Agencies receive and must review paperwork that merely regurgitates the GEM model outputs. In 1037.725(b)(2), the Agencies require sales projections for the various families. Of course, with thousands of families, and with the HDV market being a pull market, it will be impossible for a manufacturers to predict sales of vehicles within the various families with any accuracy. The Agencies further require justification if estimated sales numbers deviate "substantially" from production volumes in "earlier years." Market fluctuations occur on a yearly basis and we should not be responsible for trying to explain those, nor could we predict them in advance with any accuracy. Under the Agencies' proposal, tens of thousands of certification documents will be required with no new, accurate information added by any of them. Nor is there any benefit in having both Agencies receive, review, and approve a manufacturer's submissions. [EPA-HQ-OAR-2010-0162-1818.1, pp.52-53]

The Agencies should have a joint certification procedure, with only one submission to one Agency. Each submission should contain: [EPA-HQ-OAR-2010-0162-1818.1, p.53]

(1) a certification of the information that a manufacturer knows at the time of certification, that being the aerodynamic bins into which their various vehicles fit, the types of tires that the manufacturer sells, the types of idle reduction technologies the manufacturer offers, the manufacturer's speed limiter options, the manufacturer's weight reduction options, and the hybrid powertrain fuel savings (using preselected aerodynamic and running resistance characteristics); [EPA-HQ-OAR-2010-0162-1818.1, p.53]

(2) a statement that by the end of the three year window the manufacturer will have brought its regulatory sub-category into compliance with the subcategory's standards; and [EPA-HQ-OAR-2010-0162-1818.1, p.53]

(3) either (a) a small number, approximately a dozen, of GEM results from vehicle configurations that, based upon a good faith estimate of the market, the manufacturer thinks are representative of sales for the regulatory subcategory for the upcoming year or (b) GEM results from vehicles in the regulatory sub-category for the latest year that data are available, which the Agencies can use to verify that the manufacturer can meet the claim (2), above. [EPA-HQ-OAR-2010-0162-1818.1, p.53]

Manufacturers cannot certify any more than this, and requiring (first) regurgitation of model outputs with (second) necessarily inaccurate sales predictions is useless, burdensome, cost-ineffective, and will require the Agencies to hire a team of staffers for application processing. By contrast, with the procedure that we suggest, certification burdens will be kept to a minimum, and a manufacturer need only make a good faith attempt to characterize their upcoming year's vehicle sales, which is the best a manufacturer can do, given the information available. Moreover, this plan allows the Agencies to evaluate the likelihood of a manufacturer reaching its credit balance requirements. Shortly after the end of the model year, a manufacturer has to submit data from which the Agencies can calculate whether the manufacturer did reach its credit balance requirements. [EPA-HQ-OAR-2010-0162-1818.1, p.53]

On page 75 Fed. Reg. 74276, the Agencies state that, in the certification process for Class 2b-8 vocational vehicle, "manufacturers would need to submit an engineering evaluation demonstrating that the test group has been assembled appropriately and that the test model indeed reflects the worst-case model." The certification paperwork that the Agencies require of the manufacturers is inappropriate, in light of what the manufacturers can control. Requiring an engineering evaluation demonstrating that a test vehicle is the worst case is quizzical, considering the only input to the GEM model is the tire data (presuming engine model years will be held fixed for any given family, as no manufacturer will have reason to sacrifice 2017 engine performance in a 2014 vehicle, etc.). Further, the manner in which the Agencies create this program essentially requires manufacturers certify one family for every type of tire, in which case all vehicles perform identically in GEM. So what the Agencies mean by 'worst case' is entirely unclear. [EPA-HQ-OAR-2010-0162-1818.1, p.54]

Axle width is irrelevant to aerodynamics or any other vehicle fuel consumption characteristic. Moreover, most vehicles have axle widths within a small margin of each other. Requiring axle width as a characteristic that determines a vehicle family is useless, it drives up the number certification families (and attendant paperwork) unnecessarily, and it provides no new information. In turn, the Agencies should remove this requirement. [EPA-HQ-OAR-2010-0162-1818.1, p.54]

We understand the Agencies' position that certification processes require Agency staff resources and that the regulated entity must pay for those resources with certification fees.

However, the Agencies' NPRM did not specify what those fees would be, which makes it difficult for us to comment on the appropriateness of the fees. To be sure, the Agencies must keep the fees to a minimum. If the Agencies were to charge vehicle certification fees like those on engine certification, $34,452 per certified family, where the number of certification families is tens of thousands (as discussed above), HDV manufacturers would have to pay hundreds of millions of dollars. Such a result would not be acceptable. There are a lot of details to be worked out, and with the NPRM not providing any details the Agencies will have to find some way to provide more clarification so that the manufacturers can adequately comment. [EPA-HQ-OAR-2010-0162-1818.1, p.54]

In 40 CFR §1037.201, the Agencies require that manufacturers make available test vehicles at the Agencies' request. Keeping all test vehicles is not practicable. Because HDV manufacturers build many one-off vehicles, many test vehicles will have to be simply customer vehicles, tested prior to vehicle delivery. It would not be acceptable for manufacturers to have to build two vehicles in order to sell only one. Since GHG certification is model based, this requirement should be eliminated. Instead, if the Agencies wish to do an audit, they should work with manufacturers to find a substantially similar vehicle among the manufacturer's fleet or at the manufacturer's production facility. As the Agencies' rule is presently written, with vehicles being tested only for aerodynamics and with aerodynamic bins being coarse, it should not matter whether the Agencies can test a particular vehicle or a substantially similar one. In turn, the Agencies' proposal is extremely costly yet has no benefit associated. [EPA-HQ-OAR-2010-0162-1818.1, p.54]

EPA Reporting And Recordkeeping Requirements In §1037.250 Are The Better Way To Verify Compliance Than Necessarily Inaccurate Estimates Of Sales Prior To A Model Year. [EPA-HQ-OAR-2010-0162-1818.1, p.55]

The EPA reporting and recordkeeping requirements in 40 CFR §1037 provide all of the information that the Agency needs for verification of a manufacturer's CO2 credit balance. Moreover, the retrospective sales-weighted numbers will be much more accurate than prospective estimates, which are necessarily no more than guesses. However, the §1037.250 regulations require more information than is necessary for compliance. First, they require statement of the transmission and axle ratio in each vehicle. Neither of these are regulated components and both are components that the EPA has expressly stated (in repeated conversations with manufacturers) are components best left to manufacturers themselves. Second, they require production figures broken down by production plant. The production plant has no effect whatsoever on vehicle emissions. It is a useless addition to an already burdensome set of reporting requirements and should be eliminated. [EPA-HQ-OAR-2010-0162-1818.1, p.55]

The Agencies' Program For Hybrid Certification Needs A Provision For Petitioning The Agencies For Amendments. [EPA-HQ-OAR-2010-0162-1818.1, p.76]

DTNA considers the Agencies' proposals in relation to hybrid vehicles (e.g., 40 CFR §§1037.525, 1037.610 and 49 CFR §535.7 et seq.) to be more like an advanced notice of proposed rulemaking than a NPRM, because the proposed regulations have such limited detail. Developing robust hybrid certification rules will likely take years. So, if the Agencies propose to adopt final rules within months, we request explicit provisions to amend the Agencies' regulations as we move forward and learn more. For example, now we view the Agencies' proposed drive cycles as very problematic, because they do not well represent hybrid vehicle drive cycles and will grossly under-characterize hybrid fuel savings. Not knowing what drive cycle(s) the Agencies will propose in the final rule, we request specific language in the final regulatory text of Part 1037 for a manufacturer to petition the Agencies for a different drive cycle. (A similar provision exists in Part 1065.) Similarly, not knowing what test procedure(s) the Agencies will propose, we request specific language in the final regulatory text of Part 1037 for a manufacturer to petition the Agencies for a different test procedure like a HILS program. [EPA-HQ-OAR-2010-0162-1818.1, p.76]

The EPA And CARB Need To Relax On-Board Diagnostic (OBD) Standards On Hybrid Vehicles In Order To Incentivize Hybrid Development. [EPA-HQ-OAR-2010-0162-1818.1, p.81]

In CARB's most recent revision to 13 CCR §1971.1, CARB added a requirement for OBD systems on hybrid vehicles. Hybrid powertrain and chassis manufacturers have never yet been subject to such regulations. Hybrid integrators will have to develop OBD capability, in addition to developing OBD for new components like batteries. Even for engines used in hybrids, additional OBD work will be required because of the differences in hybrid engine duty cycles as compared to conventional engine duty cycles. We believe that this newly increased burden on hybrid vehicle manufacturers is ill-timed, when manufacturers and the Agencies are trying to increase hybrid sales. Manufacturers sell relatively few hybrid vehicles, and development and certification of OBD systems is costly. In turn, the per-vehicle price of hybrid OBD systems is high. This high price, on top of the already high upfront cost of hybrid vehicles is unwarranted, in that manufacturers already strive for robust fuel savings throughout a vehicle's life. Moreover, the price is counter to the Agencies' and manufacturers' goal of increasing hybrid sales. CARB has recognized similar issues with OBD on alternative fuel vehicles and has exempted alternative fuel vehicles from OBD requirements until 2020. CARB should do the same with hybrids. Moreover, the EPA should consider altering CARB's hybrid waiver to prohibit CARB's imposition of OBD requirements on hybrids. [EPA-HQ-OAR-2010-0162-1818.1, p.81]

Similarly, the Agencies, including CARB, should not require OBD on fuel saving or CO2 reducing technologies. Manufacturers already have a strong incentive to hold fuel consumption low throughout the life of a vehicle, for commercial reasons. So adding costly regulatory-driven sensors and diagnostics is a cost burden without a benefit. [EPA-HQ-OAR-2010-0162-1818.1, p.82]

We recommend that manufacturers be able to certify a powertrain using preselected aerodynamic and running resistance values (per elsewhere in these comments). In turn, manufacturers would not certify hybrid families for each type of aerodynamic configuration, as the Agencies suggest manufacturers should do in the NPRM. That is, the Agencies propose that manufacturers do coast-down testing for the aerodynamics values required in hybrid testing. In turn, unless a manufacturer is willing to forego emission credits, a manufacturer will have to test several configurations of powertrain and aerodynamics. Since aerodynamics only contribute a second order effect to hybrid A:B fuel savings, this is a waste of resources. Finally, we recommend that the hybrid A:B factor be a multiplier applied to GEM results for each vehicle using that powertrain. [EPA-HQ-OAR-2010-0162-1818.1, p.82]

We recommend that hybrid families be defined as similar configurations of hardware and identical engine hardware. In other words, a family would be all powertrains using (for example), Cummins ISB engines, a pre-transmission hybrid, and a particular chemistry of battery. Within the family might be ISB engines of 200 HP, 220 HP, …, plus 60 HP electric motors, 80 HP motors, …, plus 2 kW-hr battery packs, 4 kW-hr, …, and so on. The parent of the family would be the worst performing configuration on the A:B test, which we presume would be the highest power engine plus lowest power electric motor and lowest capacity storage. If a manufacturer wants to split one family into multiple ones, rather than forego credits, the manufacturer could do so but would have to test (or be confident in its modeling of) the second family's parent configuration's A:B fuel savings. [EPA-HQ-OAR-2010-0162-1818.1, p.82]

Criteria Pollutant Certification For Full Hybrid Powertrains Or Vehicles Is A Difficult Undertaking That Should Be Addressed In A Separate Rulemaking. [EPA-HQ-OAR-2010-0162-1818.1, p.82]

The EPA addressed GHG emission from hybrid powertrains in the present NPRM but did not address criteria pollutants. If the EPA wishes to address criteria pollutant certification from hybrid powertrains, we recommend a separate rulemaking, as such a rule would not be trivial and should not be inserted into a Final Rule without public comment. [EPA-HQ-OAR-2010-0162-1818.1, p.82]

On page 75 Fed. Reg. 74184 et seq., the Agencies propose a tire regulation program that puts the burden on vehicle manufacturers to certify tire data. The Agencies should not make vehicle manufacturers responsible for tire certification, because vehicle manufacturers do not test tires. Although the Agencies provide a mechanism for vehicle manufacturers to obtain from tire manufacturers a voucher for tire data, we find this insufficient as it still leaves vehicle manufacturers responsible for the performance of components that we do not test. We understand that the Agencies analogize tire performance to that of aftertreatment devices (ATDs), which are components that engine manufacturers certify. There is a big distinction between tires and ATDs, however, in that engine manufacturers must necessarily certify full engine-ATD systems (and do not certify the performance of an ATD by itself) while vehicle manufacturers will have to certify tires themselves under the proposed rules. The rule must be changed so that vehicle manufacturers are not required to test and certify tires. [EPA-HQ-OAR-2010-0162-1818.1, p.84]

The proposed emissions-related warranty requirements in §1037.120 would require a vehicle manufacturer to "warrant to the ultimate purchaser" that tires installed on a vehicle are designed and built to conform with the appropriate rolling resistance requirements, and that they are "free from defects in material and workmanship." (Re. 75 Fed. Reg. 74384.) Additionally, the proposed emissions modeling requirements in §1037.520(c) would require the vehicle manufacturer to measure the tire rolling resistance. (Re. 75 Fed. Reg. 74393.) Imposing those requirements on vehicle manufacturers would represent a departure from current marketplace practices, and would impose an impractical and unworkable burden on vehicle manufacturers. We echo the comments of EMA on this topic. In short, we recommend that the Agencies (1) allow a HD vehicle manufacturer to rely on a tire manufacturer's warranty to satisfy the regulations' "emissions-related" warranty requirements and (2) obligate tire manufacturers to measure the rolling resistance of the HD tires that they provide. [EPA-HQ-OAR-2010-0162-1818.1, p.84]

We understand from the NPRM and from discussions with the Agencies that the Agencies' intention is for engine and vehicle certification to be completely separate. And we understand from discussion with the Agencies that when a manufacturer is certifying a vehicle (e.g.) to the MY 2013 or 2014 standards, the manufacturer should use as input to GEM a MY 2014 engine, regardless what engine is actually in the vehicle. (The Agencies now recognize that MY 2013 vehicles, which are predominantly built in calendar year 2012, are available before MY 2013 engines, which are built in calendar year 2013.) Similarly, we understand that the Agencies intend for a MY 2017 vehicle to be modeled with a MY 2017 engine. In short, the Agencies' intention, as we understand it, is that vehicle certification remains separate from engine certification. In turn, if the vehicle is certified in a given model year, a manufacturer is to assume that same model year of engine in the vehicle, regardless what engine is actually used. (The exception is for MY 2013 early-compliance vehicles, which should assume MY 2014 engines rather than MY 2013 engines, because GEM treats MY 2013 engines different than the 2014 engines.) The regulations, however, do not state how to treat engine model year and thus are open to different interpretations. (Re., for example, 40 CFR §1037.520 at 75 Fed. Reg. 74391.) There are two simple fixes to the lack of clarity that exists in the NPRM, and either of these would make the regulations / GEM model parallel the Agencies' intent: first, the Agencies could change GEM such that a manufacturer cannot specify the engine model year (rather, the model year of engine would equal the model year of the vehicle); second, §1037.520 could be updated to require using the engine model year identical to the vehicle model year. [EPA-HQ-OAR-2010-0162-1818.1, pp.91-92]

EPA changes its normal practice in the preamble of the NPRM by requiring that manufacturers warrant AC components for the full useful life of the vehicle. Emissions related warranties have never been for the full useful life of the vehicle, but only a lesser emission warranty period. After that period ends, manufacturers are not responsible to repair components free of charge; the burden shifts to vehicle owners. Although EPA may have the authority to regulate a longer warranty period for certain components than for others, is that what they intend to do just for the AC components, unique among all emission-related components? The reason we ask is: anything beyond this just being a design standard, such a 5 year / 100,000 mile warranty will impact system cost, as manufacturers will not be able to shift repair burdens. [EPA-HQ-OAR-2010-0162-1818.1, p.94]In §1037.120(b), the EPA states that the warranty must last for the duration provided in 40 CFR Part 86. If the EPA attempts to resolve the divergence between their regulatory text and preamble, we suggest for the reasons above that they keep the §1037.120(b). [EPA-HQ-OAR-2010-0162-1818.1, p.95]

DTNA Believes Its Current Idle Shutdown Timers Meet The Agencies' Requirement For Tamper-Resistance Or For Being Tamper-Proof. If Not, The Agencies' Regulation Would Require Development Of New Technology And Change Of Product Plans, May Not Be Available For Early Credit Generation In Model Year (MY) 2013. [EPA-HQ-OAR-2010-0162-1818.1, p.96]

Current idle shutdown timers are tamper-resistant, although not tamper-proof in the sense that an extremely inventive vehicle operator may be able to (for example) fool the engine controller into believing the engine is not idling. We intend to offer idle shutdown timers like those used to satisfy CARB shutdown timer requirements, which we believe is consistent with the Agencies' intent that manufacturers be able to meet the 2014 standards using currently existing technologies. (75 Fed. Reg. 74172 and elsewhere.) In other words, we expect that our current idle shutdown timer technology will satisfy the Agencies' demand for tamper-resistance. If not, then we will need lead-time to develop new technologies. Changing engine controllers to include new and different tamper-resistant shut down timers might not be possible by early 2012, when the MY 2013 early credit generation is possible. Depending how much of change the Agencies demand (if you demand a change), that change might take much longer. DTNA Believes Its Current Idle Shutdown Timers Meet The Agencies' Requirement For Tamper-Resistance Or For Being Tamper-Proof. If Not, The Agencies' Regulation Would Require Development Of New Technology And Change Of Product Plans, May Not Be Available For Early Credit Generation In Model Year (MY) 2013. Current idle shutdown timers are tamper-resistant, although not tamper-proof in the sense that an extremely inventive vehicle operator may be able to (for example) fool the engine controller into believing the engine is not idling. We intend to offer idle shutdown timers like those used to satisfy CARB shutdown timer requirements, which we believe is consistent with the Agencies' intent that manufacturers be able to meet the 2014 standards using currently existing technologies. (75 Fed. Reg. 74172 and elsewhere.) In other words, we expect that our current idle shutdown timer technology will satisfy the Agencies' demand for tamper-resistance. If not, then we will need lead-time to develop new technologies. Changing engine controllers to include new and different tamper-resistant shut down timers might not be possible by early 2012, when the MY 2013 early credit generation is possible. Depending how much of change the Agencies demand (if you demand a change), that change might take much longer. [EPA-HQ-OAR-2010-0162-1818.1, p.96]

VEHICLE SPEED LIMITERS

DTNA Believes Its Current VSLs Meet The Agencies' Requirement For Tamper-Resistance Or For Being Tamper-Proof. If Not, The Same Regarding Lead time Applies To VSLs As For Idle Shutdown Timers. [EPA-HQ-OAR-2010-0162-1818.1, p.98]

The same issues as with idle shutdown timers apply here. Further we suggest that a customer changing (for example) tire sizes yet not updating the engine parameter for tire size in the engine control unit, which would give the engine an incorrect calculation for vehicle speed, should not be tampering against which the manufacturer must protect. Tire or vehicle changes are currently regular occurrences in the in-use HDV market and not something against which manufacturers can protect. [EPA-HQ-OAR-2010-0162-1818.1, p.98]

The Agencies based their proposed program on existing technologies, so that manufacturers would not challenge the lack of adequate lead time given. ('By focusing on existing technologies and well-developed regulatory tools, the agencies are able to propose rules that we believe will produce real and important reductions in GHG emissions and fuel consumption within only a few years.' Re. 75 Fed. Reg. 74172.) Such a premise only makes sense if the Agencies are speaking of technologies existing at each manufacturer. In other words, the Agencies surely recognize that just because one or a few manufacturers have a technology developed and in production does not mean that all of the other manufacturers can put that technology in production without lead time. In turn, we base our support for the Agencies' program on our understanding that the Agencies will accept our current VSL software. Our engine software for MY 2013 is already 'frozen,' meaning that we cannot significantly alter it. In turn, we may have difficulty making changes to the VSL software we have and, lacking the CAA's required lead time, can only certify with today's VSLs. Moreover, any requirement to make significant changes with such lead time could jeopardize our OBD-2013 engine programs, to which we are currently devoting a large amount of resources. Changing the relevant software protection scheme is not a trivial task. If, however, the Agencies will relax their tamper-resistance standards through 2013, then we (1) can support the Agencies' VSL program and (2) will work towards developing an appropriate level of protection for our VSL as we do with our fuel maps starting in 2014.

The Agencies' NPRM has several areas of inconsistency with warranty law, and these inconsistencies need rectification. Current law provides that "the manufacturer of each new motor vehicle and new motor vehicle engine shall warrant ... that such vehicle or engine is ... free from defects in materials and workmanship which cause such vehicle or engine to fail to conform with applicable [emission] regulations" for "5 years / 100,000 miles, whichever comes first." (Re.: CAA §207(a)(1) and 40 CFR §86.004-2.) The law does not provide that a manufacturer must warrant "any device or system whose failure would result in an increase in criteria pollutant emissions," as the Agencies assert. (Re.: NPRM, p. 238.) In the context of minimum maintenance interval regulations, e.g., at 40 CFR §86.004-25, the EPA defines "emissions-related component" as "a component whose sole or primary purpose is to reduce emissions or whose failure will significantly degrade emissions control and whose function is not integral to the design and performance of the engine." Perhaps this is the source of the Agencies' interpretation. Nonetheless, if a device or system fails in such a way that increased emissions by less than the amount necessary for the engine to reach the NTE threshold or an OBD threshold, then under the aforementioned regulations the device is an "emissions-related component" that is subject to minimum maintenance requirements yet is not necessarily by law covered by the emissions warranty. [EPA-HQ-OAR-2010-0162-1818.1, p.101]

In any case, later, the Agencies assert that “[s]ection 207 of the CAA requires manufacturers to warrant their products to be free from defects that would otherwise cause noncompliance with emission standards.” (Re.: NPRM, p. 247.) This is a correct statement of the warranty requirements. However, the Agencies follow this by asserting that “this warranty must ensure that the vehicle remains in this configuration throughout its useful life.” (Id.) Nowhere does the CAA say this. In fact, the CAA presages vehicle operators or other people tampering with their emission control devices and holds the tamperer responsible. (Re.: CAA §203(a)(3)(A).) The CAA does not require manufacturers to supply a warranty that “ensure[s] that the vehicle remains in this configuration throughout its useful life,” as warranting so would require that manufacturers enforce the anti-tampering law. In fact, where an operator has tampered with a device or system, or where an operator has failed to properly maintain the device or system per manufacturer specifications, EPA regulations allow a manufacturer to void the emission warranty in cases of abuse, neglect, improper maintenance, or tampering. [EPA-HQ-OAR-2010-0162-1818.1, p.101]

Additionally, the Agencies drastically change warranty requirements beyond the authority granted by Congress. EPA's authority derives from CAA §207(a)(1), which provides that 'the manufacturer of each new motor vehicle and new motor vehicle engine shall warrant ... that such vehicle or engine is ... free from defects in materials and workmanship which cause such vehicle or engine to fail to conform....' (emphasis added). However, in proposed regulation 40 CFR §1037.120, the EPA proposes to require that manufacturers warrant a vehicle 'is free from defects in materials and workmanship that may keep it from meeting these requirements.' (emphasis added.) In other words, the Agencies expands the warranty requirements to encompass not just defects that cause failures to conform but also defects that may cause failures to conform. We recommend that the Agencies drop the word 'may.' [EPA-HQ-OAR-2010-0162-1818.1, pp.101-102]

Further, the EPA's proposals for GHG-related warranties drastically change the agency's long-standing warranty policy and drive a lot of cost into vehicle warranties. EPA regulations have historically provided that '[e]xtended warranties on select parts do not extend the emissions warranty requirements for the entire engine but only for those parts. In cases where responsibility for an extended warranty is shared between the owner and the manufacturer, the emissions warranty shall also be shared in the same manner as specified in the warranty agreement.' (Re.: 40 CFR §86.004-2.) By contrast, the EPA's proposed §1037.120 provides:

The emission-related warranty for the vehicle may not be shorter than any published warranty you offer with or without charge for the vehicle. Similarly, the emission-related warranty for any component may not be shorter than any published warranty you offer with or without charge for that component. [EPA-HQ-OAR-2010-0162-1818.1, p.102]

In other words, the EPA's historical regulations provided for a warranty period of 5 years or 100,000 miles (whichever came first), except where a manufacturer extended the warranty on a customer's part, in which case the emissions warranty was no shorter than that extended warranty. The EPA's proposed regulation would provide that if a manufacturer publishes an offer of an extended warranty, even if few customers buy that extended warranty, the manufacturer must still cover all customers for the same duration and / or mileage. (For example, DTNA offers warranties as long as 400,000 miles as an option.) In turn, this would require drastically longer warranties than are historically required. If this departure is what the EPA intends, then the EPA should understand that (1) this will drive up costs well above what the EPA has accounted for in the cost analysis in the NPRM and Regulatory Impact Analysis and (2) this may encourage manufacturers to decrease their warranty offers. [EPA-HQ-OAR-2010-0162-1818.1, p.102]

DTNA recommends that the EPA retain its long-standing policy of emission warranty periods, not create this new one. Moreover, we recommend that the EPA re-examine what devices and systems can be drawn into an emission-related warranty. [EPA-HQ-OAR-2010-0162-1818.1, p.102]

The Agencies propose to require that “vehicle manufacturers must warrant all components installed which act to reduce CO2 emissions at the time of initial sale. This includes all aerodynamic features, tires, idle reduction systems, speed limiting system, and other equipment added to reduce CO2 emissions.” (75 Fed. Reg. 74273.) Again, the CAA grants the EPA authority to require that manufacturers warrant that the vehicle does not “fail to conform.” The CAA does not grant the EPA authority to require warranties over parts not covered by the conformance or compliance standard. Accordingly the “includes” in the above quote from 75 Fed. Reg. 74273 should be “includes and is limited to” or simply “comprises,” and the items listed should be only those used in GEM or certified (meaning, AC systems and evaporative systems). In other words, the “other equipment added to reduce CO2 emissions” is only other equipment that is listed in the manufacturer’s certification application as necessary for compliance. In §1037.120(c), the EPA properly states that the warranty provisions only “covers vehicle speed limiters, idle shutdown systems, fairings, hybrid system components, and all components whose failure would increase a vehicle’s evaporative emissions.” If the EPA attempts to resolve the divergence between their regulatory text and preamble, we suggest that they keep the §1037.120(c) text in order to stay with the bounds of authority granted by the CAA. (NHTSA’s empowering act in this regard, EISA, does not provide for warranties, so EPA’s warranty authority defines the outer bounds of authority granted to the Agencies.) [EPA-HQ-OAR-2010-0162-1818.1, pp.102-103]

Similarly, when the EPA proposes to require that manufacturers “that a repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems,” (§1037.125 at 75 Fed. Reg. 74385) we interpret this to mean only the regulated emission control devices: aerodynamic features, tires, idle reduction systems, speed limiting system, and other equipment that is listed in the manufacturer’s certification application as necessary for compliance. [EPA-HQ-OAR-2010-0162-1818.1, p.103]

Minimum maintenance interval provisions only make sense in the context of service accumulation on emission-data vehicles and limitations on frequency with which those vehicles can be maintained. In the EPA’s currently proposed program, there is no service accumulation testing. (Rather, the Agencies have voiced their intention for no DF adjustment for present technologies.) In turn, the Agency should have no reason to place a lower limit on the intervals that manufacturers recommend emissions-related components be serviced. Quite the opposite, the Agency should encourage frequent maintenance. Therefore, we recommend that the Agency omit this section of the regulations. If, contrary to our understanding of the NPRM and our discussions with the Agencies, the EPA does intend to require service accumulation and DF demonstration, then we need to (1) learn from the Agency how the DF provisions will work and (2) based on this understanding, reexamine this section of the regulations. [EPA-HQ-OAR-2010-0162-1818.1, p.106]

Response:

Both NHTSA and EPA are charged with regulating medium-duty and heavy-duty trucks; NHTSA regulates them under EISA and EPA regulates them under the CAA. Both agencies also have compliance review and enforcement responsibilities for their respective regulatory requirements. The same set of underlying facts may result in a violation of EISA and a violation of the CAA. The agencies recognize the above concerns, and intend to address them through appropriate consultation. The details of the consultation and coordination between the agencies regarding enforcement will be set forth in a memorandum of understanding to be developed by EPA and NHTSA. Additionally, for certification, there will be a single point of entry for both NHTSA and EPA using EPA's certification system(s).

Regarding NHTSA penalty provisions, Sections I. F.(2)(b) and V.G.(2) of the preamble NHTSA provides responses to the commenter's concerns.

Regarding NHTSA's authority for engine versus vehicle certification, NHTSA does not believe that EISA mandates a particular regulatory approach, but rather gives the agency wide latitude and explicitly leaves that determination to the agency. Given the MD/HD market structure, where the complete vehicle manufacturers are numerous, diverse, and often small businesses, the regulation of complete vehicles would create unique difficulties for the application of appropriate and feasible technologies. NHTSA continues to believe that this complementary engine and vehicle approach is the best way to achieve near term reductions from the heavy-duty sector.

The agencies have finalized an approach that will be based primarily on pre-model year certification by EPA. This will be based on projected volumes and will need to be reconciled following the end of the model year. Similar to the certification & compliance procedures with the light-duty CAFE program, EPA and NHTSA will jointly use the data from these end of year reports to verify that a manufacturer is in compliance with emission and fuel consumption standards.

The agencies have finalized language allowing for the use of carry-over and carry-across data provided no emission-related changes have occurred between model years. These provisions are consistent with current criteria-pollutant regulations.

Upon further review of the data, the agencies believe that a 3% compliance margin is appropriate for this final rule, which adequately accounts for production variation from engine-to-engine as well as lab-to-lab variation. The agencies will continue to collect relevant data for revisiting this compliance margin for future rulemaking activities.

There are no IRAF requirements for this final rule as we continue to believe that heavy-duty vehicle and engine manufacturers are already very well motivated to extend the regeneration frequency to as long an interval as possible and to reduce the during of the regeneration as much as possible. Both of these actions significantly reduce the impact of regeneration on CO_2 emissions and fuel consumption. We do not believe that adding an adjustment factor for infrequent regeneration to the CO_2 or fuel efficiency standards would provide a significant additional motivation for manufacturers to reduce regenerations.

The agencies agree that (at this time) this raises practical issues for certification testing, however we also believe that manufacturers have significant data from these modal points which could be used to satisfy our model refinement goals. Therefore, we believe it is appropriate to still require the submission of modal data, however manufacturers may submit development data from production-level engine calibrations to satisfy this modal data requirement.

In response to the comment stating that manufacturers may not always know the vehicle test weight for all in-use testing, the following language has been added to the preamble: For the purposes of calculating the g/ton-mile metric, we prefer that manufacturers use the measured vehicle weight. However it has been brought to our attention that this may not always be available, in which case an estimated vehicle weight can be used along with a written justification for the basis of the estimation.

In response to comments stating that transmission and axle ratio are not relevant to aerodynamic performance and therefore should not be required, the agencies are no longer requiring this information for heavy duty tractors and vocational vehicles at the time of certification.

We believe that the agencies and the commenter are largely in agreement on this topic of use and accessibility to in-use data. However, it is worth clarifying that the agencies are not finalizing a means for facilitating in-situ testing of in-use vehicles (i.e. an NTE-based test procedure and standard). We still reserve the right to test engines from in-use vehicles according to the engine dynamometer test procedures (and certification test cycles).

To reiterate, we are not finalizing an NTE standard for CO2 emissions for this final rule. This decision may be revisited in future rulemakings and this comment will be taken into account when considering additional requirements.

EPA sought public comment on what devices and/or systems may need to be added to the critical emissions-related component list to adequately address GHG emissions components. EPA expressed concerned that there may be instances where the failure of a component or system, not included on the existing critical criteria emissions-related component list, may reduce the efficiency of the engine while not increasing criteria pollutant emissions and that in this case, and that such components should therefore be added to the list. The commenter agreed with EPA's assessment that the existing list of commonly defined critical components is adequately addresses GHG emissions. The commenter felt that the list was comprehensive and essentially includes most if not all components and systems that impact engine performance and emissions, which essentially also impact the engine's fuel efficiency. During the certification application review process, §1036.205 requires that manufacturers describe in detail all system components for controlling GHG emissions. During this review, components that are introduced specifically for GHG emissions reduction will be identified and where appropriate, added to the emissions-related components list. The commenter believed that it would not be appropriate to include on this list components that serve primary functions unrelated to GHG emissions control but which may have features whose improvement may lead directionally to improved GHG emissions. The list of critical components is being finalized as proposed.

The maintenance requirements are being finalized as proposed.

The agencies generally agree with the concerns raised by the commenter regarding the impact of consumer labels or significant labeling constraints without benefit and do not wish to add burdensome and arbitrary labeling requirements. Concurrently, we also remain committed to giving agency inspectors adequate tools to ensure a vehicle is in its certification at least at the time of sale. Therefore, we are finalizing a vehicle label requirement that includes:

-Compliance statement

-Vehicle manufacturer

-Vehicle family (and subfamily)

-Date of manufacture

-Regulatory subcategory

-Emission control system identifiers

To address the concerns identified above, particularly related to emission control (EC) identifiers, we believe a combination of selectable information on the label as well as a set of EPA-defined EC identifiers will provide a useful, but not overly burdensome labeling scheme. Since the intent of these identifiers is to provide inspectors with a means for simply verifying the presence of a component, we do not believe overly detailed identifiers are necessary, particularly for tires and aerodynamic components. For instance, current engine regulations require that three-way catalysts be identified on engine labels as "TWC." However, unique details such as catalyst size, loading, location, and even the number of catalysts are not on the label. In similar fashion, we believe that identifying tires and aerodynamic components in a general sense will prove similarly effective in determining if a vehicle has been built as intended or if it has been modified prior to being offered for sale.

EPA is requiring that components for which vehicle certification is dependent upon be identified on the label. This includes limited aerodynamic components (roof fairings, side skirts, & gap reducers), vehicle speed limiters, LRR tires, and idle reduction components. If vehicle certification also depends on the use of innovative or advanced technologies, this too must be included on the label.

On the vehicle label, several (if not all), available EC identifiers available in a given subfamily can be listed and the appropriate selections can be made at the time of assembly based on each unique vehicle configuration. This practice is common on engine ECI labels (normally for month/year of manufacture) and selections are made using a punch, stamp, check mark or other permanent method. This provides inspectors with the information they need while still affording flexibility to manufacturers with several unique vehicle configurations.

At the time of certification, manufacturers are required to submit an example of their vehicle emission control label such that EPA can verify that all critical elements mentioned above are present. In addition to the label, manufacturers will also need to describe where the unique vehicle identification number and date of production can be found on the vehicle (if the date is not present on the label)

At this point, Part 1066 requirements only apply to HDVs subject to chassis testing requirements, such as hybrid vehicles. This does not apply to chassis-certified HDVs with a GVWR below 14,000 lbs.

Selection criteria for vehicle families have been modified since the NPRM to address concerns such as what the commenter has identified. The final rule requires a minimum of one vehicle family per regulatory subcategory, with separate families being required for vehicles utilizing advanced/innovative technologies. Manufacturers may create additional families as they deem necessary, however this is not required.

To address the multitude of vehicle configurations, each family can be divided into sub-families, each with a unique GEM inputs and FELs. GEM results for at least ten configurations are required (or all configurations if there are less than 10 in the subfamily). For manufacturers wishing to subdivide families according to each permutation of equipment, batch processing functionality will be available in GEM which will allow a for a spreadsheet of vehicle configurations. GEM will calculate emission results for each configuration and the resulting spreadsheet will be submitted for certification. The agencies do not believe this will place undue burden on manufacturers.

The agencies believe that the commenter's concerns have adequately been addressed in the certification processed being finalized. Additionally, axle width has been removed as a family determinant for the final rule.

Requirements have been revised to include the following language, which we believe provides adequate flexibility to address the commenter's concern.

§1037.201(g): "Alternatively, you may choose to deliver another vehicle that is identical in all material respects to the test vehicle."

In response to comments from engine manufacturers, hybrid system manufacturers, and related trade groups which broached concerns regarding the feasibility of applying OBD systems on heavy-duty hybrid applications starting in 2013 and requesting a delay until 2020 to implement OBD on these systems, the EPA is extending the OBD phase-in for these systems until 2016/2017 depending on the application. We believe the additional phase-in time is necessary to allow these manufacturers time to work together to develop the appropriate communication protocol, address any hardware and/or software issues, and to provide sufficient lead-time for additional hybrid diagnostic system development given resource constraints as engine manufacturers are focused on meeting the 2013 OBD requirements for conventional products at this time. Manufacturers will be required to implement feasible controls for these hybrid systems that do not adversely impact emissions performance in 2013. In 2016, hybrid systems that were in production after January 1, 2013 must meet full OBD requirements, and those put into production prior to January 1, 2013 must be in compliance by 2017. Additionally, manufacturers will be required to provide annual documentation of their progress toward meeting the OBD requirements for 2016 and 2017. See Section 16 of this document for further details.

Criteria pollutant certification unique to hybrid powertrains is not addressed in this rulemaking

The agencies are not requiring tire certification in this rulemaking. Rather a demonstration must be made, either by the tire or vehicle manufacturer, showing the rolling resistance of the tire. While we leave it up to the tire and vehicle manufacturers to sort out which entity conducts such testing, the vehicle manufacturer remains ultimately responsible for using tires with rolling resistances consistent with what they specify on their application for certification.

Vehicle manufacturers may use the tire manufacturer's warranties to satisfy regulatory requirements, provided that all requirements outlined in §1037.120 are met. However if tire manufacturers fail to meet their warranty obligations, the vehicle manufacturer will be held liable.

Engine model year (or any engine parameter) is no longer a GEM input, so we do believe this comment has been addressed.

All emission-related warranty language in the preamble has been revised to more accurately reflect agency intent (consistent with Part 86). More specifically, A/C systems are required to be warranted against design or manufacturing defects causing refrigerant leakage in excess of the standard. The warranty period for the A/C system is identical to the vehicle warranty period.

For the final rule, some adjustments to the maximum speed limit governed by VSLs by vehicle manufacturers are appropriate to accommodate flexibilities desired by the trucking industry. We believe that these flexibilities would not significantly decrease the anticipated fuel consumption/CO_2 benefits of VSLs. Issues identified by the commenters including the ability to change delivery routes requiring different governed speeds or when a fleet's business practices change resulting in a desire for greater fuel consumption savings are not in conflict with the purpose and benefit of VSLs. As such, the agencies have decided to allow a manufacturer to allow its fleet customers to set their own lower maximum VSL speed limits, but the agencies have decided to not allow compliance to be recalculated if the VSL speed limit is lowered. In this case, the agencies will not allow additional benefit in GEM to a manufacturer for allowing a lower governed speed than the certified maximum limit for this first phase of the HD National Program. The agencies will continue to monitor the performance of the fleets and will consider giving further benefits in the next phase of the program.

The warranty duration was incorrectly specified in section V of the preamble to the NPRM. The correct warranty duration for GHG emission related components is consistent with criteria pollutant regulations under 40 CFR Part 86 and the preamble has been corrected to reflect this.

Chapter V of the preamble has been updated to be consistent with §1037.120.

We respectfully disagree with the commenter's assertion in regarding the purpose of maintenance instructions. If an element of the emission control system requires routine maintenance to remain functional for the useful life of the engine/vehicle, then this maintenance needs to be described in the certification application, which is consistent with current agency practice.

Organization: Engine Manufacturers and Truck Manufacturers Associations

The Associations also note the discussion in the Preamble that acknowledges EPA's support of the World-Wide Heavy-Duty Certification Procedure ('WHDC') that was recently amended by the UNECE World Forum for Harmonization of Vehicle Regulations (WP.29). Those amendments eliminated the options in the WHDC procedure that stood as a significant barrier to the WHDC being a uniform and acceptable global procedure. Now that the WHDC is an effective and implementable procedure, EPA should work expeditiously to adopt the WHDC in the United States. [EPA-HQ-OAR-2010-0162-1940.1, p.4]

Metrics for GHG/FE Standards As noted above, EMA and TMA fully support the work-based metrics that the Agencies have proposed for implementing and assessing compliance with the GHG/FE standards, as those metrics account for the work-based functions that HD vehicles are designed to perform. The emission metrics that the Agencies have proposed (g/bhp-hr; glton-mi.) also align well with the metrics that apply to the HD vehicle emission standards for criteria pollutants, as do the proposed engine certification test procedures (i.e., the FTP and SET). This alignment will allow for a single engine certification process for all of the regulated pollutants (NOx, HC, CO, PM, and now CO2, N2O and CH4), and will help to ensure that compliance with the emission standard for one pollutant does not come at the expense of non-compliance with another. [EPA-HQ-OAR-2010-0162-1940.1, p.11]

The Associations agree with the Agencies that it is not appropriate to consider NTE-based CO2 standards at this time, or to establish a manufacturer-run in-use testing program for CO2 emissions, as has been implemented for other gaseous pollutants and PM. Thus, EMA and TMA support the Agencies' conclusions that the only types of post-certification testing that might apply to CO2 emissions from HD vehicles and engines will be confirmatory testing and Selective Enforcement Audit ('SEA') testing. In light of the foregoing, and given the present infeasibility of establishing an objective, accurate, and repeatable in-use testing protocol for CO2 emissions, the Agencies should not require any in-use vehicle testing to assess compliance with the Proposed GHG/FE Standards. In-use vehicle testing involves too many uncontrolled variables that can impact CO2 emission rates, including wind speeds, driving routes, driver behavior, and vehicle condition. In addition, any In-use vehicle testing would not match-up with the certification test cycles for CO2 emissions. [EPA-HQ-OAR-2010-0162-1940.1, p.12]

In that regard, it is critically important that the Agencies establish a sufficient compliance margin for any post-certification testing. To do so, the Agencies must analyze additional CO2 emissions data beyond those included in the Draft Regulatory Impact Analysis ('RIA'). Those data do not involve a sufficient number of test facilities, and were derived from too few engines, including engines equipped with older emissions control technologies. The Agencies need to analyze a larger data set in order to achieve a more statistically-robust understanding of test-to-test (short-term and long-term) and engine-to-engine variability, and to determine whether a margin is needed for any potential confirmatory testing. At the same time, the Agencies should use the same data analysis to determine whether the proposed 2% adjustment factor is sufficient for SEA testing. The Associations stand ready to participate in any additional round-robin testing that is needed to apply appropriate data to properly address those important issues. [EPA-HQ-OAR-2010-0162-1940.1, pp.12-13]

The proposed emissions-related warranty requirements in §1037.120 would require a vehicle manufacturer to 'warrant to the ultimate purchaser' that tires installed on a vehicle are designed and built to conform with the appropriate rolling resistance requirements, and that they are 'free from defects in material and workmanship.' (See 75 FR at 74384.) Additionally, the proposed emissions modeling requirements in §1037.520(c) would require the vehicle manufacturer to measure the tire rolling resistance. (See 75 FR at 74393.) Imposing those requirements on vehicle manufacturers would represent a departure from current marketplace practices, and would impose an impractical and unworkable burden on vehicle manufacturers.

Thus, the Agencies should eliminate those unacceptable requirements. [EPA-HQ-OAR-2010-0162-1940.1, p.24]

The current practice in the HD vehicle market is for tire manufacturers to warrant to the ultimate vehicle purchaser that the tire is free from defects in materials and workmanship. Since tires are designed, manufactured, and marketed by the tire companies without any direct involvement from HD vehicle manufacturers, vehicle manufacturers are not involved in providing tire warranties to vehicle purchasers. HD vehicle manufacturers make available a wide array of tire brands, models and sizes for vehicle purchasers to choose from. Often, the HD vehicle purchaser's tire choice is based on a long history of analyzing the cost of operation for a particular tire, and a long-standing relationship with the tire manufacturer and/or a particular distributor. As such, the tire manufacturer's warranty is extended directly to the vehicle purchaser, and any services under the warranty are provided directly from the tire manufacturer to the end user. [EPA-HQ-OAR-2010-0162-1940.1, p.24]

Due to the nature of the marketplace for tires, HD vehicle manufacturers also do not identify the rolling resistance characteristics for particular tires. Instead, the rolling resistance is one of the many tire features (along with brand, model, size, tread configuration, load and speed ratings, etc.) that a customer may consider when choosing a tire for a particular HD vehicle. The tire manufacture designs the tire with a particular rolling resistance characteristic in mind, and measures that rolling resistance to validate the tire's performance. Moreover, the tire manufacturer controls the raw material and manufacturing processes to ensure that the produced tire will perform as expected. Accordingly, tire manufacturers (not vehicle manufacturers) are responsible for the rolling resistance of the HD tires that they provide to the marketplace. [EPA-HQ-OAR-2010-0162-1940.1, p.24]

Considering the current HD tire and vehicle marketplace, the Agencies should allow a HD vehicle manufacturer to rely on a tire manufacturer's warranty to satisfy the regulations' 'emissions-related' warranty requirements. Further, tire manufacturers should be obligated to measure the rolling resistance of the HD tires that they provide, and to warrant those test results to vehicle manufacturers, so that those test results can be used as part of the certification of the GHG emission levels of the vehicle. Additionally, the Associations are concerned about potential variability in the rolling resistance results from tires tested at different laboratories. Accordingly, the Agencies should consider modifications to the proposed provisions in §1037.520(c) and/or the ISO 28580:2009 test method (incorporated by reference in §1037.810) to address potential test-to-test variability. [EPA-HQ-OAR-2010-0162-1940.1, p.24]

Developing, validating and implementing OBD for engines used in hybrid powertrains, as well as hybrid system components, will require the investment of significant capital and human resources from engine and vehicle manufacturers, complicated by the lack of vertical integration between engine, vehicle and hybrid system suppliers. Because hybrids are sold in very low volumes, any costs associated with OBD compliance will be amortized over very few vehicles, which will further exacerbate the already-high cost of purchasing hybrids. Thus, the cost and complexity associated with the imposition of OBD requirements would be a significant obstacle to the increased development and deployment of HD hybrid vehicles. [EPA-HQ-OAR-2010-0162-1940.1, pp.30-31]

Accordingly, and in furtherance of the stated goal of increasing the deployment of HD hybrid vehicles, the Agencies should clarify that no OBD requirements of any kind will be required for hybrid systems, whether related to GHG/FE improvement technologies or criteria pollutant control technologies. OBD requirements for hybrid engines and hybrid system components should not be implemented before 2020, in any event, to align with the 2020 effective date for OBD for alternative fuel engines. The Agencies should work to ensure that CARB adopts a similar regulatory approach. [EPA-HQ-OAR-2010-0162-1940.1, p.31]

For all of the reasons set forth above, the emission-related warranty provisions in §1037.120 (i.e., 5 years/ 100,000 miles, whichever occurs first) are not appropriate for all components that make up hybrid drivetrains. For example, electrochemical battery systems are not likely to last 5 years or 100,000 miles. Indeed, not all battery systems even have uniform degradation rates among the various composition materials (e.g., lithium-based versus lead-based batteries) and, as a result, it is difficult to establish an appropriate emission warranty period, and predict emissions-related warranty costs, for hybrid technologies. Considering the dynamic and developing nature of hybrid system technologies, the risk of potential emission warranty liability could discourage manufacturers from introducing hybrid systems into the marketplace. Accordingly, the Agencies should provide more flexible emission-related warranties tailored to specific hybrid system components, particularly for energy storage systems. To do otherwise will hinder the availability of HD hybrid powertrains, particularly lower cost hybrid powertrain and vehicle designs. [EPA-HQ-OAR-2010-0162-1940.1, pp.31-32]

Instead of overlapping and duplicate certification reporting requirements, the Agencies need to implement a single coordinated reporting template (one for engine manufacturers and one for vehicle manufacturers) that manufacturers can submit to both Agencies. As it currently stands, the Proposed GHG/FE Standards will impose on HD engine and vehicle manufacturers numerous overlapping, and potentially conflicting, requirements relating to the submission of engine/vehicle certification applications, ABT reports, preliminary and final compliance reports, and voluminous record-keeping obligations. Those myriad requirements, as currently proposed, are likely to cause extensive and unacceptable delays in the certification process for HD engines and vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.35]

Moreover, there are overlapping and potentially conflicting requirements between the submissions and reports that are to be made to EPA, and those that are to be made to NHTSA. This is apparent from the sheer volume of the multiple reporting-related regulatory provisions at issue. [EPA-HQ-OAR-2010-0162-1940.1, p.35]

In lieu of the current tangle of requirements, EPA and NHTSA need to adopt a single, uniform template that manufacturers can use to make their submissions to each Agency. Otherwise, the burdens of the HD National Program will quickly become unmanageable and the certification process will collapse under its own weight. [EPA-HQ-OAR-2010-0162-1940.1, p.35]

In addition to eliminating the prospect of duplicate reporting requirements, the Agencies will need to ensure that they will not assess any duplicate certification fees. Certification fees are calculated based on the number of engine families and projected sales volume (subject to a final reconciliation). That process should carryover to the GHG/FE standards, such that only one calculation of certification fees results. The manner in which the Agencies choose to allocate that single fee calculation is for them to determine. The critical point is that the Agencies are not entitled to any enhanced or duplicative fees simply because they are implementing a joint program. Any increased costs that may result from the Agencies' overlapping efforts are their costs, not manufacturers'. Manufacturers should be assessed a single certification fee based on the established methodology. (See 40 CFR §86.901; 40 CFR §85.2401.) [EPA-HQ-OAR-2010-0162-1940.1, p.35]

EPA's authority to assess penalties for the violation of emission standards is specifically provided for and circumscribed under the CAA. (See CAA §205; 42 U.S.C. §7524.) Significantly, the opportunity for hearings under the Administrative Procedure Act ('AP A') (5 U.S.C. §554, et al.) and for judicial review of any EPA-imposed penalties also is specifically provided for. (See 42 U.S.C. §7524(c).) [EPA-HQ-OAR-2010-0162-1940.1, pp.35-36]

The case is entirely different, however, with respect to NHTSA's authority to assess penalties for any violations of the GHG/FE/fuel economy standards at issue. NHTSA's authority to establish fuel economy standards for HD vehicles arises under EISA. (See 49 U.S.C. §32902(k).) Significantly, EISA contains no express grant of authority to NHTSA to assess civil penalties, nor does it contain any provisions establishing the necessary limits and judicial safeguards circumscribing that authority. Thus, NHTSA's claim to penalty-assessing authority is, at best, premised on an unconstitutional delegation of insufficiently limited and circumscribed legislative authority, or, more likely, is simply beyond NHTSA's actual statutory authority under EISA, and thus invalid. [EPA-HQ-OAR-2010-0162-1940.1, p.36]

More specifically, EISA authorizes NHTSA only to establish 'compliance and enforcement protocols' (i.e., testing and certification protocols and procedures) for the HD fuel efficiency improvement program that it has developed in consultation with EPA. EISA contains no reference whatsoever to monetary civil penalties arising from potential violations of fuel efficiency requirements. Thus, there is no underlying statutory basis for the penalty provisions that NHTSA is proposing to adopt as a part of the rulemaking at issue. (See §535.9(b).) [EPA-HQ-OAR-2010-0162-1940.1, p.36]

Moreover, under its proposed regulations, the monetary penalties that NHTSA would grant itself the authority to assess would not be subject to the review process of the APA (see §535.9(b)(1)) and, in the case of penalties up to $250 million would not be entitled to any administrative appeals process whatsoever (see §535.9(b)(12)). Thus, in addition to being unauthorized under EISA, the penalty provisions at issue are invalid on fundamental due process grounds as well. At the very least, there must be an express right to judicial review of any civil penalty that NHTSA would seek to assess, even assuming it had the authority to do so, which it does not. [EPA-HQ-OAR-2010-0162-1940.1, p.36]

EPA and NHTSA also have failed to establish any safeguards in their proposed regulations to ensure that their penalty-assessment provisions (albeit invalid to begin with for NHTSA) do not unlawfully duplicate the other's penalty-assessment provisions, thereby creating double-jeopardy for manufacturers with respect to the same alleged violation of the GHG/FE standards at issue. Without clear-cut regulatory assurances and safeguards against any potentially duplicative civil penalties, the Agencies' program cannot satisfy even the minimum requirements of procedural due process. [EPA-HQ-OAR-2010-0162-1940.1, p.36]

Accordingly, in light of all of the fundamental defects that are inherent with respect to NHTSA's attempt to grant itself penalty-assessment authority, the proposed regulatory provision that has spawned from that unconstitutional exercise (specifically, §535.9(b)) should be withdrawn. In its place, NHTSA should simply adopt a regulation stating that it will rely on EPA's penalty-assessment authority to assess any civil penalties that may be warranted for violations of the Proposed GHG/FE Standards, and that, under no circumstances, will the Agencies pursue separate enforcement actions for the same alleged violation. Otherwise, the stage will be set for legal challenges to the Proposed GHG/FE Standards, which otherwise were intended by all stakeholders to be implemented on an accelerated timetable in accordance with a common core of agreed-upon principles. [EPA-HQ-OAR-2010-0162-1940.1, pp.36-37]

Response:

EPA will take harmonized duty cycle option suggestions under advisement for future rulemakings. However, the WHDC will not be an option for demonstrating compliance for this final rule.

The proposed metrics (as identified above) will be retained for the final rule with regarding to duty cycles and methods for assessing performance.

We believe that the agencies and the commenter are largely in agreement on the topic of many of the in-use testing options. However, it is worth clarifying that the agencies are not finalizing a means for facilitating in-situ testing of in-use vehicles (i.e. an NTE-based test procedure and standard). We still reserve the right to test engines from in-use vehicles according to the engine dynamometer test procedures (and certification test cycles).

Upon further review of the data, the agencies believe that a 3% compliance margin is appropriate for this final rule, which adequately accounts for production variation from engine-to-engine as well as lab-to-lab variation. The agencies will continue to collect relevant data for revisiting this compliance margin for future rulemaking activities.

The agencies are requiring that a performance demonstration must be made, either by the tire or vehicle manufacturer, showing the rolling resistance of the tire. While we leave it up to the tire and vehicle manufacturers to sort out which entity conducts such testing, the vehicle manufacturer remains ultimately responsible for using tires with rolling resistances consistent with what they specify on their application for certification. Similarly, tire manufacturers may provide a warranty on their product that vehicle manufacturers may pass directly on to the ultimate purchaser. However, if the tire manufacturer fails to meet their warranty obligations, the vehicle manufacturer is responsible for addressing warranty claims.

In response to comments from engine manufacturers, hybrid system manufacturers, and related trade groups which broached concerns regarding the feasibility of applying OBD systems on heavy-duty hybrid applications starting in 2013 and requesting a delay until 2020 to implement OBD on these systems, the EPA is extending the OBD phase-in for these systems until 2016/2017 depending on the application. We believe the additional phase-in time is necessary to allow these manufacturers time to work together to develop the appropriate communication protocol, address any hardware and/or software issues, and to provide sufficient lead-time for additional hybrid diagnostic system development given resource constraints as engine manufacturers are focused on meeting the 2013 OBD requirements for conventional products at this time. Manufacturers will be required to implement feasible controls for these hybrid systems that do not adversely impact emissions performance in 2013. In 2016, hybrid systems that were in production after January 1, 2013 must meet full OBD requirements, and those put into production prior to January 1, 2013 must be in compliance by 2017. Additionally, manufacturers will be required to provide annual documentation of their progress toward meeting the OBD requirements for 2016 and 2017. See Section 16 of this document for further details.

For the final rule, the agencies have finalized a process for streamlined certification utilizing either existing procedures (for engine certification) or new templates (for vehicles) all submitted to EPA. End of year reporting requirements have been communized to the greatest degree possible, so we believe that the commenter's concerns have been addressed.

EPA is responsible for certification and will assess certification fees. NHTSA will obtain certain data from EPA to verify compliance with their fuel consumption standards, but will not directly certify or collect certification fees from manufacturers.

Regarding NHTSA penalty provisions, Sections I.F.(2)(b) and V.G of the preamble provide responses to the commenter's concerns.

NHTSA does not agree with the commenter's suggestion that the proposed language limits the agency's discretion to impose a civil penalty.

Organization: Exa Corporation

We agree with the EPA proposal to split the CFD requirements into 3 categories, including a general category applicable to all methods, a category specific to Navier Stokes methods, and a category specific to Lattice Boltzmann methods. In section 3, we will comment on the proposed set of minimum requirements for these three categories. [EPA-HQ-OAR-2010-0162-1759.1, p.8]

We believe that the more critical aspect of the proposed ruling is to define the certification “test” for approved CFD methods to mandate the use of a fully, standardized and universal setup. This must be defined in such a way that users cannot tune or calibrate any of the modeling parameters to meet certain accuracy criteria on a specific vehicle. Different turbulence model parameters influence the simulation results and therefore need to remain unchanged in order to allow the comparison of aerodynamic performance between different vehicle designs. In practice, this is how Exa’s customers operate. They use the provided setup templates and standard definitions for all of the simulation setup parameters. These are used consistently when making comparisons across different trucks. These setup parameters are derived from extensive studies and comparisons to experimental testing, in order to meet certain accuracy criteria. All controllable setup parameters must be standardized and well defined in order to have a truly robust and predictive simulation process. [EPA-HQ-OAR-2010-0162-1759.1, p.8]

In addition to adhering to a set of minimum requirements, we advise the agencies to use a certification process for approving the use of specific aerodynamic assessment methods. This certification should be required for coastdown testing, wind tunnel testing, and CFD methods. We will comment on the agencies envisioned two part program, restated here: [EPA-HQ-OAR-2010-0162-1759.1, p.12]

1.) “Validation of the manufacturer source data by performing an audit of the manufacturer’s aerodynamic assessment methods and tools as described in this proposal using a reference truck” [EPA-HQ-OAR-2010-0162-1759.1, p.12]

2.) “Vehicle confirmatory evaluation using a vehicle recruited from the in-use fleet and performing the aerodynamic assessment discussed in this proposal, either using the manufacturer’s facility and tools or using the agency’s facility and tools” [EPA-HQ-OAR-2010-0162-1759.1, p.12]

In general, Exa supports the agencies envisioned program, however, would like to suggest that a single wind tunnel facility be selected as the benchmark for approving all other methods including other wind tunnels, coast down test results, and CFD simulation methods. The wind tunnel facility must accommodate a full scale tractor-trailer combination, such that an in-use vehicle can be tested as stated in the second part of the program. We propose that the agencies define different passing criteria for each of the approved methods as follows: [EPA-HQ-OAR-2010-0162-1759.1, p.12]

All CFD methods must follow the set of minimum guidelines for modeling wind tunnel environments (recommended in section 3.3.2) and predicted wind-average drag coefficients must not differ by more than 2% from uncorrected wind tunnel measurements. [EPA-HQ-OAR-2010-0162-1759.1, p.13]

Alternative wind tunnels should follow the set of minimum guidelines and predicted "open road" wind-average drag coefficients must not differ by more than a stated amount. [EPA-HQ-OAR-2010-0162-1759.1, p.13]

Coastdown testing should also follow the set of minimum requirements and predicted drag at zero yaw should be compared with the reference wind tunnel "open-road" drag coefficient. Given the challenges discussed in section 2, Exa recommends additional research to understand the achievable level of correlation between coast down testing and the more controlled wind tunnel and simulation methods. [EPA-HQ-OAR-2010-0162-1759.1, p.13]

It is our suggestion that the EPA and NHTSA require certification testing on several tractor-trailer models that represent a cross section of the manufacturer's fleet. This will ensure that approved methods are able to correctly predict both the absolute values and the relative changes between different models. [EPA-HQ-OAR-2010-0162-1759.1, p.13]

Response:

The agencies agree with the commenter that additional research is needed to most accurately reflect the appropriate correlation between coastdown and other aerodynamic methods. The agencies will continue to revisit this issue as data from comparison evaluation versus the updated reference coastdown method is provided at the time of certification by manufacturers and based on subsequent findings by the agencies of vehicle performance and consistency with data submitted to the agencies.

Organization: Heavy-Duty Fuel Efficiency Leadership Group

EPA/NHTSA has proposed the ATC program to incentivize hybrids and other advanced technologies. However, the Agencies have not provided relief from certain certification requirements that could hinder the adoption of these advanced technologies in the marketplace. For example, the proposal should delay the introduction of On Board Diagnostic (OBD) requirements for hybrid powertrain constituents (engine, electric motors, power electronics and energy storage components) until 2020 as has already been done for alternative fuel engines. Similarly, EPA/NHTSA should carefully consider the impacts of other potential impediments such as useful life, warranty and deterioration requirements. [EPA-HQ-OAR-2010-0162-1620.1, pp.3-4]

In keeping with the Agencies goals of achieving significant fuel efficiency improvements and energy security benefits using existing technology, we recommend that the rule offer sufficient flexibility in compliance certification methods to ensure that natural gas vehicles across all the heavy duty classes can be certified as compliant with the rule. [EPA-HQ-OAR-2010-0162-1620.1, p.4]

Supplemental Certification: Existing certification test methods should be supplemented to recognize the efficiency improvements of technologies not accounted for at this time. Some hybrid systems, for example, deliver greater fuel efficiency and GHG reduction benefits than would be estimated based on current engine test protocols, New supplemental testing and certification procedures should be capable of differentiating fuel efficiency across novel technologies. [EPA-HQ-OAR-2010-0162-1620.1, p.5]

Response:

In response to comments from engine manufacturers, hybrid system manufacturers, and related trade groups which broached concerns regarding the feasibility of applying OBD systems on heavy-duty hybrid applications starting in 2013 and requesting a delay until 2020 to implement OBD on these systems, the EPA is extending the OBD phase-in for these systems until 2016/2017 depending on the application. We believe the additional phase-in time is necessary to allow these manufacturers time to work together to develop the appropriate communication protocol, address any hardware and/or software issues, and to provide sufficient lead-time for additional hybrid diagnostic system development given resource constraints as engine manufacturers are focused on meeting the 2013 OBD requirements for conventional products at this time. Manufacturers will be required to implement feasible controls for these hybrid systems that do not adversely impact emissions performance in 2013. In 2016, hybrid systems that were in production after January 1, 2013 must meet full OBD requirements, and those put into production prior to January 1, 2013 must be in compliance by 2017. Additionally, manufacturers will be required to provide annual documentation of their progress toward meeting the OBD requirements for 2016 and 2017. See Section 16 of this document for further details.

We believe that the advanced and innovative technology programs included in the final rule provide enough flexibility to both accommodate and encourage new, efficiency improving technologies. The commenter offers no specifics to support its claim that "some hybrid systems … deliver greater fuel efficiency and GHG reduction" than measured by current engine test protocols. EPA believes that the test procedure adopted for hybrids in the regulations fully assesses the savings potential for the reasons set out in most detail in Chapter 3 of the RIA as well as in section IV of the preamble to the final rule.

Organization: Hino Motors, Ltd.

Hino would like to request to postpone the implementation of OBD requirement for medium and heavy-duty hybrid vehicles, which are still at the beginning of market penetration, and quite difficult to comply with the OBD requirement by 2013. We request to support cultivating the newly introduced HEV technology and enhance the market diffusion of HEV by exempting them from heavy burden of development cost associated with heavy-duty OBD, which will results in the retail price hike of these vehicles. For this purpose, we request to delay the implementation of heavy-duty OBD regulation by 2020 as CNG vehicles. [EPA-HQ-OAR-2010-0162-1609.1, p.2]

Response:

In response to comments from engine manufacturers, hybrid system manufacturers, and related trade groups which broached concerns regarding the feasibility of applying OBD systems on heavy-duty hybrid applications starting in 2013 and requesting a delay until 2020 to implement OBD on these systems, the EPA is extending the OBD phase-in for these systems until 2016/2017 depending on the application. We believe the additional phase-in time is necessary to allow these manufacturers time to work together to develop the appropriate communication protocol, address any hardware and/or software issues, and to provide sufficient lead-time for additional hybrid diagnostic system development given resource constraints as engine manufacturers are focused on meeting the 2013 OBD requirements for conventional products at this time. Manufacturers will be required to implement feasible controls for these hybrid systems that do not adversely impact emissions performance in 2013. In 2016, hybrid systems that were in production after January 1, 2013 must meet full OBD requirements, and those put into production prior to January 1, 2013 must be in compliance by 2017. Additionally, manufacturers will be required to provide annual documentation of their progress toward meeting the OBD requirements for 2016 and 2017. See Section 16 of this document for further details.

Organization: International Council on Clean Transportation (ICCT)

In the proposed rule, the EPA and NHTSA discuss the need for a new, more sophisticated approach to vehicle testing than currently proposed to “completely capture the complex interactions of the total vehicle and the potential to reduce fuel consumption and GHG emissions through the optimization of those interactions.” (75 Fed. Reg. at 74172) The Heavy-duty National Program should transition to a compliance scheme based on actual technology performance in a full-vehicle configuration. Doing so will enable future standards to encourage technologies that fail to be differentiated in the current compliance regime but can actually cut emissions and fuel consumption. To enable the transition, the agencies should include requirements in this rule to collect and publicly disseminate existing vehicle performance data and data generated future model years. The agencies should also establish procedures to demonstrate progress and to enhance the program transparency. [EPA-HQ-OAR-2010-0162-1945.1, p.25]

Requirements for public data are intended to accomplish three goals:

(a) Establish a broad technical database to support transition of the compliance regime from one based on simulation results of specific components to one based on full-vehicle technology implementation and testing that is validated by on-road measurements

(b) Enhance public understanding of vehicle performance and technology adoption

(c) Track actual on-road emissions and fuel consumption performance of new vehicles and the full on-road fleet [EPA-HQ-OAR-2010-0162-1945.1, p.25]

Recommendations

1) Collect in-use and full vehicle testing data performed by manufacturers and the federal agencies. Expand agency testing to validate the current compliance model (GEM), and encourage manufacturers to provide more data. This may be a good role for the SmartWay Program, given that they are already doing much of this data collection and outreach work for the tractor-trailer segment. [EPA-HQ-OAR-2010-0162-1945.1, p.25]

2) Require manufacturers to report actual specifications for vehicle configurations sold. Run GEM using these specifications. [EPA-HQ-OAR-2010-0162-1945.1, p.25]

3) Build a heavy-duty vehicle market database for public use and evaluation. Include a description of the commercial fleet population and its operating characteristics through data types previously provided through the U.S. Census Vehicle Inventory and Use Survey, but also organize data so that it is consistent with the subcategories used in the proposed compliance regime. [EPA-HQ-OAR-2010-0162-1945.1, p.25]

4) Publish an annual report describing new and in-use vehicle performance. For new vehicles, the report should contain data similar to the EPA's annual publication of "Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends." The report should be expanded to cover performance and summary characteristics (from the database described in point 3 above) of the existing fleet so an overall picture of medium- and heavy-duty truck emissions and fuel consumption progress is clear. [EPA-HQ-OAR-2010-0162-1945.1, p.25]

Response:

The agencies agree that there is a need for sharing heavy-duty emissions and fuel consumption information and will make as much information publically available as practical. However, at this point the agencies are not willing to commit to periodic (i.e. annual) publications until the full scope of implementation of this rule is realized and adequate resources can be retained.

Organization: Clean Air Task Force (CATF)

Ensure Adequate Data Collection and Transparency

EPA should design the Rule to transition from a technology/component-based approach to a performance-based vehicle standard by 2018. This will involve rapid development of duty-cycle-specific test protocols and standards. To achieve this and to ensure transparency, the program needs to include a major data collection component from the outset, including:

- in-use testing and full vehicle testing data from manufacturers and government agencies;

- manufacturer reporting of actual configurations sold and their simulated fuel consumption; and

- the status of manufacturer compliance including credit balances for each compliance category. [EPA-HQ-OAR-2010-0162-2734.1, p.12]

EPA should make the collected data public and provide annual reports describing new and on-road fleet performance. [EPA-HQ-OAR-2010-0162-2734.1, p.12]

Response:

The agencies agree that there is a need for sharing heavy-duty emissions and fuel consumption information and will make as much information publically available as practical. However, at this point the agencies are not willing to commit to periodic (i.e. annual) publications until the full scope of implementation of this rule is realized and adequate resources can be retained.

Organization: Motor & Equipment Manufacturers Association (MEMA)

There is limited information in the NPRM regarding the certification process for verifying electric vehicle (EV) fuel economy and GHG emissions. The agencies should take a similar course as they did in the light-duty vehicle (passenger car) National Program rulemaking and exempt upstream emissions for the first phase of the rule. Additionally, the NPRM does not mention plug-in hybrid electric vehicle (PHEV) although the potential market penetration of PHEVs equals or exceeds EVs. It is important for the agencies to recognize PHEVs in the rule as they represent the natural progression from HEV to EV and make significant contributions to GHG emission and fuel consumption reductions. Failure to establish PHEVs in the rule will prevent the commercialization of these technologies as well as the potential cost reduction of electric drive components (such as batteries, motors and inverters) through increased manufacturing volumes and additional demand. [EPA-HQ-OAR-2010-0162-1752.1, p.7]

MEMA supports the agencies' inclusion of innovative technology credits. There are many technologies that contribute measurably to vehicle fuel efficiency and emissions output that may not be appropriately credited in the existing engine test cycle(s). The challenges, of course, are quantifying those contributions and obtaining the credit. The NPRM considers an "innovative technology" to be "those [technologies] that are newly introduced in one or more vehicle models or engines, but that are not yet widely implemented in the heavy-duty fleet. This could include known technologies not yet widely utilized in a particular subcategory." [EPA-HQ-OAR-2010-0162-1752.1, p.7]

Certainly, MEMA recognizes that the agencies were purposefully vague so as to permit them maximum discretion and latitude when innovative technologies are submitted to them for review and credit eligibility. In lieu of a definition, which, we concede, would be limiting and potentially counterproductive, at a minimum, therefore, the agencies should prescribe a specific process/procedure in the final rule by which innovative technologies can be submitted for eligibility review and consent. Having a process outlined will provide a clear path for all involved parties to follow. This way, suppliers, OEMs, engine manufacturers, and, indeed, the regulators themselves can have confidence in a uniform process to manage the eligibility review for "unconventional" innovative technologies. [EPA-HQ-OAR-2010-0162-1752.1, p.8]

A suggested approach is for the agencies to provide a formal means for suppliers to submit technical justification directly to the agencies. Successful review of the data would lead to some form of provisional certification for the technology. This evaluation process would need to be conducted only once, even if multiple OEMs eventually include the innovative technology(ies) in their vehicle certification packages. [EPA-HQ-OAR-2010-0162-1752.1, p.8]

It is recognized that the agencies may not be receptive to the idea of "certifying" technologies separate from a complete vehicle certification. Providing a forum for suppliers to present the technical justification would at least allow the agencies to become familiar with a technology prior to submission by the OEMs in the vehicle certification package, which should facilitate and accelerate the approval process. [EPA-HQ-OAR-2010-0162-1752.1, p.8]

To allow the agencies to gauge industry interest in a proposed innovative technology, the supplier/owner of the technology could be asked (or required) to present letters from one or more OEMs that expresses OEM interest in the technology. Such informal endorsements would be an indication that there is indeed sufficient interest in a technology to warrant a detailed review. [EPA-HQ-OAR-2010-0162-1752.1, p.8]

MEMA urges the agencies to consider these alternate approaches for certifying innovative technologies. [EPA-HQ-OAR-2010-0162-1752.1, p.8]

The NPRM sought comment on the use of the International System of Units (SI), specifically, in the proposed Part 1066. The goal of EPA and NHTSA is to ultimately seek global harmonization of the test procedures; having them in all based on SI units would make that process less complicated. MEMA agrees with the agencies and supports the use of SI units; not mixing English and SI units is recommended and preferred. [EPA-HQ-OAR-2010-0162-1752.1, p.8]

Response:

The procedure for certifying vehicles with innovative technologies is outlined in §1037.610 and §535.7(e) and should provide the type of specificity and flexibility which the commenter requests. See also 75 FR at 25439-40 describing how these same procedures function in the light-duty vehicle context. We believe that this gives manufacturers enough guidance for certification while still affording leeway to the agencies for certifying vehicles with technologies that are unknown at the time of this rulemaking. We may revisit this process for future rulemakings once we have a better idea of how successful this is in practice.

Organization: National Association of Clean Air Agencies (NACAA)

EPA proposes a grams-per-mile (g/mile) fleet average for a manufacturer's combined fleet of both Class 2b and Class 3 vehicles. NACAA recommends that such fleet standards be bifurcated such that separate fleet average g/mile standards are established for each of these categories. With respect to certification of vehicles between 8,501 and 14,000 GVW (i.e., both Class 2b and Class 3), NACAA recommends that diesel and gasoline vehicles be subject to full chassis certification, rather than requiring such testing only for gasoline vehicles. [EPA-HQ-OAR-2010-0162-1607.1, p.3]

NACAA agrees with the agencies that full chassis certification is a superior method in principle. However, due to agency resource constraints and current industry capabilities, such full chassis certification is not proposed as part of the rulemaking. NACAA recommends that EPA and NHTSA expedite the development and refinement of full chassis test procedures and require full chassis certification testing for all heavy-duty truck-trailer combinations no later than the 2018 MY, and sooner if feasible. [EPA-HQ-OAR-2010-0162-1607.1, p.4]

EPA proposes that Class 7 useful life requirements be substantially shorter than those for Class 8 tractors. Given the disproportionate impact that highly aged vehicles have on emissions inventories, it is essential that such useful life requirements reflect the latest in-use experience. NACAA therefore recommends that the useful life for Class 7 trucks be increased from 185,000 miles to 250,000 miles (although this is still substantially less than the Class 8 useful life of 435,000 miles). [EPA-HQ-OAR-2010-0162-1607.1, p.4]

Response:

The agencies have not finalized a chassis testing requirement for conventional vehicles. However, we remain committed to including chassis-based testing as part of certification for future rulemakings.

For this rulemaking, the agencies aimed to keep vehicle and engine useful lives consistent. This requires that Class 7 tractors either have a useful life of 185,000 or 435,000 miles. We believed that using the higher mileage would be inappropriate given the typical duty cycles for Class 7 tractors (normally urban and much shorter annual mileage than class 8 line haul tractors). In addition, we do not believe this will have a significant real-world affect on air pollution since we expect the majority of GHG emission-related components (engines, weight reduction components, idle-reduction technologies, etc) between class 7 and class 8 tractors to be common, and therefore designed to the longer useful life.

Organization: National Automobile Dealers Association (NADA)

To the greatest degree possible, the final rule should take into account and harmonize with EPA's commercial truck onboard diagnostics (OBD) implementation timeframe. In no way should the rule impose any new OBD requirements related to GHGs or otherwise. [EPA-HQ-OAR-2010-0162-2705, p.10]

NADA/ATD cannot support a mandate or large credit for the installation of engine shutoffs that kick in after 5 minutes of idling. While excessive and unnecessary idling is a legitimate concern, it is best addressed through an array of tailored strategies including state and local laws, fleet policies, and anti-idling devices, that accommodate a variety of potential real world circumstances. Mandatory shut-offs can involve serious risks to driver health and welfare that outweigh any potential benefits, especially for sleeper cabs. [EPA-HQ-OAR-2010-0162-2705, p.10]

Compliance with the national fuel economy/GHG program must only be measured when new vehicles are produced and delivered for sale or lease. This is the model NHTSA has used successfully for over thirty years when implementing its fuel economy standards. Dealers and their customers simply cannot support fuel economy/GHG standards that would impose potential liabilities downstream. Of course, if OEMs are willing to accept the liability for emissions-type performance warranties applicable to the engines and vehicles they deliver for sale, so be it. However, such warranties must not be accompanied by mandatory "allowable maintenance" requirements. Again, compliance with and responsibility for nonconformity with the final rule must rest exclusively with the vehicle and engine OEMs. [EPA-HQ-OAR-2010-0162-2705, p.11]

In addition, the final rule must not impose any potential downstream "tampering" liabilities related to fuel economy and GHGs. Any attempt to do so would only serve to reinforce the absurdity of applying EPA's redundant mobile source emissions regulations to fuel economy and GHGs. While Section 203(a)(3)(A) of the Clean Air Act makes it unlawful for "any person to render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser," that provision makes no sense in the context of fuel economy and GHGs. 42 USC '7522. For example, it would be ridiculous to suggest that owners, operators, dealerships, and others must not render inoperative a device or element of design of a truck or tractor arguably related to its fuel efficiency. [EPA-HQ-OAR-2010-0162-2705, p.11]

If anything, vehicle owners and operators are economically incentivized to maintain and operate their vehicles with the goal of maximizing, not reducing fuel efficiency (and thus GHG emissions performance). Similar incentives have not historically existed with respect to criteria emissions, so EPA's tampering policies have made sense when applied to components related to such emissions. By way of contrast, changes to vehicle aerodynamics and tires, for example, are to be expected in the normal course of truck and tractor operations, and in some cases, may be done for safety reasons (winter tires, skirt and faring modifications, etc). [EPA-HQ-OAR-2010-0162-2705, p.11]

NADA/ATD does not object to the concept of making OEMs primarily responsible for any and all components, including tires, which they install in their vehicles. Dealerships selling and purchasers buying commercial vehicles should not be burdened by having to look to several different potential OEMs when an issue arises. Instead, if and when an issue arises, the truck or tractor manufacturer should be required to work things out with the suppliers whose parts or components they install. On the other hand, OEMs should not be primarily responsible for the performance of parts and components installed by a downstream manufacturer or installer where they have no control over the manufacture or installation of such those parts or components. [EPA-HQ-OAR-2010-0162-2705, p.11]

No new certification/compliance labels are necessary. Rather the rule should simply require that the "underhood" emissions label be modified to include information indicating compliance with the national fuel efficiency/GHG standard. An external label is unnecessary and more than likely would fall off, wash off, become stolen or destroyed, or otherwise disappear. [EPA-HQ-OAR-2010-0162-2705, p.11]

Response:

Manufacturers may enter a value of 5 g CO_2/ton-mile for the use of automatic engine shutdown (AES) with idle reduction technologies. The agencies are also adopting a provision to allow manufacturers to provide an AES system which is active for only a portion of a vehicle's life. In this case, a discounted idle reduction value would be entered into GEM.

More detail about each of the override provisions can be found in the RIA Chapter 2, Section 2.5.4.3. The regulatory text defining these overrides can be found at 40 CFR 1037.660. We believe that, in most circumstances, extended periods of idling can and should be avoided. We also understand that in periods of extreme weather, this may present unnecessary risk to the health of drivers and are allowing for provisions to temporarily disable idle shut-down features during these periods.

As with current criteria pollutant regulations, the burden of compliance is placed on the vehicle/engine manufacturer.

If it's "ridiculous" to suggest that an owner/operator would tamper with a GHG emissions-reduction component, then there is no reason to oppose anti-tampering language.

For all but class 2b/3 vehicles, there is no current "underhood" label for identifying emissions control information. It is essential for vehicles to carry an emission control information label so that inspectors can verify that new vehicles are both certified and in their certified configuration. For these vehicles, we are finalizing that a vehicle emission control label be secured to a part of the vehicle needed for normal operation and not normally requiring replacement. This does not have to be on an external surface and would preferably be in a visible area under the hood.

Organization: Natural Gas Vehicle Interests

The HD Rule proposes that "a comprehensive list of AECDs covering both criteria pollutant, as well as GHG emissions is required at the time of certification." 75 FR 74267. The proposed regulations then require a description of all AECDs, although we request clarification that this includes the effects of AECDs on GHG emissions. [EPA-HQ-OAR-2010-0162-2119.1, p.11]

Assuming that a description of the effects on GHG emissions is required, for this initial rule we request that NG engine manufacturers be allowed to describe AECD impacts on GHG emissions via analysis as opposed to physical testing. Adding GHGs to AECD criteria pollutant testing will require significant additional expenditure. NG engine manufacturers currently test AECDs at ambient temperature and altitude with the modified combustion phasing, lack of EGR, etc., to get a measure of the NOx impact. However, the CO2 impact will be inaccurate with this approach, especially during AECD testing that mimics the engine response to cold temperature conditions, because the internal friction of engines is much higher at cold temperatures, resulting in lower efficiency and higher CO2 emissions. As a result, we will need to invest in or contract with more expensive facilities and take longer to gather data for certification, increasing compliance costs. We estimate the additional cost of full AECD GHG testing for a single engine to be $250,000, and established analytical methods (such as engine cycle simulation) can supplement the more easily-obtained ambient condition test data in order to accurately determine these effects. [EPA-HQ-OAR-2010-0162-2119.1, pp.11-12]

Diurnal plus hot soak standard. The HD Rule requests comment on proposed changes to evaporative emission standards. However, even though "EPA regards these proposed changes as discrete, minimal, and for the most part clarifications to the existing standards" (75 FR 74276), the Rule contains a major revision of the diurnal plus hot-soak standards. The current standard in 40 CFR 86.004-11(b)(3)(ii)(A)(1) for vehicles with a GVWR greater than 14,000 lbs. is 4.0 grams: "For the full three-diurnal test sequence described in § 86.1230–96, diurnal plus hot soak measurements: 4.0 grams per test." [EPA-HQ-OAR-2010-0162-2119.1, p.12]

However, the HD Rule proposes that this standard be reduced to 1.9g (and also reduces the standard for vehicles below 14,000 lbs. GVWR from 3.0g to 1.4g); the proposed new regulation at 40 CFR 1037.103(a)(1) states that: The sum of diurnal and hot soak measurements from the full three-day diurnal test sequence described in 40 CFR 86.1230-96 may not exceed 1.4 g for vehicles with GVWR at or below 14,000 pounds, and may not exceed 1.9 g for vehicles with GVWR above 14,000 pounds. [EPA-HQ-OAR-2010-0162-2119.1, p.12]

Because EPA states that the proposed changes in evaporative emissions standards are being done for housekeeping purposes, and in any event provides no explanation for why it would reduce this standard by more than 50%, the Natural Gas Vehicle Interests request clarification of this provision. [EPA-HQ-OAR-2010-0162-2119.1, p.12]

Conflict With Other Vehicle Fuel System Standards. The HD Rule requests comment on changing the requirements related to certifying gaseous-fuel vehicles to design-based certification, and the Natural Gas Vehicle Interests request that any design-based evaporative emissions standards applicable NGVs take account of the other regulatory provisions that apply to NGVs. For example, NHTSA already regulates for fuel leakage safety purposes (see, e.g., 49 CFR 571.301 "Fuel System Integrity"). Any such new or additional design-based requirements should not either duplicate or conflict with existing requirements governing NGVs. [EPA-HQ-OAR-2010-0162-2119.1, p.12]

Response:

The final regulations are not prescriptive in requiring testing to demonstrate that an AECD does not qualify as a defeat device. We plan to address evaporative emissions standards in a subsequent regulatory action.

Organization: Natural Resources Defense Council (NRDC)

The Heavy-Duty National Program should transition to a compliance scheme based on actual technology performance in a full-vehicle configuration. In the proposed rule, the agencies discuss the need for a new, more sophisticated approach to vehicle testing than currently proposed to "completely capture the complex interactions of the total vehicle and the potential to reduce fuel consumption and GHG emissions through the optimization of those interactions." (75 Fed. Reg. at 74172) Transitioning to a more performance-based, full-vehicle approach will enable future standards to encourage technologies that fail to be differentiated in the current compliance regime but can actually cut emissions and fuel consumption further than the current compliance regime envisions. To enable this transition, the agencies should include requirements in this rule to collect and publicly disseminate existing vehicle performance data and data generated in future model years. The agencies should also establish procedures to demonstrate progress and to enhance the program transparency. [EPA-HQ-OAR-2010-0162-1776.1, p.7]

The Heavy-Duty National Program should collect and publicly disseminate vehicle configuration and performance data from new vehicle sales and, to the degree possible, for the existing on-road fleet. Requirements for public data are intended to accomplish three goals:

(a) Establish a broad technical database to support transition of the compliance regime from one based on simulation results of specific components to one based on full-vehicle technology implementation and testing that is validated by on-road measurements, [EPA-HQ-OAR-2010-0162-1776.1, p.7]

(b) Enhance public understanding of actual technology adoption, and

(c) Track actual on-road emissions and fuel consumption performance of new vehicles and the full on-road fleet. [EPA-HQ-OAR-2010-0162-1776.1, p.8]

The following recommendations are intended to address these goals.

1. Collect in-use testing and full vehicle testing data. Make data publicly available.

EPA and NHTSA should build a public database of chassis and full-vehicle testing performed by manufacturers and the federal agencies. The agencies should expand its on-road testing to validate current compliance models and encourage manufacturers to provide more data. The agencies should make data available to the public to improve understanding of technology performance; where necessary, data can be aggregated to protect confidential business information. [EPA-HQ-OAR-2010-0162-1776.1, p.8]

Tracking fleetwide emissions is critical to understanding if improvements in per-truck emissions required under the Heavy-Duty National Program are actually resulting in reductions of emissions from the entire on-road fleet. A future fleet of cleaner trucks could emit more carbon pollution than today’s fleet if the future fleet has a larger population or travels more miles. [EPA-HQ-OAR-2010-0162-1776.1, p.8]

EPA and NHTSA should aggressively support federal efforts to reinstate surveys to collect truck market data. Such surveys should provide a description of the truck fleet population and its operating characteristics. A description of the existing fleet has been provided publicly in the past through the discontinued U.S. Census Vehicle Inventory and Use Survey (VIUS). The VIUS classified truck data by various characteristics including physical configuration (age, size, weight, body type, engine size, and mechanical equipment), operational uses (business purpose, range, efficiency, and geography) and fuel type. EPA and NHTSA should create a public database that includes current data from at least the same fields of the VIUS but also allows organization of data consistent with the subcategories used in the truck emissions and fuel economy compliance regime. [EPA-HQ-OAR-2010-0162-1776.1, pp.8-9]

EPA and NHTSA should annually release a report that describes the emissions and fuel consumption performance of the current and past model year fleets and the overall on-road fleet. For new vehicles, the report should contain data similar to EPA's annual publication of "Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends." The report should be expanded to cover performance and summary characteristics of the existing fleet (from the database described in item 3 above) so an overall picture of medium- and heavy-duty truck emissions and fuel consumption progress is clear. [EPA-HQ-OAR-2010-0162-1776.1, p.9]

EPA and NHTSA should annually release a report that describes the manufacturer credit balances within each compliance category. The report should also include the generation of credits under all allowed flexibility provisions. [EPA-HQ-OAR-2010-0162-1776.1, p.9]

The federal agencies should further develop and refine compliance test procedures to accurately measure the real-world fuel and GHG emissions reductions from technology improvements. Both component-level and vehicle-systems analysis should be improved. The goal of the improvement efforts should be to (a) help transition the Heavy-Duty National Program to a compliance regime based on a full-vehicle performance, (b) better capture fuel and emissions performance as they would exist in real-world operations, especially for advanced technologies, and (c) ensure a level playing field for all regulated entities. [EPA-HQ-OAR-2010-0162-1776.1, p.9]

For the heavy-duty pickup and van category, NHTSA proposes to calculate a petroleum fuel consumption compliance level for dedicated alternative fuel vehicles by testing the vehicle on the alternative fuel and determining a petroleum equivalent fuel consumption using a Petroleum Equivalency Factor determined by the Department of Energy for each alternative fuel. From the proposed rule, it is unclear whether or not this same approach applies to vehicles outside the heavy-duty pickup and van category. The agencies should clarify the treatment for other classes and design a system that provides consistent treatment for goals to reduce petroleum consumptions. [EPA-HQ-OAR-2010-0162-1776.1, p.12]

Fuel consumption and emissions performance labeling is an important tool for helping consumers choose the cleanest and most efficient trucks for their needs. The proposal includes some labeling requirements, but these should be extended. [EPA-HQ-OAR-2010-0162-1776.1, p.13]

Labeling requirements in the proposed rule are as follows:

- For Class 2B and Class 3 pickups, the label would show compliance with criteria pollutant standards only. (75 Fed. Reg. at 74263)

- For engines, the current label for criteria pollutants is permanent and provides descriptive information, including displacement, emission control systems, and tune-up specifications. Under this rule, the label would also indicate whether the engine is certified for tractor or vocational use and, if the manufacturer is using ABT, the Family Emissions Limit. (75 Fed. Reg. at 74268)

- For combination tractors, the label would include descriptive information about the vehicle and its certified engine, and about any features that would affect GHG emissions such as aerodynamic equipment and tires. It would also list the vehicle's Family Emissions Limit for GHG if the manufacturer is using ABT.

- Vocational trucks would be labeled similarly to tractors. Aerodynamic equipment would not be included, but hybrid powertrain or other advanced technology applied to the certification of the vehicle would be. [EPA-HQ-OAR-2010-0162-1776.1, p.13]

The agencies decline to require fuel consumption labeling, because they believe it could mislead the purchaser. (75 Fed. Reg. at 74352) [EPA-HQ-OAR-2010-0162-1776.1, p.13]

The label should serve not only as a compliance tool, but also to provide consumer information. Lack of standardized fuel consumption information is a market barrier to efficient technologies. For heavy pickups and vans, a label similar to the light-duty vehicle label would be appropriate. For engines, tractors, and vocational trucks, the Family Emissions Limit, at a minimum, should be provided on the label, whether or not the manufacturer is participating in ABT. While such information may not at this stage allow for meaningful estimates of on-road fuel consumption, it should allow comparisons across similar vehicles and promote the deployment of efficiency technologies. For vocational vehicles, labels showing performance on each of the drive cycles (transient, 55 mph, 65 mph) would allow users to better understand the suitability of a given vehicle for their duty cycles. [EPA-HQ-OAR-2010-0162-1776.1, p.13]

We recommend the agencies modify the proposal to expand the labeling. Class 2b and 3 vehicles should be labeled with fuel consumption in gallons per 100 miles. Fuel consumption could be supplemented with payload and towing capacity information on the label. Engine, tractor, and vocational truck labels should include the Family Emissions Limit, regardless of whether the manufacturer is participating in ABT. Tractor and vocational truck labels should list the vehicle's (or family's) performance on each test cycle, instead of, or in addition to, the weighted average used for certification. [EPA-HQ-OAR-2010-0162-1776.1, p.14]

Response:

The agencies agree that there is a need for sharing heavy-duty emissions and fuel consumption information and will make as much information publically available as practical. However, at this point the agencies are not willing to commit to periodic (i.e. annual) publications until the full scope of implementation of this rule is realized and adequate resources can be retained.

For this final rule, chassis testing is not required for conventional heavy-duty vehicles to show compliance with emissions and fuel consumption standards. The agencies do agree however, that there is potential value in a chassis testing requirement for future rulemaking efforts, and will continue to build a knowledge base to support this.

The commenter is correct in pointing out that all labeling requirements outlined in the NPRM are enforcement based, rather than consumer focused. While we agree that consumer focused labels have proven to be valuable to consumers in the light-duty vehicle market when shopping and comparing vehicles, the vast array of in-use drive cycles for heavy-duty vehicles and significant impact on GHG emissions reduce the intrinsic value of such fuel efficiency data to consumers. Additionally, many heavy-duty vehicles are unique and purpose-built which prevents direct comparison to other vehicles. The agencies may revisit this topic for future rulemaking activities; however, there is no consumer label requirement for this final rule.

Organization: Navistar, Inc.

The deadline for on-board diagnostics ("OBD") requirements for all engine families should be aligned with the Proposed GHG Rule's effective dates in MY 2014 and MY 2017.

The compliance and enforcement provisions create overly burdensome and duplicative reporting, penalty, and recordkeeping provisions. The duplication needs to be eliminated. [EPA-HQ-OAR-2010-0162-1871.1, p.2]

Because of the cumulative burdens from the various regulatory deadlines, the OBD requirements for the non-OBD lead engine families should be changed to model years 2014 and 2017 from the current deadlines of 2013 and 2016. Moreover, feasibility aside, failure to do so would violate the 3-year stability mandate in CAA § 202(a)(3)(C) and 49 U.S.C. § 32902(k)(3). See infra at VII.F. Because the OBD requirements are set to take effect in MY 2013, the proposed MY 2014 effective date for GHGs violates the prohibition on changes in standards in no less than 3 model years. The same is true for the OBD requirements set to take effect in MY 2016. Delaying by one year the OBD requirements would address the stability violation (although it would accomplish nothing to fix the inadequate lead time). [EPA-HQ-OAR-2010-0162-1871.1, p.15]

The Agencies also should coordinate with the State of California to align the OBD requirements in the federal deadlines with California's deadlines. In this regard, Navistar specifically endorses the separate comments of the EMA and Truck Manufacturer's Association, which go into further depth on the need for this deadline adjustment. EPA also should make explicit in the regulations themselves the statement in the preamble that OBD requirements do not extend to the proposed GHG emission standards. [EPA-HQ-OAR-2010-0162-1871.1, p.15]

Furthermore, the Proposed GHG Rule lacks acceptable criteria regarding the implementation of OBD requirements and hybrid vehicles. Hybrids are currently a very low-volume product. OBD requirements for hybrids are significantly more complex than in traditional vehicle configurations. In addition, to comply with OBD requirements for hybrids, an OEM must work extensively with suppliers, including transmission and battery manufacturers, many of whom have little or no experience with OBD requirements and who consider much of the needed information to be proprietary. For hybrid vehicles, therefore, OBD requirements will be extremely burdensome, especially when considered cumulatively with the Proposed GHG Rule. In order to encourage the growth of hybrid vehicles, EPA therefore must align the OBD deadline for hybrids with the OBD implementation timeline for alternative fuel vehicles beginning in model year 2020. [EPA-HQ-OAR-2010-0162-1871.1, pp.15-16]

EPA should adopt deadlines for its decisions on submitted applications for certification. Currently, there are no proposed decision deadlines pertaining to applications for certification, but timely decisions on certifications are critical to business for manufacturers. EPA should, therefore, adopt decision deadlines for its decisions. EPA should adopt deadlines whereby it would make a determination on completeness of an application within 15 days of receipt. If determined to be complete, there should be a decision deadline on the application itself within 90 days from the date the application was determined to be complete. [EPA-HQ-OAR-2010-0162-1871.1, p.22]

EPA requires as part of the certification procedure a manufacturer to justify “estimated production volumes if they are substantially different than actual production volumes in earlier years for similar vehicle models.” There is no basis in law for the requirement to provide such justification. Manufacturers may base estimated production volumes on many factors in their industry. Sometimes these estimates will be largely correct, sometimes they will not. If incorrect, there are many potential reasons for this inaccuracy, including general economic conditions, market volatility, buyer preferences, regulatory actions and actions of competitors, among many others. Requiring a justification implies some level of regulatory oversight over the accuracy of a company’s market forecasts. This goes too far and serves no regulatory purpose. As such, this provision must be stricken. [EPA-HQ-OAR-2010-0162-1871.1, pp. 35-36]

Additionally, EPA’s certification requirements are overly broad and unnecessarily burdensome. For example, EPA requires a manufacturer to include in its application, the detailed information of the vehicle’s “emission controls.” This would include all detailed components of the vehicle configuration necessary to achieve a vehicle’s GHG profile (i.e., mirrors, fairings, wheel size, wheel weight, drive ratio, etc.). Other information includes maintenance instructions (i.e., operator manual) to the ultimate purchaser. Such instructions can be extensive and detailed. Similarly, EPA demands that minutia of all operating parameters and production tolerances be reported. Production tolerances include myriad requirements across a wide variety of components and equipment. Navistar is not adverse to supplying appropriate information, but the relevance of the information EPA is demanding is, at best, questionable. EPA can only require information seminal to the determination of whether Navistar’s trucks meet the requisite standards, i.e., truck GEM model characteristics. If a manufacturer chooses to provide actual vehicle data in lieu of the GEM model, a manufacturer would need to provide data that would parallel that required by the GEM model. EPA's overbroad demands for information must be eliminated. [EPA-HQ-OAR-2010-0162-1871.1, p.36]

There also are a number of defects with EPA's proposed emission warranty and maintenance provisions. 89 Under CAA § 207(a)(1), the manufacturer of each new heavy-duty motor vehicle or engine "shall warrant ... that such vehicle or engine is (A) designed, built, and equipped so as to conform at the time of sale with applicable regulations under section 7521 of this title, and (B) free from defects in materials and workmanship which cause such vehicle or engine to fail to conform with applicable regulations . . . for the warranty period provided under subsection (i) of this section." 42 U.S.C. § 7541(a)(1). The heavy-duty diesel engine warranty period is generally "5 years/100,000 miles, whichever occurs first." 40 CFR § 86.004-2. Several of EPA's assertions and proposed warranty regulations are inconsistent with the CAA and, thus, need to be modified or eliminated. [EPA-HQ-OAR-2010-0162-1871.1, pp.36-37]

First, contrary to EPA's assertion, neither the CAA nor current heavy-duty regulations require a manufacturer to warrant "any device of system whose failure would result in an increase in . . . emissions." To the contrary, the defect must cause the engine to "fail to conform with applicable regulations." 42 U.S.C. § 7541(a)(1)(B). A failure that results in an increase in emissions but does not cause the engine to violate emission standards (e.g., NTE) is not covered by the emissions warranty. [EPA-HQ-OAR-2010-0162-1871.1, p.37]

Third, EPA must modify its proposal that "vehicle manufacturers must warrant all components installed which act to reduce CO2 emissions at the time of initial sale." As noted above, the CAA grants EPA authority to require that manufacturers warrant that the vehicle does not "fail to conform." The CAA does not grant EPA authority to require a warranty over parts not covered by the conformance or compliance standard. As such, when EPA proposes to require that manufacturers state clearly in its emission maintenance instructions that "that a repair shop or person of the owner's choosing may maintain, replace, or repair emission control devices and systems," Navistar interprets this to cover only the regulated emission control devices – namely, those devices listed in the manufacturer's certification application as necessary for compliance. [EPA-HQ-OAR-2010-0162-1871.1, pp.37-38]

Finally, EPA must modify the proposed "useful life" for aerodynamic components. Specifically, the proposed regulation defines the useful life of aerodynamic components (including bumpers, mirrors, fuel-tank skirts, side extenders and air fairings) as 435,000 miles. Navistar's understanding of this requirement is that those components must remain in factory condition for that duration, or in instances of damage, Navistar must cover their repair. EPA's proposed useful life, however, is contradictory to the design goals of aerodynamic components and the proposed regulations themselves. In order for our customers to maximize payload, aerodynamic components must be lightweight. Although Navistar has selected materials with durability in mind, it is likely that a redesign of these components to meet the useful life requirements of this regulation would cause the components not only to be cost prohibitive for our customers, but also payload prohibitive thanks to what would likely require a substantial weight increase. Moreover, it is possible that some of our vehicles will be on their second owner before the 435,000 mile mark. In that case, they may not use the tractor as initially intended, and they may chose to either remove some of the aerodynamic components or simply not replace them as they are damaged. Since tractor OEMs are not necessarily in control of these vehicle sales, it will be difficult if not impossible for us to track these vehicles much less warranty the aerodynamic components. As a result, such an extended useful life actually disincentivizes manufacturers from offering such aerodynamic component add-ons. [EPA-HQ-OAR-2010-0162-1871.1, p.39]

EPA is proposing that air conditioning systems be added to the CAA emission warranty provisions (CAA §207) and that vehicle manufacturers warrant their systems for the useful life of the vehicle against design or manufacturing defects causing refrigerant leakage in excess of the proposed standard. And, although not entirely clear from the proposed rule, it appears that EPA seeks to apply defect reporting and recall requirements to air conditioning systems as well. Neither the emission warranty, defect reporting nor recall requirements are legally or practically appropriate for air conditions systems. [EPA-HQ-OAR-2010-0162-1871.1, p.41]

Emission warranty, defect reporting and recall requirements were established for tailpipe pollutants because emissions could rise significantly if pollution control devices failed. This is simply not the case for air conditioning system emissions, which EPA itself admits are “very small” when compared to the overall GHG emission footprint of a heavy-duty vehicle. According to EPA, such emissions are so small that allocating “credit” for improvements is simply not worth it. As a result, the actual costs from requiring emission warranty and defect reporting as well as the potential costs of a recall are disproportionate to any environmental impact from leakage. There is simply no emission-based reason to support application of such requirements under the CAA. [EPA-HQ-OAR-2010-0162-1871.1, p.41]

EPA exacerbates the defects in the program by proposing that the required duration of the air conditioning warranty (and, thus, potential for recall) is for the “useful life” of the vehicle. That cannot be EPA’s intent. EPA is proposing that the current useful life for heavy-duty engines also be applicable to heavy-duty vehicles. For Class 7 and 8 tractors, that means the useful life will be 10 years/185,000 miles and 10 years/435,000 miles, respectively. Navistar strongly disagrees with such an extended warranty period for air conditioning systems. Will manufacturers be required to charge their systems for the entire useful life (even when doing so may create performance issues) or face the costs of “scheduled maintenance” approval? There is no discussion in the proposed rule on these issues. [EPA-HQ-OAR-2010-0162-1871.1, pp.41-42]

No emission coverage is supportable given the high costs and little environmental benefit from such a program. At a minimum, however, the applicable warranty period cannot be longer than what EPA is proposing for CO2 emission control systems, which is the same as the current emissions warranty period applicable to heavy-duty engines, roughly half of the useful life of the vehicle. There is no basis on this record to justify any warranty requirement or such a long warranty requirement for air conditioning systems. [EPA-HQ-OAR-2010-0162-1871.1, p.42]

Pre-Certification Compliance Reports (Proposed Regulation 49 CFR § 535.8)

Navistar supports rational and reasonable reporting requirements that may be required by the Agencies, but NHTSA is proposing a unique new report requirement that is impractical, burdensome and arbitrary. Specifically, NHTSA proposes that manufacturers submit a "precertification compliance report" two years before the given model year and that such report contain fuel consumption information for the two following model years. Thus, for example, NHTSA states that "the pre-certification compliance report for 2016 must be submitted no later than December 31, 2013 and must contain fuel consumption information for vehicles manufactured for model years 2016 to 2018." Moreover, NHTSA requires that these reports contain, among many other specific items, planned credit flexibility options that will be used to comply, a balance of credits, projected production volumes for each regulated subcategory attested to "authenticity and accuracy" by a senior company officer, and applicable fuel consumption standards including FCLs and FELs that can only be derived after significant testing. [EPA-HQ-OAR-2010-0162-1871.1, p.61]

NHTSA's proposed pre-certification compliance report is both impractical and of little value to NHTSA. The burden of producing such a report – which requires the manufacturer to project years in advance what final production volumes might be for each of its product families, what emission limits will apply to those families and what credits it may generate or use, not to mention the testing that will be required to generate such numbers – is, to the say least, onerous. Navistar is highly concerned that there will be insufficient data to generate a meaningful report and/or the overly burdensome costs to generate such data. Moreover, these reports will be useless as a regulatory tool. Platforms and families changes as a result of technology changes, production capabilities and, of course, the market. Reports with projections many years out provide no usefulness to the agencies or the manufacturers and may even turn out to be unintentionally misleading. Indeed, NHTSA itself notes that these sorts of "projections can vary considerably from the reality of final production and emission results." [EPA-HQ-OAR-2010-0162-1871.1, p.62]

And, NHTSA is proposing to require this data submission years before similar information will be required by EPA (e.g., certification preview meeting). Thus, NHTSA's proposal does not comport with the Agencies' stated objective of having "an effective and coordinated compliance program." In short, the burden from NHTSA's current proposal is enormous while it offers near zero utility. NHTSA must eliminate the pre-certification compliance report requirement. [EPA-HQ-OAR-2010-0162-1871.1, p.62]

Information Protection (Proposed Regulation 49 CFR § 555.8(b)(4))

There also are a number of defects with the provisions NHTSA is proposing for the protection of the confidential business information ("CBI") required to be submitted under the proposed fuel consumption rules. Specifically, NHTSA is proposing that a manufacturer submit a confidentiality request form for each report submitted to the agency specifying the parts the manufacturer believes to be protected and the "evidence" of confidentiality, including how and when disclosure "would result in significant competitive harm. [EPA-HQ-OAR-2010-0162-1871.1, p.62]

NHTSA's proposed procedures for the protection of CBI impose both unduly and unnecessary burdens on manufacturers. NHTSA must revise its proposed regulations to more closely match EPA's procedures in 40 CFR § 2.201, et seq. EPA's rules better balance the rights of a manufacturer to protect its CBI and the public rights of access. Under EPA's current procedures, manufacturers need not go through the substantial steps, including the submission of "evidence," for the protection of information that NHTSA proposes to require. Instead, manufacturers need only provide EPA with notice of confidentiality – a stamp is sufficient – and then only support its designation if and when the confidentiality is called into question by EPA or others. See, e.g., 40 CFR §§ 2.203(b), 204, 301. To mandate that each report have required "forms" and "evidence" of confidentiality with each submission is not workable and not needed. [EPA-HQ-OAR-2010-0162-1871.1, p.63]

Penalty Provisions (Proposed Regulation 49 CFR § 535.9)

NHTSA is proposing civil penalties for non-compliance with its fuel consumption standards. However, NHTSA has no authority under EISA to assess penalties for any violations of fuel consumption standards. Significantly, Congress did not provide NHTSA any express grant of authority in EISA to assess civil penalties. Nor did Congress enact any provisions that establish the necessary limits and judicial safeguards that circumscribe such authority. By contrast, in the CAA, Congress expressly granted EPA authority to assess penalties (CAA § 205) and expressly provided the opportunity for hearings under the APA and for judicial review of EPA penalties (CAA § 205(c)). Accordingly, it is simply beyond NHTSA's authority under EISA to impose penalty provisions. [EPA-HQ-OAR-2010-0162-1871.1, p.63]

Even if NHTSA did have such authority – and it does not – such provisions must be fair, transparent and, where as here, two agencies have regulatory authority, not duplicative. Although Navistar supports EPA's and NHTSA's efforts to streamline and coordinate their compliance processes, to fulfill the Agencies' objectives (as well as comport with due process requirements), modifications to NHTSA's proposed rules are necessary. [EPA-HQ-OAR-2010-0162-1871.1, p.63]

First, in the preamble, EPA and NHTSA state that "[i]ts not the intent of either agency to impose duplicative civil penalties." And yet, there is no specific provision proposed for NHTSA's proposed compliance provisions or EPA's existing provisions that recognizes that a manufacturer may not be penalized twice for the same GHG violation. Similarly, there is no provision that provides that once one agency opens an investigation, the second agency is precluded from opening a separate investigation on the same issue(s). A dual investigation would, of course, impose unreasonable costs on the manufacturer. And, duplicative penalty assessments would be impermissible double jeopardy. EPA and NHTSA must add provisions to comport with minimum due process standards. [EPA-HQ-OAR-2010-0162-1871.1, pp.63-64]

Second, the proposed rules do not provide that NHTSA-imposed penalties are subject to the APA review process and, in the case of penalties less than "$250,000,000," are not entitled to any administrative appeals process whatsoever. These provisions also violate fundamental due process as well. [EPA-HQ-OAR-2010-0162-1871.1, p.64]

Finally, proposed subpart 535.9(b)(2) provides that "[i]f NHTSA Enforcement determines that a regulatory subcategory of vehicles or engines fails to comply with the applicable fuel consumption standards, the ... manufacturer shall be subject to a civil penalty." This language should be revised to "may be subject to a civil penalty" because NHTSA should retain discretion to not impose a penalty when circumstances warrant such an enforcement approach. Such a revision would bring (b)(2) in line with subsequent sub-paragraphs that NHTSA retains such discretion. [EPA-HQ-OAR-2010-0162-1871.1, p.64]

Response:

In response to comments from engine manufacturers, hybrid system manufacturers, and related trade groups which broached concerns regarding the feasibility of applying OBD systems on heavy-duty hybrid applications starting in 2013 and requesting a delay until 2020 to implement OBD on these systems, the EPA is extending the OBD phase-in for these systems until 2016/2017 depending on the application. We believe the additional phase-in time is necessary to allow these manufacturers time to work together to develop the appropriate communication protocol, address any hardware and/or software issues, and to provide sufficient lead-time for additional hybrid diagnostic system development given resource constraints as engine manufacturers are focused on meeting the 2013 OBD requirements for conventional products at this time. Manufacturers will be required to implement feasible controls for these hybrid systems that do not adversely impact emissions performance in 2013. In 2016, hybrid systems that were in production after January 1, 2013 must meet full OBD requirements, and those put into production prior to January 1, 2013 must be in compliance by 2017. Additionally, manufacturers will be required to provide annual documentation of their progress toward meeting the OBD requirements for 2016 and 2017. See Section 16 of this document for further details.

While we understand the commenter's concern that business decisions may be contingent on timely receipt of certificates of conformity, it is not current agency practice to follow strict deadlines for reviewing applications. Many applications present unique challenges, which may require extra review time. In addition, the volume of applications will affect review time. The agency remains committed to reviewing and processing applications as expeditiously as possible.

It is the manufacturer's responsibility to provide good-faith estimates of production volumes at the time of certification. For carry-over engine/vehicle families, the agencies will have sales volumes from previous model years. If there is a large discrepancy, the agencies may question whether the forecasts are indeed made in good faith. The requirement to include justification in the certification application if volumes have changed significantly only serves to expedite processing of the application. By providing this explanation as standard practice rather than requiring the certification engineer to request this from the manufacturer reduces unnecessary delays.

The final rule requires that manufacturers submit all necessary information for the agencies to a) verify that the GEM inputs are correct and b) that the end user has the necessary information to operate and maintain the vehicle in a manner that will ensure the emission control system remains functional. This approach is not a departure from current criteria pollutant regulations and we do not believe they present an unnecessary burden to manufacturers.

Regarding emission warranty provisions for component deterioration, the agencies agree with the commenter and preamble and regulation language has been revised to reflect this. Updated regulatory text may be seen in 40 CFR 1037.120 and the agencies require that the emission control system be free from defects in materials and workmanship that cause the vehicle to fail to conform to the requirements of this part during the applicable warranty period.

We agree that the components covered by the emissions related warranty are only those components listed on the application as being part of the emissions control system.

The agencies have finalized the requirement that emissions control components (including aerodynamic components that contribute the GEM CdA input) are designed to last the useful life of the vehicle. This is not a departure from agency practice and to do anything less would require that the emissions-reduction benefit of a particular component be discounted at certification to reflect the shorter lifespan. At this point, we have not seen sufficient evidence that the design practices for a fairing to meet a 435,000 mile useful life need to result in a large weight increase.

Regarding NHTSA penalty provisions, Sections I. F.(2)(b) and V.G. of the preamble provide responses to the commenter's concerns.

Organization: Odyne Systems, LLC

Odyne also strongly recommends that the EPA have a process to confirm the validity of assertions made by third parties to slow or stop the introduction of advanced technology. The EPA may need a process to resolve disagreements between chassis OEMs and suppliers of components to the drive train. It is possible that an advanced technology may have strong merit, but current drive train suppliers may engage in efforts to stop the introduction of the advanced technology for reasons other than legitimate technical or performance considerations. It is also possible that existing suppliers may attempt to slow or stop the introduction of advanced technology to protect their business interests. To create a level playing field, Odyne recommends that if a company can show the EPA or NHTSA that an advanced technology is effective and reliable, then the EPA should request proof or analysis from an entity that disagrees and wants to block introduction of the new technology. [EPA-HQ-OAR-2010-0162-1853.1, p.3]

EPA Vol. 75 No. 229 pg. 74242: We believe that it is more appropriate given the status of technology development and our high hopes for future advancements in hybrid technologies to encourage their production through incentives. The agencies welcome comments on this approach. [EPA-HQ-OAR-2010-0162-1853.1, p.8]

Odyne recommends that the EPA broaden the regulatory approach to include solutions outside of the chassis OEM. The EPA should include solutions that are developed from intermediate and final stage manufacturers. Medium and heavy-duty trucks are typically manufactured and marketed to customers much differently than cars and light-duty trucks. Due to lower volumes of trucks sold (vs. passenger cars) and the high level of specialized applications, the truck manufacturing industry has evolved to enable a high degree of customization. Most medium and heavy-duty trucks are typically built in multiple stages. During the first stage, an original equipment manufacturer builds an incomplete vehicle, commonly known as a chassis. The vehicle is then often completed by a different company, known as a final stage manufacturer. Final stage manufacturers typically evaluate the intended application of the vehicle, perform engineering analysis, and then install an appropriate body, equipment and interface components with chassis systems in a manufacturing operation. As stated in the overview, the application may not be know at the time the chassis is manufactured, so it is highly desirable to included hybrid solutions that can be installed in later stages of manufacturing to better match the actual application. [EPA-HQ-OAR-2010-0162-1853.1, p.8]

The credits should be granted to advanced hybrid technologies for improvements in efficiency over the baseline vehicle. The hybrid manufacturers should be required to perform an A to B test of a conventional vehicle to a hybrid vehicle to determine the credit amount. This A to B test could then be used to establish an improvement guideline across multiple platforms and to create a model to calculate benefits for other chassis makes and sizes. The manufacturers of advanced technologies should provide warranty coverage on the hybrid system that is installed on the vehicle. Odyne recommends that the hybrid system provider should not have to provide warranty over the entire vehicle, especially if the OEM chassis manufacturer keeps credits from compliance with base efficiency regulations (potentially obtained through improvements to the engine and the addition of low rolling resistance tires) and if the addition of the system is minimally intrusive (does not adversely impact engine certification, or in the event of a hybrid failure does not cause the vehicle to become non-compliant with base efficiency regulations). The hybrid system should be designed for the useful life of the chassis, unless an exemption or deferment is granted. Other components that contribute to compliance with green house gas emissions are not designed to last the useful life of the vehicle, principally low rolling resistance tires. If the hybrid system has performance anomalies or fails, the penalty associated with the failure should be given to the hybrid system provider. Odyne agrees that hybrid suppliers could be required to track failures and report defects for a certain period of time. The penalties should only be for a prorated amount of the initial credit that was obtained and potentially modified based upon the consequences of the failure and size of the company. Using Odyne's approach, if the hybrid system fails, the vehicle will continue to meet baseline EPA regulations. Odyne recommends that the EPA consider a postponement of the useful life requirement or a temporary reduction in penalties for non-compliance, especially for smaller innovative companies, if the failure of an advanced technology does not cause the chassis to become non-compliant to base efficiency regulations. The precedent for providing different compliance standards has already been established for small companies in the currently proposed EPA rules. (p. 74157 “Neither EPA nor NHTSA is proposing standards at this time for GHG emissions or fuel consumption, respectively, for heavy-duty commercial trailers or for vehicles or engines manufactured by small businesses. However, the agencies are considering proposing such standards in a future rulemaking, and request comment on such an action later in this preamble.”) The modification to penalties is intended to encourage smaller, innovative companies to introduce advanced technologies and level the playing field with larger companies. [EPA-HQ-OAR-2010-0162-1853.1, pp.8-9]

Odyne recommends that the EPA evaluates the merits of a negative claim by an entity that would try to block the advancement of vehicle technology. To increase development of advanced technologies, if a claim is made that an advanced technology is detrimental to the base vehicle; tests must be performed and presented to validate the claim. Entities with existing technologies may put up road blocks to protect investment in current technologies, or protect their business interest. [EPA-HQ-OAR-2010-0162-1853.1, p.9]

As an example, manufacturers of advanced technology that have taken steps to demonstrate the efficiency and reliability of their solutions could face assertions from existing suppliers or OEM chassis manufacturers that the use of the advanced technology could cause harm to existing components or will cause existing drive train components to become non-compliant or less effective in meeting current emissions requirements. In those situations, the EPA or NHTSA should request proof from those that would like to block the introduction of the advanced technology, that technical justification has been provided. [EPA-HQ-OAR-2010-0162-1853.1, pp.9-10]

Provide an equal playing field - encourage companies to innovate, create cost effective solutions

If hybrid system does not modify EPA/CARB certified engine and compliance is maintained even if hybrid system fails. do not require expensive hybrid certification process or extensive hybrid warranties. [EPA-HQ-OAR-2010-0162-1853.1, p.13]

Power-train variations are very diverse (diesel. CNG, gasoline) along with transmission combinations. allow modular systems, after-market solutions and retro-fits' Odyne uses same base traction motor adjusts for different applications in s/w and battery system size.

EPA Vol. 75 No. 229 pg. 74269: Beginning in the 2013 model year, manufacturers will be required to equip heavy-duty engines with on-board diagnostic systems. These systems monitor the activity of the emission control system and issue alerts when faults are detected. These diagnostic systems are currently being developed based around components and systems that influence criteria pollutant emissions. Consistent with the light-duty vehicle GHG rule, we believe that monitoring of these components and systems for criteria pollutant emissions will have an equally beneficial effect on CO2 emissions. Therefore, we do not anticipate the necessity of having any unique onboard diagnostic provisions for heavy-duty GHG emissions. We are seeking comment on this topic, however. [EPA-HQ-OAR-2010-0162-1853.1, p.14]

Supports not having unique onboard diagnostic provisions for GHG emissions for advanced technologies. The Odyne solution is minimally intrusive to the EPA compliant vehicle, allowing the chassis to continue to operate to EPA standards without the hybrid system. The Odyne system will send a signal to the operator to indicate if the hybrid system is in need of repair. The operator can continue to operate the conventional chassis, in non-hybrid mode, until the hybrid system can be scheduled for service. Odyne does not recommend a requirement that the chassis go into a low power mode or shutdown mode if the hybrid system is not functional, especially if the vehicle defaults to EPA compliant base performance in the advent of a hybrid failure. [EPA-HQ-OAR-2010-0162-1853.1, p.14]

Response:

The commenter raised concerns regarding the implementation of OBD for hybrid systems. As stated in the proposal and with this final action, EPA has not created new OBD requirements GHG related technologies. It also did not require any new modes of operations for failure of GHG related components as Odyne suggested.

The commenter also expressed concerns that existing suppliers may attempt to slow or stop the introduction of advanced technology to protect their business interested. The commenter further broached concerns regarding creation of / ensuring a level playing field with respect to driveline advanced technologies. The agencies have adopted the use of innovative technologies that are also advanced technologies as described in 40 CFR 1036.610 and 1037.610. This process includes a process for public review of technology via Federal Register notification. Additionally, the approach to advanced technology allows for three options for certification that addresses concerns regarding driveline component suppliers having an opportunity to participate. The role of OEMs and final stage manufacturers in the manufacturer process has been recognized to help provide incentives for the introduction of advanced technology options. The three options we are finalizing with this option include pre-transmission, post-transmission, and full chassis/complete vehicle certification. Additionally, for manufacturers who supply hybrid systems that provide additional benefit via PTO operation there is a provision for PTO duty cycle testing as well to quantify the A to B comparison to baseline benefit assessment in 40 CFR 1037.525. Warranty requirements for hybrid systems will be consistent with the approach used by EPA for criteria pollutant systems. The certificate holder has the warranty responsibilities, however the certifying manufacturer may have contractual arrangements which require the chassis manufacturer to process or honor warranty claims. The certificate holder retains ultimate responsibility as described in 40 CFR 1036.115 and 40 CFR 1037.120.

Organization: Parker Hannifin Corporation

Section IV.B.2.(b)(i) and (ii) of the preamble to the proposed rule sets out hybrid certification procedures to generate credits. Parker Hannifin believes that these requirements are too burdensome and a simpler approach could provide a better measure of real world reductions. An alternative to estimating the benefits of a new technology using a chassis or engine dynamometer test over some simulated driving schedule would be to measure real world reductions in fuel consumption. A manufacturer could declare a percent fuel consumption reduction for a particular technology. Emission credits would be based on that declaration, but those credits (or a portion of those credits) would not be available for use until the manufacturer provided data from in-use vehicles validating the claimed reduction in fuel consumption. This concept could not only simplify the testing necessary to introduce innovative technology, it could also verify that these new technologies actually achieved real world fuel consumption reductions. It would also allow for the introduction of innovative concepts (i.e., vehicle routing and logistics) that achieved reductions that cannot be measured on a chassis or engine dynamometer test procedure. [EPA-HQ-OAR-2010-0162-1615-cp, p.1]

Response:

The commenter appears to be advocating introduction of vehicles into commerce and then basing certification values on in-use performance. In addition to raising legal questions under section 206 of the Act (which requires certification of compliance with standards before a vehicle is introduced into commerce), EPA believes that the testing requirements remain valid for these final rules. The agencies are also finalizing the approach of conducting hybrid testing based on the complete vehicle to ensure the performance improvement of the actual hybrid system is completely captured with the associated hardware. The agencies have not taken an absolute approach, in that the performance metric allows for improvement in the test methods as we learn more over time, while providing the construct of a basic framework for a complete vehicle assessment that more accurately reflects real-world benefits.

Organization: Sierra Club

To lay the groundwork for a performance based compliance scheme, EPA and NHTSA should include requirements in the final rule to collect and make publicly available vehicle performance data. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

More specifically, the agencies should expand on-road testing and use the results to validate current compliance models. Further, the agencies should build a truck market database that is publicly accessible. Lastly, EPA and NHTSA should publish an annual report, similar to the EPA's "Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends" report that describes new and on-road fleet performance for medium and heavy-duty vehicles. This report should also detail the balance and use of compliance credits for each manufacturer. [EPA-HQ-OAR-2010-0162-1889.1, p. 2]

Response:

The agencies agree that there is a need for sharing heavy-duty emissions and fuel consumption information and therefore will make information publically available under this program.

Organization: Truck Renting and Leasing Association (TRALA)

Both EPA and NHTSA should not be able to impose penalties for the same act of noncompliance

As a matter of fairness, EPA and NHTSA separately should not be allowed to penalize a manufacturer for the same act of non-compliance (75 Fed. Reg. at 74269). We also note that NHTSA lacks administrative procedures to ensure 'due process' in its assessment of penalties. [EPA-HQ-OAR-2010-0162-1816.1, p.7]

Response:

Both NHTSA and EPA are charged with regulating medium-duty and heavy-duty trucks; NHTSA regulates them under EISA and EPA regulates them under the CAA. Both agencies also have compliance review and enforcement responsibilities for their respective regulatory requirements. The same set of underlying facts may result in a violation of EISA and a violation of the CAA. The agencies recognize the above concerns, and intend to address them through appropriate consultation. The details of the consultation and coordination between the agencies regarding enforcement will be set forth in a memorandum of understanding to be developed by EPA and NHTSA.

Organization: Volvo Group

Fuel efficiency (FE) standards proposed by NHTSA are duplicative of the GHG standards proposed by EPA, and fail to offer any additional meaningful contribution to GHG reduction or FE improvement. Both Agencies' standards rely on EPA certification data and direct grams CO2/gallon conversions, and result in duplicative requirements. See 75 FR 74152, 74435-74449. As such, a manufacturer who complies with EPA's proposed regulations also would be in compliance with those proposed by NHTSA. [EPA-HQ-OAR-2010-0162-1812.2, p.5]

Notwithstanding this, the NHTSA proposal would impose additional reporting requirements and noncompliance penalties that are unnecessarily burdensome and inappropriately expand the potential liability and penalties faced by manufacturers. From a standpoint of fuel efficiency and reduction of GHG emissions, there is no justification for imposition of additional standards from NHTSA that duplicate EPA standards. To the extent NHTSA elects to, or believes it is required to, adopt independent standards, these standards should be limited to an incorporation by reference of EPA's requirements, without imposing additional burdens, penalties or liabilities. [EPA-HQ-OAR-2010-0162-1812.2, p.5]

The NHTSA reporting requirements are both unnecessary and overly burdensome. They require manufacturers to submit numerous reports to the agency, and include other requirements that are excessively burdensome. See 75 FR 74152, 74449-53. These include requiring signatures of corporate officers that are Vice Presidents or higher and requirements for detailed production projections. See 75 FR 74152, 74451-52. One of the main characteristics of the heavy-duty industry that distinguishes it from light duty is that heavy-duty production is built-to-order. This limits the ability of manufacturers to make accurate projections of production volumes and vehicle characteristics. In light of the redundancy of the standards, these reporting requirements are excessively burdensome, and exceed the recommendations made in the NAS study (page 179) and the NHTSA report (page 48). [EPA-HQ-OAR-2010-0162-1812.2, p.5]

In addition to duplicating EPA requirements, the proposed NHTSA program seeks to impose additional, excessive penalties on manufacturers, without providing adequate due process. The proposed penalty provisions are unlawful and should be eliminated. At a minimum, these provisions must be amended to make them consistent with the existing fuel economy statute. [EPA-HQ-OAR-2010-0162-1812.2, p.5]

First, provisions in the NHTSA proposal that provide for penalties and subsequent administrative appeals exceed the authority granted to the agency by Congress. In developing these provisions, NHTSA relies on an overbroad interpretation of the relevant EISA language. EISA amended the existing fuel economy statute (49 U.S.C. Chapter 329) by adding, inter alia, the following provision to 49 U.S.C. § 32902, Average Fuel Economy Standards. [EPA-HQ-OAR-2010-0162-1812.2, p.5]

Rulemaking – Not later than 24 months after completion of the study required under paragraph (1), the Secretary, in consultation with the Secretary of Energy and the Administrator of the Environmental Protection Agency, by regulation, shall determine in a rulemaking proceeding how to implement a commercial medium- and heavy-duty on-highway vehicle and work truck fuel efficiency improvement program design to achieve the maximum feasible improvement, and shall adopt and implement appropriate test methods, measurement metrics, fuel economy standards, and compliance and enforcement protocols that are appropriate, cost-effective, and technologically feasible for commercial medium- and heavy-duty on-highway vehicles and work trucks. [EPA-HQ-OAR-2010-0162-1812.2, pp.5-6]

49 U.S.C. §32902(k)(2). In interpreting this provision, NHTSA concludes that "Congress' approach is unlike CAFE enforcement for passenger cars and light trucks, where Congress specified a program where a manufacturer either complies with the standards or pays civil penalties." 75 FR 74152, 74172. The agency then finds that by not defining "compliance and enforcement protocols," Congress "has assigned this matter to the agency's discretion." Id. In other words, NHTSA concludes that it has broad authority to "determine both whether manufacturers have complied with the standards, and to establish the enforcement mechanisms and decision criteria for non-compliance." [EPA-HQ-OAR-2010-0162-1812.2, p.6]

NHTSA's interpretation, however, fails to account for the fact that Congress did not adopt an entirely new fuel economy statute for medium- and heavy-duty vehicles, but rather amended an existing statute – and that the existing statute contains both penalty provisions and, more importantly, provisions for administrative and judicial appeals of penalties. See 49 U.S.C. §§ 32912, 32915. It appears that NHTSA arbitrarily concludes that "Congress' approach is unlike CAFE enforcement" and therefore none of the enforcement and appeals provisions of the statute apply to medium- and heavy-duty vehicles. NHTSA then concludes it is free to invent whatever scheme it desires. Having ignored the existing statute in reaching this erroneous conclusion, NHTSA proposed penalty and enforcement provisions that are wholly different from those set forth in the statute, inappropriately thwart the requirements of the Administrative Procedure Act, and fail to provide for meaningful due process. [EPA-HQ-OAR-2010-0162-1812.2, p.6]

Rather than develop penalty provisions that align with the mandates of the fuel economy statute, NHTSA relies on entirely different statutory authority which does not even fall within the purview of the agency. NHTSA proposes to simply adopt the penalty provisions of the Clean Air Act (CAA), which provides for the Environmental Protection Agency to impose maximum penalties of $37,500 per vehicle.1 Proposed 49 CFR § 535.9(b)(3), 75 FR 74152,74454. By comparison, the fuel economy statute provides for a per-vehicle civil penalty of $5 multiplied by each 0.1 of a mile per gallon by which a vehicle model exceeds applicable fuel economy standards. See 49 U.S.C. § 32912(b). These penalties, as envisioned and prescribed by Congress, are vastly lower than the CAA penalties NHTSA seeks to graft into its fuel economy program. While Volvo Group appreciates the differences between the light-duty CAFE program and the fuel-efficiency standards NHTSA is proposing for medium- and heavy-duty vehicles, these differences do not justify NHTSA's adoption of an entirely different penalty scheme that is grossly out of proportion with existing penalties provided for NHTSA under the 49 U.S.C. Chapter 329. [EPA-HQ-OAR-2010-0162-1812.2, p.6]

In addition, penalties imposed by NHTSA are likely to be in addition to those imposed by EPA for what is essentially the same violation – resulting in double jeopardy. Although the proposal would require NHTSA Enforcement to "take into account" civil penalties paid under the Clean Air Act, there is nothing in the proposal that bars NHTSA from imposing penalties in addition to those imposed by EPA. [EPA-HQ-OAR-2010-0162-1812.2, p.6]

Proposed 40 CFR § 535.9(b)(4), 75 FR 74152, 74454. Given that NHTSA's program is largely duplicative and unnecessary in the first place, such an outcome would be patently unfair and unlawful. As such, if finalized, the proposal at a minimum must be modified to provide that NHTSA and EPA are barred from imposing penalties where a manufacturer already has paid or successfully appealed penalties imposed or sought to be imposed by one or the other agency. In addition, to the extent NHTSA adopts its own penalty provisions, those provisions should reflect and be in line with the fuel-economy penalties envisioned by Congress for NHTSA as set forth at 49 U.S.C. §32912. Use by NHTSA of the CAA penalty provisions in this context is both inappropriate and contrary to the intent of Congress. [EPA-HQ-OAR-2010-0162-1812.2, p.7]

Equally, if not more, problematic are the administrative review provisions contained in NHTSA's proposal. First, as proposed, the civil penalties section provides that the Administrative Procedure Act (APA) would not apply to penalty proceedings against medium- and heavy-duty vehicle manufacturers. Proposed 49 CFR §535.9(b)(1), 75 FR 74152,74454. Second, the proposal does not even consider provisions of 49 U.S.C. Chapter 329 applicable to fuel-economy penalty proceedings, which provide for appeals of civil penalty orders in federal court. Third, having ignored these avenues for ensuring due process, NHTSA's proposal instead imposes an administrative review process that is entirely within the discretion of the agency and contains no readily apparent right of judicial appeal. [EPA-HQ-OAR-2010-0162-1812.2, p.7]

Under the proposal, NHTSA Enforcement has discretion to determine both whether a violation has occurred, and what the penalty for the violation should be. Proposed 40 CFR § 535.9(b), 75 FR 74152, 74454. Following review of the NHTSA Enforcement report, NHTSA's Chief Counsel then has discretion to issue a Notice of Violation (which may be served by facsimile, e-mail, overnight mail, or regular – i.e. uncertified – mail). Id. Manufacturers must appeal the notice of violation to NHTSA within 30 days of receipt or they waive any right to further review. Id. Manufacturers are then entitled to a hearing before a NHTSA Hearing Officer, but are not entitled to discovery of evidence in advance of the hearing. The Hearing Officer also is not bound by strict rules of evidence, and there is no requirement for a verbatim transcript unless requested and paid for by one of the parties. [EPA-HQ-OAR-2010-0162-1812.2, p.7]

As proposed, the Hearing Officer has discretion to determine appropriate penalties, and there is no further administrative appeal unless penalties exceed $250 million. Id. In addition, nothing in the proposal declares the Hearing Officer's ultimate order to be final agency action. As drafted, therefore, NHTSA's proposal allows an employee of the agency to impose penalties of up to $250 million without any apparent right of appeal. Moreover, the proposed "hearing officer" need not have any particular qualification for that role other than being a NHTSA employee who has been delegated authority to assess penalties by the Administrator and is not otherwise connected with the case. See Proposed 49 CFR § 535.4, 75 FR 74152, 74439, and 49 CFR § 535.9, 75 FR 74152, 74455. By comparison, regulations applicable to adjudicative proceedings under the existing CAFE program require a hearing before a "presiding officer", or an individual "who shall be an administrative law judge qualified under title 5, U.S.C. Section 3105 and assigned by the Chief Administrative Law Judge, Office of Hearings, United States Department of Transportation." 49 CFR §511.3. [EPA-HQ-OAR-2010-0162-1812.2, p.7]

In sum, NHTSA's proposed process for adjudicating penalties under $250 million violates the very statute that provides NHTSA authority to impose fuel economy standards, the APA, and the Due Process Clause of the Constitution. [EPA-HQ-OAR-2010-0162-1812.2, p.7]

Although it provides for a marginal amount of additional review, the proposed adjudicative process for penalties in excess of $250 million also is fatally flawed. The NHTSA proposal allows for additional appeal in such cases to the NHTSA Administrator, who may affirm the penalty, modify the penalty, rescind the Notice of Violation, or remand the case. Id. Absent a remand, the decision of the Administrator is final agency action under the proposal. [EPA-HQ-OAR-2010-0162-1812.2, pp.7-8]

Although final agency action is presumably reviewable in federal court, the proposal does not explicitly state this to be the case. Given NHTSA's other pronouncements regarding the level of discretion it has afforded itself under the EISA, its provision that the APA does not apply, and its apparent conclusion that it is not bound by 49 USC Chapter 329 (or its existing regulations regarding appeals of fuel economy violations), it is unclear whether NHTSA would agree that a party has a right to further review of decisions of either the Hearing Officer of the NHTSA Administrator. Such a position is untenable. [EPA-HQ-OAR-2010-0162-1812.2, p.8]

In summary, the enforcement and penalty provisions of NHTSA's proposal suffer from the following major flaws: (1) they seek to enforce requirements that are duplicative of those already enforced by EPA; (2) they would impose civil penalties in addition to penalties imposed by EPA for the same violation – thus placing the defendant in double jeopardy; (3) they lack statutory basis or authority for NHTSA's proposed maximum civil penalty, which also conflicts with the penalty scheme envisioned by Congress for violations of fuel economy standards; (4) they lack statutory basis or authority for NHTSA's penalty, enforcement and administrative review provisions; and (5) NHTSA's administrative review process is entirely lacking and likely violates the underlying fuel economy statute, the APA and the Constitution by, among other things, limiting appeals to proceedings solely before NHTSA employees and not providing a clear right of appeal of those decisions. [EPA-HQ-OAR-2010-0162-1812.2, p.8]

NHTSA's regulatory program as laid out in this NPRM is redundant of EPA's, also making it unnecessary, administratively burdensome and unlawful. Alternatively NHTSA should accept EPA GHG certification without requiring any further action. [EPA-HQ-OAR-2010-0162-1812.2, p.8]

Response:

Sections I. F.(2)(b) and V.G. of the preamble provide responses to the commenter's concerns.

Organization: Volvo Group

Assuming a 2014 start date for the HD OBD requirements, Volvo Group agrees with the Agencies that the existing OBD requirements for "components and systems for criteria pollutant emissions will have an equally beneficial effect on CO2 emissions" and that "unique onboard diagnostic provisions for heavyduty GHG emissions" are not necessary, but we are concerned that this language could be understood to mean that existing provisions might somehow be applied to GHG emission controls and components. 75 FR 74152, 74269. Expanding OBD requirements to GHG emissions and fuel consumption reduction technologies would impose unnecessary burdens on manufacturers, would conflict with the core principles of the HD National Program -- that the program be implementable and spur the introduction of advanced technologies, and would not allow for proper diagnostic development with aged components. Thus, the Agencies should more clearly articulate that OBD provisions will not be required specifically for GHG emissions. [EPA-HQ-OAR-2010-0162-1812.2, p.33]

Response:

As proposed, we are not finalizing unique GHG-related OBD requirements for conventional engines. However, to the extent that advanced technologies (for GHG purposes) affect criteria pollutant emissions, OBD requirements may still apply under 40 CFR Part 86.

Organization: Volvo Group

Developing, validating and implementing onboard diagnostics ("OBD") for hybrid system components will require the investment of significant capital and human resources from engine and vehicle manufacturers, complicated by the lack of vertical integration between engine, vehicle and hybrid system suppliers. Because hybrids are sold in very low volumes, any costs approached with OBD compliance will be amortized over very few vehicles, which will further exacerbate the already-high cost of purchasing hybrids. Thus, the cost and complexity associated with the imposition of OBD requirements would be a significant obstacle to the increased development and deployment of HD hybrid vehicles. [EPA-HQ-OAR-2010-0162-1812.2, pp.33-34]

The inability of vehicle OEM's to monitor hybrid system functionality extends to the hybrid battery suppliers, which currently lack appropriate uniform industry-accepted practices regarding how to characterize battery performance. The current industry metric used to characterize performance is based on the battery manufacturer's defined capacity and state of charge. Each manufacturer defines the capacity and state of charge performance based on non-standard manufacturer-specific test conditions. However, capacity and state of charge alone do not accurately represent the battery's ability to deliver energy over a broad range of operating conditions and duty cycles. Battery-hybrid system and vehicle manufacturers must develop a systematic and standardized procedure to characterize the battery performance under a range of operating conditions. In addition, state of charge is a dimensionless parameter that does not translate directly from one battery manufacturer to another based on an equivalent battery capacity and performance. The battery supplier defines state of charge based on internal battery metrics rather than the more rigorous state of energy available from the battery at any given time. Absent a standardized understanding of the energy available for hybrid use, an effective OBD emission monitoring system cannot be developed. [EPA-HQ-OAR-2010-0162-1812.2, p.34]

Since most applications will also be OBD certified in California in 2013, is also vitally important that EPA clearly states and supports the California Air Resources Board (CARB) not requiring any additional GHG OBD requirements. [EPA-HQ-OAR-2010-0162-1812.2, p.34]

Response:

In response to comments from engine manufacturers, hybrid system manufacturers, and related trade groups which broached concerns regarding the feasibility of applying OBD systems on heavy-duty hybrid applications starting in 2013 and requesting a delay until 2020 to implement OBD on these systems, the EPA is extending the OBD phase-in for these systems until 2016/2017 depending on the application. We believe the additional phase-in time is necessary to allow these manufacturers time to work together to develop the appropriate communication protocol, address any hardware and/or software issues, and to provide sufficient lead-time for additional hybrid diagnostic system development given resource constraints as engine manufacturers are focused on meeting the 2013 OBD requirements for conventional products at this time. Manufacturers will be required to implement feasible controls for these hybrid systems that do not adversely impact emissions performance in 2013. In 2016, hybrid systems that were in production after January 1, 2013 must meet full OBD requirements, and those put into production prior to January 1, 2013 must be in compliance by 2017. Additionally, manufacturers will be required to provide annual documentation of their progress toward meeting the OBD requirements for 2016 and 2017. See Section 16 of this document for further details. Additionally, to address the brake work capture limit, 40 CFR 1036.525 provides a procedure for determination of the maximum brake fraction. To avoid the need to delete extra brake work from positive work you may set an instantaneous brake limit target.

Organization: Volvo Group

75 FR 74267 – Infrequent Regeneration Adjustment Factors (IRAF)

Volvo Group adamantly opposes EPA's conclusion to omit IRAF requirements for CO2 emissions. Fuel use and GHG emissions from regeneration can be a significant fraction of the expected improvement and a significant variable between manufacturers. As stated in the proposed rule, the amount of testing required to determine these factors is far less than the testing requirement for Durability Testing. Volvo Group disagrees with the Agency conclusion that manufacturers are motivated to maximize the operating time between regeneration events due to the IRAF requirements for criteria pollutants. It is easy to conceive of operating schemes whereby a manufacturer will accept higher CO2 emission rates in order to minimize the impact of IRAF on the criteria emission levels. Without a requirement to balance regeneration strategies while considering both GHG and criteria pollutant impacts, there is potential for an unlevel playing field among manufacturers due to the differences in engine aftertreatment technologies. Volvo Group requests that fuel used for regeneration of DPF's be factored into the targets and included in the measurement process. [EPA-HQ-OAR-2010-0162-1812.2, pp.34-35]

Response:

There are no IRAF requirements for this final rule as we continue to believe that heavy-duty vehicle and engine manufacturers are already very well motivated to extend the regeneration frequency to as long an interval as possible and to reduce the during of the regeneration as much as possible. Both of these actions significantly reduce the impact of regeneration on CO_2 emissions and fuel consumption. We do not believe that adding an adjustment factor for infrequent regeneration to the CO_2 or fuel efficiency standards would provide a significant additional motivation for manufacturers to reduce regenerations.

Organization: Waste Management

Affording Supplemental Compliance Certification Methods: Existing certification test methods will need to be supplemented to recognize efficiency improvements of technologies not accounted for at this time. This will be a critical component of recognizing and building upon fuel efficiency improvements from new technologies. Our municipal and large commercial and industrial customers have aggressive sustainability goals and push us to implement innovative technologies to reduce our carbon footprint. We are pleased with the consideration provided to future innovations such as hybrids and electric vehicles. We urge the Agencies to also incorporate supplemental compliance methods for certifying natural gas engines along with incentives that promote their use.[EPA-HQ-OAR-2010-0162-1854.1, p.3]

Waste Management has determined that the best near-term option for operating a more fuel-efficient fleet that also meets stringent criteria pollutant emissions standards is to increase our natural gas powered fleet. While we have road-tested a number of hydraulic and electric hybrid trucks, we do not believe that hybrid technology will be a practicable solution in the near-term from a performance or cost standpoint. Because natural gas vehicles have far lower GHG emissions on a ton of refuse hauled basis, meet the stringent NOx and particulate matter standards, are lighter than diesel or hybrid vehicles, and are relatively uncomplicated to maintain, WM's new truck purchases will overwhelmingly be natural gas vehicles. We also plan to make significant investments in natural gas fueling infrastructure. As we make these very substantial sustainability investments, we need regulatory certainty that these natural gas vehicles can be certified as compliant under the final HD Rule. We urge EPA and NHTSA to incorporate regulatory compliance options to certify natural gas vehicles that span the HD classes covered by the rule. [EPA-HQ-OAR-2010-0162-1854.1, p.4]

Response:

Comments from Waste Management request that supplemental test methods be developed to recognize efficiency improvements of technologies not accounted for at this time; however, the comments do not specify what methods are needed or what technologies are intended. We believe that the innovative technology credit program we are establishing is sufficiently robust to evaluate and credit such emerging technologies. Waste Management also requests regulatory certainty that NGVs can be certified under the final rule. We are confident that the test and compliance procedures established in this rule do adequately provide for testing and certification of alternative-fuel vehicles and engines, including NGVs, and do not believe additional provisions are needed at this time.

17.2. Comments on Regulatory Text

Organization: Chew, Yuli

§ 86.016-1(e) Special certification for small volume manufacturers. Special certification procedures are available for any manufacturer whose projected combined U.S. sales of light-duty vehicles, light-duty trucks, heavy-duty vehicles, and heavy-duty engines in its product line (including all vehicles and engines imported under the provisions of 40 CFR 85.1505 and 85.1509 of this chapter) are fewer than 10,000 units for the model year in which the manufacturer seeks certification. [EPA-HQ-OAR-2010-0162-0558.1, p.1]

§ 1036.150 (d) Small manufacturers. Manufacturers meeting the small business criteria specified for 'Gasoline Engine and Engine Parts Manufacturing' or 'Other engine Equipment Manufacturers' in 13 CFR 121.201 are not subject to the greenhouse gas emission standards in § 1036.108. [EPA-HQ-OAR-2010-0162-0558.1, p.1]

Is EPA applies the provision of 13 CFR 121.201 consistent across different vehicle categories? [EPA-HQ-OAR-2010-0162-0558.1, p.1]

In the EPA-HQ-OAR-2009-0472 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule covering model year 2012 through 2016, EPA ruled that 'In the interest of establishing the small volume manufacturer provisions as narrowly as possible while still accomplishing the purpose of the provisions, EPA has decided to use a cut-point of 5,000 vehicles. In determining eligibility for SVM deferment, manufacturers must be aggregated according to the provisions of 40 CFR 86.1838-01(b)(3), EPA is deferring establishing CO2 standards for manufacturers with MY2008 or MY2009 sales of less than 5,000 vehicles.' [EPA-HQ-OAR-2010-0162-0558.1, p.1; this comment can also be found at section 15 of this comment summary]

The environmental impact per vehicle from the medium and heavy duty vehicle is several times more that a light duty vehicle; it is very important that EPA limit this very loosened this definition for 'small manufacturer'. [EPA-HQ-OAR-2010-0162-0558.1, p.2]

Response:

We do not believe our definition of small manufacturer is loose. Further, we believe it is appropriate for this first regulation of heavy-duty vehicles for greenhouse gas.

Organization: Chew, Yuli

§ 1037.104 Exhaust emissions standards for CO2, CH4, and N2O for heavyduty vehicles at or below 14,000 pounds GVWR. (c) N2O and CH4 standards. Except as allowed under this paragraph (c), all vehicles subject to the standards of this section must comply with an N2O standard of 0.05 g/mile and a CH4 standard of 0.05 g/mile. [EPA-HQ-OAR-2010-0162-0558.1, p.2]

§ 1037.104(g) Low-volume exclusion. You may exclude a limited number of vehicles from the standards of this section, as specified in this paragraph (g). The number of excluded vehicles may not exceed 2,000 in any model year, unless your total production of vehicles in this category for any model year. [EPA-HQ-OAR-2010-0162-0558.1, p.2]

Two percent of 100,000 is 20,000. This exclusion is too lenient for LVM. Similarly to the previous Light Duty Rule, EPA should use a cut-point of 5,000 vehicles as an exemption criteria based on the previous sales quantities in the US. [EPA-HQ-OAR-2010-0162-0558.1, p.2]

Response:

The low volume exclusion is not being finalized.

Organization: Engine Manufacturers and Truck Manufacturers Associations

The proposed regulations should be revised to ensure that they do not improperly expand manufacturers' emissions warranty obligations under CAA §207(a). The CAA provides that manufacturers 'shall warrant [that each new] vehicle or engine is [in conformance with the applicable emissions standards] and free from defects in materials and workmanship which cause such vehicle or engine to fail to conform with applicable regulations for its useful life.' (42 U.S.C. §7541(a)(1).) In their proposal, however, the Agencies articulate an overly-broad reading of the CAA' s emissions warranty provision, claiming that 'vehicle manufacturers must warrant all components installed which act to reduce CO2 emissions at the time of initial sale.' (75 FR at 74273.) [EPA-HQ-OAR-2010-0162-1940.1, p.22]

In addition, proposed §1037.120(a)(2), goes beyond the language of §207(a) by stating that manufacturers must warrant that its new vehicle 'is free from defects in materials and workmanship that may keep it from meeting [the applicable] requirements.' That conditional language ('may cause' vs. 'cause') is overly-broad. Consequently, the Agencies should delete the word 'may' from the proposed regulation. [EPA-HQ-OAR-2010-0162-1940.1, pp.22-23]

Further, EPA's proposal for GHG-related warranties significantly change and expand the Agency's long-standing warranty policy. EPA regulations historically have provided that '[e]xtended warranties on select parts do not extend emissions warranty requirements for the entire engine but only for those parts. In cases where responsibility for an extended warranty is shared between the owner and the manufacturer, the emissions warranty shall also be shared in the same manner as specified in the warranty agreement.' (See 40 CFR §86.004-2) By contrast, the EPA's proposed §1037.120(b) provides: [EPA-HQ-OAR-2010-0162-1940.1, p.23]

The emission-related warranty for the vehicle may not be shorter than any published warranty you offer with or without charge for the vehicle. Similarly, the emission-related warranty for any component may not be shorter than any published warranty you offer with or without charge for that component. [EPA-HQ-OAR-2010-0162-1940.1, p.23]

EPA's existing regulations provide for a warranty period of 5 years or 100,000 miles (whichever comes first), except where a manufacturer has extended the warranty on a specific part, in which case the emissions warranty can be no shorter than that extended warranty. (See 40 C.F.R. §86.004-2.) EPA's proposed regulation would provide that if a manufacturer publishes an offer of an extended warranty, even if only a few customers purchase that extended warranty, the manufacturer must cover all customers for the same duration and/or mileage. That would result in significantly longer emission warranties than are authorized. Accordingly, §1037.120(b) must be revised to preclude that result. [EPA-HQ-OAR-2010-0162-1940.1, p.23]

The Proposed GHG/FE regulations state that emissions-related warranties for vehicle components which act to reduce CO2 emissions 'must be valid for at least as long as the minimum periods specified in 40 CFR part 86.' (See 75 FR at 74384.) That warranty period (discussed above) as applied to GHG emissions would appear to apply to air conditioning ('A/C') systems, consistent with the new A/C leakage requirements proposed in the rule. While the leakage requirements, and subsequent warranty requirements, are new and challenging for vehicle manufacturers, they do not appear to be unreasonable, since they are consistent with current vehicle warranties, and other emission-related warranty requirements. However, the Preamble states that 'the vehicle manufacturer is also required to warrant the A/C system for the useful life of the vehicle.' (See 75 FR at 74273.) Singling out A/C systems for a warranty period equal to the full vehicle useful life period (10 years/435,000 miles for a heavy-duty engine) is unreasonable, and would make the A/C system warranty twice as long as other emissions-related warranties. Thus, the proposed full useful life emissions-related warranty for A/C systems is unreasonable and should be deleted from the final rule. There simply is no basis in the rulemaking record to justify such a long warranty requirement for A/C systems. [EPA-HQ-OAR-2010-0162-1940.1, p.23]

Accordingly, the Agencies must clarify that the minimum emissions-related warranty period for A/C systems is that specified under 40 CFR Part 86. [EPA-HQ-OAR-2010-0162-1940.1, pp.23-24]

Organization: Volvo Group

The preamble section V (D)(3)(a) *See* 75 FR 74152,74273 states that the vehicle manufacturer "must warrant all components installed which act to reduce CO2 emissions at the time of initial sale…In addition, the manufacturer must ensure these components and systems remain functional for the useful life of the vehicle. The exception being tires, which are only required to be warranted for the first life of the tires". [EPA-HQ-OAR-2010-0162-1812.2, p.35]

Proposed 40 CFR § 1037.120(b) states that, "[t]he emission related warranty for the vehicle may not be shorter than any published warranty you offer with or without charge for the vehicle. Similarly, the emission related warranty for any component may not be shorter than any published warranty you offer with or without charge for that component." 75 FR 74152, 74384 [EPA-HQ-OAR-2010-0162-1812.2, p.35]

Volvo Group believes that all emission-related components should be mandated to be warranted for the same period as the current engine criteria emission warranty or base mechanical warranty, whichever is greater, and the proposed rule should be corrected to reflect this. [EPA-HQ-OAR-2010-0162-1812.2, p.35]

In addition, the preamble section V(D)(3)(a) states that, "Manufacturer must warrant the A/C system for the useful life of the vehicle against design or manufacturing defects causing refrigerant leakage in excess of the standard". 75 FR 74152, 74273. This should not exceed the warranty of any other emission-related component. Proposed 40 CFR § 1037.120(b) does not explicitly state it covers A/C leakage, but it does state that it is "with respect to greenhouse gas and evaporative emissions" and part (c) states it covers "all components whose failure would increase a vehicle's evaporative emissions". It needs to be stated clearly in 1037.120(b) and (c) that the A/C components meet the same warranty requirement as specified for all other emission related components. [EPA-HQ-OAR-2010-0162-1812.2, pp.35-36]In section V(D)(i) of the preamble the Agencies state, "As with engine certification, a manufacturer must provide evidence of compliance through the regulatory useful life…features are expected to last the full life of the vehicle without becoming detached, cracked/broken…". It is unclear what is meant by these statements. Is “full life” synonymous with useful life? Is this specifying a warranty period or does it provide for penalties based on in-use verification audits? Volvo Group tests its components to a typical life of 1,000,000 km (620,000 miles). As noted above, Volvo Group rejects the requirement to warrant the vehicle emission components to anything beyond the current criteria emission component required warranties. [EPA-HQ-OAR-20

The current practice in the HD vehicle market is for tire manufacturers to warrant to the ultimate vehicle purchaser that the tire is free from defects in materials and workmanship. Since tires are designed, manufactured, and marketed by the tire companies without any direct involvement from HD vehicle manufacturers, the vehicle manufacturers are not involved in providing tire warranties to vehicle purchasers. Unlike passenger car tires that are designed specifically for a particular vehicle, HD vehicle manufacturers make available a wide array of tire brands, models and sizes for vehicle purchasers to choose from. Often, the HD vehicle purchaser’s tire choice is based on a long history of analyzing the cost of operation for that particular tire, and a long-standing relationship with the tire manufacturer and/or a particular distributor. As such, the tire manufacturer’s warranty is extended directly to the vehicle purchaser, and any issues remedied under the warranty are provided directly from the tire manufacturer to that end user. [EPA-HQ-OAR-2010-0162-1812.2, p.40]

Considering the current HD tire and vehicle marketplace, Volvo Group requests that the Agencies allow a HD vehicle manufacturer to rely on a tire manufacturer’s warranty to satisfy the regulations’ “emissions-related” warranty requirements. Further, tire manufacturers should be obligated to measure the rolling resistance of the HD tires that they provide, and to warrant those test results to vehicle manufacturers, which can then use those results as part of the certification of the GHG emission levels of the vehicle with tire manufacturers held liable for the accuracy and consistency of the tire rolling resistance. [EPA-HQ-OAR-2010-0162-1812.2, p.41]

Organization: Robert Bosch LLC

Seeks clarification of its understanding that EPA’s emission-related warranty provision, if retained in the final rule, would not alter the warranty periods set forth in 40 C.F.R. section 86.004-2. [EPA-HQ-OAR-2010-0162-1630.1, p.3]

In the final rule establishing the LDV National Program, EPA did not promulgate an emissions-related warranty provision specifying the precise parts covered by a manufacturer’s warranty. Rather, EPA explained in the preamble that the rule “extend[ed] the [Clean Air Act’s] defect warranty requirement to emission-related components necessary to meet CO2, CH4, and N2O standards, including emission-related components which are used to obtain [any of the] optional credits.” EPA further explained that “emission related parts,” which term is defined in 40 C.F.R. section 85.2102(a)(14), “would include those parts, systems, components and software installed for the specific purpose of controlling emissions or those components, systems, or elements of design which must function properly to assure continued vehicle emission compliance, including compliance with CO2, CH4, and N2O standards." EPA went on to state that "[f]or example, today's action will extend defect warranty requirements to emission-related components on advanced technology vehicles such as cylinder deactivation components or batteries used in hybrid-electric vehicles." [EPA-HQ-OAR-2010-0162-1630.1, pp.35-36]

EPA states in the preamble of the HD proposed rule that combination tractor manufacturers would be required to warrant, at the time of initial sale, "all components installed which act to reduce CO2 emissions," and EPA points out that "[t]his includes all aerodynamic features, tires, idle reduction systems, speed limiting system, and other equipment added to reduce CO2 emissions." EPA seems to suggest that the defect warranty period is "the useful life of the vehicle." Similarly, EPA asserts that vocational vehicle chassis manufacturers would have to "warrant their product to be free from defects that would adversely affect emissions," a warranty that would "cover[] the failure of emission related components," which EPA identifies as the vehicle's tires, "for the useful life of the vehicle." [EPA-HQ-OAR-2010-0162-1630.1, p.36]

Unlike the LDV final rule, EPA has proposed section 1037.120 ("Emission-related warranty requirements") as part of its GHG emissions standards for combination tractors and vocational vehicles. Bosch thinks a much cleaner and more streamlined approach would be for EPA merely to explain, as it did in the LDV rule, that the defect warranty requirement under Clean Air Act section 207 would be extended to emissions related parts necessary to meet the GHG emissions standards. A warranty-specific regulation is unnecessary. [EPA-HQ-OAR-2010-0162-1630.1, pp.36-37]

Furthermore, two particular aspects of the proposed regulatory provision concern Bosch: (1) the express mention among the listed parts of "hybrid system components;" and (2) the length of the warranty period as suggested by the preamble discussion. Bosch suspects that EPA has included the hybrid component language on the assumption that a vehicle with a hybrid system would qualify for an AT credit. Bosch requests confirmation of this view. If this is the case, Bosch questions why a hybrid system is the only advanced technology specified. [EPA-HQ-OAR-2010-0162-1630.1, p.37]

More important still, Bosch observes that the statement in section 1037.120(c), that "[t]he emission-related warranty covers these components even if another company produces the component," undoubtedly will mean that vehicle manufacturers will require hybrid system suppliers to warrant their hybrid systems for the same periods as the subject vehicles. As discussed in section III.A.1 above, EPA has proposed vehicle-specific useful life periods of 10 years/110,000 miles for Class 2b-5 vocational vehicles, 10 years/185,000 miles for Class 6-7 vocational vehicles and Class 7 tractors, and 10 years/435,000 miles for Class 8 vocational vehicles and tractors. Section 1037.120(b) specifies that the "emission-related warranty with respect to [GHG] and evaporative emissions must be valid for at least as long as the minimum periods specified in 40 CFR part 86 for the engine used in the vehicle." Notwithstanding the preamble suggestions to the contrary, Bosch assumes, and requests confirmation of its assumption, that in accordance with Clean Air Act sections 207(a) and 207(i), the warranty period for the emission-related warranty will continue to be as set forth in 40 C.F.R. section 86.004-2: “a period of 5 years/50,000 miles, whichever occurs first, for Otto-cycle HDEs and light heavy-duty diesel engines,” and “[f]or all other heavy-duty diesel engines the [warranty] period shall be 5 years/100,000 miles, whichever occurs first.” [EPA-HQ-OAR-2010-0162-1630.1, pp.37-38]

Organization: American Trucking Associations, Inc. (ATA)

Second, for heavy-duty vehicles, EPA proposes that manufacturers warrant a vehicle “is free from defects in materials and workmanship that may keep it from meeting these requirements.” That is a drastic change to the CAA language that requires manufacturers only warrant defects “which cause” a vehicle to fail to conform. 42 U.S.C. § 7541(a)(1)(B). EPA’s proposed expansion of the CAA warranty requirements is not appropriate. EPA must conform the language of proposed 1037.120(a)(2) to the language of the CAA. [EPA-HQ-OAR-2010-0162-1871.1, p.37]

Fourth, the language in proposed subpart 1037.120(b) is also defective. This provision appears to extend the emission warranty for the vehicle to the length of “any” extended warranty offered by the manufacturer “with or without charge for the vehicle.” Many extended warranties are similar to insurance policies, often serviced by third parties but offered through the manufacturer. Therefore, if a manufacturer offered an optional extended warranty, under the NPRM, any emission warranty must also be offered. This is a significant departure from part 86, which limited the extension to “the basic mechanical warranty” not any extended warranty. 40 CFR § 86-004-2. The proposed warranty would be extremely expensive and discourage the offering of extended warranties by manufacturers. Accordingly, this proposed part must be deleted. [EPA-HQ-OAR-2010-0162-1871.1, p.38]

Indeed, EPA’s proposed warranty period for GHG vehicle systems is a dramatic change from EPA’s long-standing warranty policy for engines. Under part 86, “[e]xtended warranties on select parts do not extend the emissions warranty requirements for the entire engine but only for those parts.” 40 CFR § 86.004-2. Thus, for engines, EPA’s provided a warranty period of 5 years/100,000 miles, except where a manufacturer extended the warranty on a customer’s part, in which case the emissions warranty for that part was no shorter than the extended warranty. Id. By contrast, EPA’s proposed subpart 1037.120(b) provides that if a manufacturer publishes an offer of an extended warranty, even if few customers buy that extended warranty, the manufacturer must still cover all customers for the same duration and/or mileage. This, of course, would require drastically longer warranties and exponentially increase the costs as compared to EPA’s engine warranty. Navistar does not believe that is EPA’s intent. EPA needs to modify its proposed regulation. Failure to do so may result in fewer warranties being offered by manufacturers. [EPA-HQ-OAR-2010-0162-1871.1, p.38]

Organization: American Automotive Policy Council

With respect to the warranty-related regulatory language proposed by EPA, AAPC recommends the following changes to section § 1037.120: [EPA-HQ-OAR-2010-0162-1762.1, p.14]

(b) Warranty period. Your emission-related warranty with respect to greenhouse gas and evaporative emissions must be valid for at least as long as the minimum periods specified in 40 CFR part 86 for the engine used in the vehicle. You may offer an emission-related warranty more generous than we require. ~~The emission-related warranty for the vehicle may not be shorter than any published warranty you offer with or without charge for the vehicle~~. [EPA-HQ-OAR-2010-0162-1762.1, p.14]

(c) Components covered. The emission-related warranty includes components whose proper functioning is necessary to comply with the greenhouse gas and evaporative requirements, including emission-related components which are used to obtain optional credits. ~~The emission related warranty covers vehicle speed limiters, idle shutdown systems, fairings, hybrid system components, and all components whose failure would increase a vehicle's evaporative emissions.~~ The emission-related warranty covers these components even if another company produces the component. Your emission-related warranty does not need to cover components whose failure could not cause the emissions of any regulated pollutant to exceed applicable standards. [EPA-HQ-OAR-2010-0162-1762.1, p.14]

These changes are necessary and appropriate for the following reasons: [EPA-HQ-OAR-2010-0162-1762.1, p.14]

With respect to the warranty period, it is appropriate to allow manufacturers to provide a longer warranty for emission-related components than is required by the regulations. If offered, such a longer period should not be confused with the required 'emissions' warranty and would probably not be characterized by the manufacturer as an 'emissions' warranty, so we have suggested removing the regulatory reference to an 'emissions' warranty in the sentence. [EPA-HQ-OAR-2010-0162-1762.1, p.14]

It is not appropriate to require manufacturers to warrant emissions-related components for a warranty period equal to that of any published warranty, with or without charge. This inhibits the free market for no legitimate purpose. If manufacturers wish to offer, and consumers wish to purchase, an extended warranty for selected components that have nothing to do with emissions, there is no reason why manufacturers should be compelled to extend the warranty for emissions-related components as well. [EPA-HQ-OAR-2010-0162-1762.1, p.14]

With respect to the components covered by the warranty, the AAPC suggests that the regulation describe the nature of the components in general terms and allow manufacturers to determine which components are covered for a specific vehicle, rather than providing a list that may be over- or under-inclusive. The general language should be based on identifying components whose failure could result in an exceedance of emissions standards, or components that are necessary for the manufacturer to obtain emission-related credits under the regulations. [EPA-HQ-OAR-2010-0162-1762.1, p.14]

Response:

The commenters generally expressed concern that warranty requirements in the NPRM went beyond current warranty requirements and the Clean Air Act. With respect to their concern that the preamble implied that warranty requirements would be beyond what in the proposed regulations, we note that the preamble was incorrect. The preamble has been corrected to note that the air conditioning requirements apply for the same warranty periods as other components. With respect to the comments about extended warranties, the regulations have been revised to maintain the existing policy on extended warranties.

Regarding the vehicle components covered, the list has been revised to only include tires and evaporative emission controls (for vehicles required to meet evaporative emission standards). The covered components list has also been clarified to include vehicle speed limiters, idle shutdown systems, fairings, and hybrid system components, to the extent such emission-related components are included in the certified emission controls. The regulations have been revised to more closely follow the wording of the Clean Air Act. They now state that the manufacturer must warrant that the vehicle "is free from defects in materials and workmanship that cause the vehicle to fail to conform to the requirements of this part during the applicable warranty period."

We have added a new section 1037.650 to the regulations to address vehicle manufacturers can rely on warranties provided by tire manufacturers. However, the vehicle manufacturers remain liable for any failure to comply with the warranty requirements for tires. We plan to address evaporative emissions control in greater detail in a subsequent regulatory action.

Organization: Engine Manufacturers and Truck Manufacturers Associations

The Preamble states that the emissions control information label should be 'a logical first step' in 'allowing field inspectors to identify whether a vehicle is certified, and if so, whether it is in the certified configuration.' (See 75 FR at 74277.) Under proposed §1037.135, the label would include some admittedly useful information (i.e., date of manufacture, the manufacturer's name, and statement that the vehicle complies with the regulations), but also would include a litany of unnecessary and seemingly useless information: i.e., the vehicle's regulatory subcategory, family, and subfamily; the Family Emission Limit; and details about the 'emission control system.' (See 75 FR at 74385.) More fundamentally, a certification label will not help a field inspector determine whether the vehicle is in its certified configuration. For example, if the label lists an FEL, the field inspector will not know the CO_2 emissions of the vehicle without running GEM or, even if the inspector somehow knew the GEM results, he/she could not know whether or not the manufacture certified the vehicle using ABT. Similarly, if the label states that the vehicle was manufactured with aerodynamic mirrors, the inspector would not be able to tell whether the mirrors on the vehicle were the same ones installed at the factory. Further, if the label states that the vehicle was manufactured with low rolling resistance tires, an inspector could not determine whether the tires on the vehicle (even if they were 'low rolling resistance tires') were the same ones installed at the factory. [EPA-HQ-OAR-2010-0162-1940.1, pp.28-29]

Response:

The agencies generally agree with the concerns raised by the commenter and do not wish to add burdensome and arbitrary labeling requirements. Concurrently, we also remain committed to giving agency inspectors adequate tools to ensure a vehicle is in its certification at least at the time of sale. Therefore, we are finalizing a vehicle label requirement that includes:

-Compliance statement

-Vehicle manufacturer

-Vehicle family (and subfamily)

-Date of manufacture

-Regulatory subcategory

-Emission control system identifiers

To address the concerns identified above, particularly related to emission control (EC) identifiers, we believe a combination of selectable information on the label as well as a set of EPA-defined EC identifiers will provide a useful, but not overly burdensome labeling scheme. Since the intent of these identifiers is to provide inspectors with a means for simply verifying the presence of a component, we do not believe overly detailed identifiers are necessary, particularly for tires and aerodynamic components. For instance, current engine regulations require that three-way catalysts be identified on engine labels as “TWC.” However, unique details such as catalyst size, loading, location, and even the number of catalysts are not on the label. In similar fashion, we believe that identifying tires and aerodynamic components in a general sense will prove similarly effective in determining if a vehicle has been built as intended or if it has been modified prior to being offered for sale. Further clarification on the requirements of the final rule can be found in the preamble to the final rule, chapter 5.

Organization: Engine Manufacturers and Truck Manufacturers Associations

Thus, the vehicle certification label should only provide the following information: the name of the vehicle manufacturer, the build date, and a statement that the vehicle was certified to comply with the regulations. With that information, a field inspector could determine whether the vehicle was certified when it was built, and the name of the certifying manufacturer. Regardless of what else is on the label, any further analysis would require a detailed inspection of the vehicle and the need to audit the manufacturer's certification paperwork to determine if the vehicle is 'in the certified configuration.' Accordingly, and in light of the foregoing recommendations regarding a simplified method for designating vehicle families, the final labeling requirements should not include anything more than the information stated above. Otherwise, the proposed regulations will impose unnecessary burdens on manufacturers and will make it impossible to fit labels on vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.29]

Response:

As stated in the response to the previous comment, the minimal information this commenter suggests is not adequate for field inspection purposes. We believe the final labeling provisions represent a reasonable compromise between avoiding overly burdensome labeling and providing inspectors with the information they need.

Organization: Volvo Group

The Preamble states that the emissions control information label should be “a logical first step” in “allowing field inspectors to identify whether a vehicle is certified, and if so, whether it is in the certified configuration.” 75 FR 74152,74277. However, more information will be required for the label than the Agencies specify if the Agencies intend for this label to be of any real use for in- field inspections. Merely listing “LRR” tires does not describe which specific tires are called-for. Additionally, an enforcement officer is unlikely to know by looking at a tire and at a label marked 'LRR' that the correct tire is on the vehicle. Additionally, “ARM” does not specify adequately whether the proper mirrors are on a vehicle, so a field inspector would have to use his or her judgment about whether the mirrors are sufficiently aerodynamic. Moreover, the mirrors are but a small portion of the vehicle’s aerodynamics package. [EPA-HQ-OAR-2010-0162-1812.2, p.36]

Response:

To address the concerns identified above, particularly related to emission control (EC) identifiers, we believe a combination of selectable information on the label as well as a set of EPA-defined EC identifiers will provide a useful, but not overly burdensome labeling scheme. Since the intent of these identifiers is to provide inspectors with a means for simply verifying the presence of a component, we do not believe overly detailed identifiers are necessary, particularly for tires and aerodynamic components. For instance, current engine regulations require that three-way catalysts be identified on engine labels as “TWC.” However, unique details such as catalyst size, loading, location, and even the number of catalysts are not on the label. In similar fashion, we believe that identifying tires and aerodynamic components in a general sense will prove similarly effective in determining if a vehicle has been built as intended or if it has been modified prior to being offered for sale. Further clarification on the requirements of the final rule can be found in the preamble to the final rule, chapter 5.

Organization: Volvo Group

Similarly, the Agencies indicate that vocational vehicles will need labels that list the range of allowable tire rolling resistances, "allowing field inspectors to identify whether a vehicle is certified, and if so, whether it is in the certified configuration." 75 FR 74152, 74277. Tires do not generally carry information about their tested rolling resistance. Thus, unless a field inspector happens to know the rolling resistance of the tires that are on a particular vehicle, he or she will not be able to use the Agencies' proposed label to determine if the vehicle is certified or if it is in its certified configuration. [EPA-HQ-OAR-2010-0162-1812.2, p.36]

Response:

Manufactures of vocational vehicles may list "LRR" as an emission control identifier if they tires they equip the vehicles with have a rolling resistance of 7.7 kg/metric-ton or below. Agency inspectors will work independently (and with tire manufacturers) to determine a reliable method for determining which tires meet this criteria.

Organization: Volvo Group

In sum, the emission control label can only be used to convey information about a vehicle's compliance if the label can impart information about all of the components that impact aerodynamics, both visible to an inspector and not, including tires, engine shutdown timer (invisible to an inspector), speed limiter (invisible to an inspector), and so on. Accordingly, the label would have to describe each and every external and many internal components of the vehicle, and an inspector would be unable to verify many of them. This is an unworkable solution. The only proper solution is for the label to state simply that the vehicle complies with the relevant GHG/FE standards because the manufacturer has constructed and monitored its fleet in such a way as to ensure compliance. [EPA-HQ-OAR-2010-0162-1812.2, p.36]

Response:

We believe the final labeling provisions represent a reasonable compromise between avoiding overly burdensome labeling and providing inspectors with the information they need.

Organization: Rubber Manufacturers Association (RMA)

The NPRM describes that "it is important to have the ability to determine if the vehicle is in the certified configuration both at the time of sale, as well as at any point within its useful life." The primary method for accomplishing this would be through vehicle inspections for conformance to the vehicle emissions control information label specification. The NPRM provides examples of what information might be included on this label, including low rolling resistance tires. However, the NPRM also recognizes that "the presence of LRR tires could be verified at the point of initial sale; however verification at other points throughout the useful life would be non-enforceable…." [EPA-HQ-OAR-2010-0162-1963.1, p.9]

Since EPA recognizes that it would not be able to enforce the use of LRR tires on a vehicle while in use, tire information should not be included on the Vehicle Emissions Control Information Label, which will be used for enforcement purposes while the vehicle is in service. This information on the label would be misleading to inspectors and could lead to unwarranted enforcement actions regarding replacement tires installed on the vehicle. RMA recommends that this information not be required to be included on the label. Instead, EPA and NHTSA should certify initial compliance with the regulation through the provisions for obtaining a certificate of conformity, which would include documentation of how the vehicle meets the emission standards and other regulatory requirements. This demonstration would include all necessary information about vehicle components related to compliance with the regulations, including tire rolling resistance. [EPA-HQ-OAR-2010-0162-1963.1, pp.9-10]

Response:

The VECI label will primarily provide inspectors with needed information for verifying that a vehicle is in the certified configuration at the time of initial sale. If certification was based on the use of low rolling resistance tires, inspectors should be able to verify this. Therefore we remain convinced that this adds value to the VECI label and will continue to require it where appropriate.

Organization: Volvo Group

Subpart C, section 1037.201 (a) of the proposed regulatory text calls for a separate application for each vehicle family. See 75 FR 74387, 74389. If we consider Volvo Group North America's North American Trucks business unit, which consists of the Volvo, Mack, and UD brands, the potential exists for several thousand families across the tractor and vocational segments. Early estimates indicate there may be as many as 1,500 tractor and 1,080 vocational families. [EPA-HQ-OAR-2010-0162-1812.2, p.24]

In addition, Subpart C section 1037.205(a) of the proposed regulation states that the manufacturer must identify each "distinguishable vehicle configuration in the vehicle family" (also called a sub-family). 75 FR 74152, 74387. Section 1037.205(k), meanwhile, calls for the identification of FELs for each subfamily. Id. And Section 1037.205(o) requires reporting of the results and modeling inputs for each sub-family with detailed descriptions of the derivations. 75 FR 74152, 74388. The burden of meeting these requirements for the potentially vast number of families/subfamilies that will be created is substantial and unjustified. [EPA-HQ-OAR-2010-0162-1812.2, p.24]

Volvo Group does not accept the use of engine model in defining a vehicle test group as it adds complexity by increasing the number of required tests but with no impact based on the proposed vehicle certification process, since engine impacts are specifically excluded from the vehicle model. [EPA-HQ-OAR-2010-0162-1812.2, p.38]

Proposed section 1037.230(b) defines a sub-family as having identical bins for each modeling input. 75 FR 74152, 74389. Given the potential number of bins for each modeling input, the number of sub-families can become unmanageable. It is acknowledged that the range of aero bins per family may not be five. However, it is just as likely, if not assured, that the number of tire bins will far exceed the estimated three. [EPA-HQ-OAR-2010-0162-1812.2, p.25]

Another issue associated with the certification process is the good-faith estimate required by proposed 40 CFR §1037.205(s). 75 FR 74152, 74388. Given that heavy heavy-duty vehicles are primarily built to order, and market influences and fluctuations are unpredictable, the resulting estimates are prone to error particularly when market segments (vocational, long-haul, regional-haul, etc.) are considered. To attempt to predict volumes based on a new categorization would be extremely burdensome, with questionable accuracy, and no added value. In addition, since volumes can fluctuate significantly from year to year (in the first 6 months of 2010, for instance, economic haul sleeper sales were nearly equal that for all of 2009), the added burden of justifying volume differences year to year provides limited comparative benefit in light of the additional resource requirements. [EPA-HQ-OAR-2010-0162-1812.2, pp.25-26]

To address all of the issues listed here, Volvo Group proposes an alternate certification process. For a vehicle manufacturer, the important factors for certification are (1) to define the available options to meet the requirements, and (2) to put in place a product plan which will allow it to meet the mandated credit neutral position within the three year time frame. Given that product plans are confidential, it would be preferable to allow an officer of the corporation to attest, in good faith, that the manufacturer will meet the mandate, or will work with the Agencies to address any shortcomings. [EPA-HQ-OAR-2010-0162-1812.2, p.26]

To reduce the certification burden, Volvo Group proposes that the following two requirements be met by the manufacturer in order to gain a certificate of conformity prior to a model year:

1. The manufacturer would define all vehicle models to be certified, the regulatory sub-categories they fall within, bounds on the aerodynamic performance of the vehicle per regulatory sub-category (worst-case to best-case), and provide a list of all features available to allow the manufacturer to meet the mandated requirement, along with one or more representative runs

from GEM showing the available features can meet the requirements for the regulatory sub-category.

2. A certification by an officer of the corporation that the manufacturer has a plan in place to be in a minimum credit neutral position within three years. [EPA-HQ-OAR-2010-0162-1812.2, p.26]

After the end of each year, a manufacturer would then provide a detailed AB&T report stating a final credit position, with the manufacturer defining only as many sub-families and FELs as desired to show compliance or banked credits/accrued deficits. [EPA-HQ-OAR-2010-0162-1812.2, p.26]

In addition to the benefits noted, the process of amending an application as provided for in proposed 40 CFR § 1037.225 would no longer be necessary, allowing a manufacturer the ability to quickly change emission components throughout the year. All that would then be required would be a notice to the Agencies of any effect on or changes in CO2 output. [EPA-HQ-OAR-2010-0162-1812.2, p.26]

Volvo Group also requests that carry-over provisions be included in any vehicle certification process so that vehicle models that have no other changes year-to-year other than the change of model year do not have to generate new certification paperwork or data. [EPA-HQ-OAR-2010-0162-1812.2, p.26]

Response:

We have revised the regulation to address Volvo' primary concern. However, we will require more during certification than Volvo suggests. The purpose of certification is for the manufacturer to demonstrate that its vehicles will conform to the regulations. This requires significantly more detail than suggested by Volvo. In particular, we will require that manufacturers include technical descriptions of the emission controls for their vehicles and the range of subfamily FELs to which they are certifying.

Our regulations include a simplified certification program for carry-over certificates. However, the Clean Air Act requires manufacturers to submit new applications for each model year.

Organization: Volvo Group

The requirement of proposed 40 CFR §1037.201(g) is unreasonable as many heavy heavy-duty vehicles are customer-specific and may be unique, single-production vehicles. Obviously, these cannot all be delivered to the Agencies for testing. In these situations we request that the Agencies accept "sound engineering judgment" based on similar vehicles and past experience, but with clear definition of a process for acceptance. Furthermore, since the vehicle certification is based on the GEM output, there is no applicable testing to be carried out. [EPA-HQ-OAR-2010-0162-1812.2, p.26]

Volvo Group does not accept that the Administrator's results from "comparable testing" become the de facto certification results. In the case of results differing from the manufacturer's results, the Agency should work with the manufacturer to understand any differences and correct the results as necessary. In the case of negligence or purposeful deception then the Administrator's results will become official. [EPA-HQ-OAR-2010-0162-1812.2, p.39]

Organization: Engine Manufacturers and Truck Manufacturers Associations

In §1037.201, the Agencies require that manufacturers make available any test vehicles at the Agencies' request, which in turn requires that manufacturers keep and preserve all of those test vehicles. Keeping all test vehicles is not practicable. Because HD vehicle manufacturers build many 'one-off' vehicles, many test vehicles will become customer vehicles, tested prior to vehicle delivery. It is not reasonable for the Agencies, in essence, to require manufacturers to build two vehicles in order to sell only one, given the already-tight profit margins in the HD vehicle manufacturing industry. Accordingly, the Agencies should eliminate the requirement to preserve all test vehicles. [EPA-HQ-OAR-2010-0162-1940.1, p.29]

Response:

We recognize the manufacturer's concern that supplying a test vehicle for confirmatory testing may be difficult for some configurations, and would consider such difficulties when making our request. However, it is essential that we have the ability to perform confirmatory testing before accepting a manufacturer's test data for certification. For example, we could perform confirmatory coastdown testing to verify the drag area used by a manufacturer to determine the applicable aerodynamic bin. With respect to the concern about keeping test vehicles, we note that the regulations do not require that manufacturers keep test vehicles for all configurations, provided they can create a test vehicle of a given configuration when we request it. For example, a manufacturer may keep a base configuration of a given vehicle model and modify it as necessary to provide the configuration we request. This approach is not inconsistent with the agency's approach for criteria pollutants.

It has always been EPA policy that our test results become the official test results. Volvo presented no reason why this policy should be different for greenhouse gases.

Organization: Volvo Group

Volvo Group does not agree with standard trailer definition. See 75 FR 74391. Ambiguity in the trailer definitions can result in different calculated values. Cd is a direct result of the form/shape of a vehicle. Using a different form, shape will ultimately result in a different result. The definition needs to be further defined to include all dimensions needed to describe the geometry. Height, width and length all need to be defined as well as distance from ground to bottom of trailer and distance to roof of trailer. The trailer form needs to be defined (e.g. cylinder, box, etc.). Lastly, the underbody, axle and wheels need to be defined. [EPA-HQ-OAR-2010-0162-1812.2, p.38]

It also should be noted in proposed 40 CFR §§ 1037.501(g) and 1037.520(b)(1)(ii) that aerodynamic testing performed in a wind tunnel may be done with partial length trailers due to size restrictions of the wind tunnel facilities. [EPA-HQ-OAR-2010-0162-1812.2, p.40]

<u>Response:</u>

We have revised the regulatory definition of for standard trailers to meet the commenter's concern.

Organization: Rubber Manufacturers Association (RMA)

Regulation Should Clarify Vehicle Manufacturer Requirement to Provide Written Tire Replacement Information [EPA-HQ-OAR-2010-0162-1963.1, p.10]

The proposed regulatory language would require that vehicle manufacturers provide ultimate purchasers of vehicles with "instructions that will enable the owner to replace tires so to that the vehicle conforms to the original certified vehicle configuration." However, EPA does not provide any specificity to this information in terms of how this information is to be provided. Currently, there is no uniform way tire fuel efficiency information is provided to purchasers of tires suitable to vehicles affected by this rule. For light duty vehicle tires, Congress has mandated that NHTSA develop a rating system to provide consumers with information to better inform purchasers about the fuel efficiency of tires at point of sale. Although NHTSA has conducted rulemaking pursuant to this statute, NHTSA has not yet promulgated a fuel efficiency rating system for light duty vehicle tires. No similar mandate exists for tires suitable for medium- and heavy-duty vehicles. [EPA-HQ-OAR-2010-0162-1963.1, p.10]

Assuming vehicle manufacturers provide information that is sufficient for vehicle purchasers to seek replacement tires of similar performance, analogous information would need to be available in the replacement market about replacement tires. In the long haul tire segment, tire purchasers can find out which tires are SmartWayTM verified. Aside from tires for the long haul segment, rolling resistance of truck tires has not been the focus of voluntary or mandatory government programs, until this NPRM. Largely, rolling resistance for other tire types has not been assessed. [EPA-HQ-OAR-2010-0162-1963.1, p.10]

<u>Response:</u>

We agree that a comprehensive and quantitative assessment of tire rolling resistance is not currently available in the heavy-duty marketplace. This is a primary reason why the regulations are not more specific regarding the instructions provided to the owner/operator of the vehicle. We believe that as LRR tires become more prevalent in the marketplace, it will be easier for vehicle manufacturers to list tires with similar performance as the original equipment tires. Until that time, we encourage manufacturers to work with their certification representative to formulate adequate language to satisfy this requirement.

Organization: Volvo Group

Proposed amended 40 CFR § 86.007-23 – Required Data EPA proposes to amend 40 CFR § 86.007-23, pertaining to data required for purposes of certifying heaving duty engines, by adding the following subsection (o):

The provisions of this paragraph (o) apply starting with the 2014 model year. For heavy-duty engines tested over the transient engine test cycle, manufacturers must show individual measurements for cold-start testing and hot-start testing. For heavy-duty engines testing over the SET cycle, manufacturers must show individual results for each steady-state test mode for each pollutant except PM. [EPA-HQ-OAR-2010-0162-1812.2, pp.42-43]

75 FR 74152, 74364 (emph. added) The terms “individual measurements” and “individual results” are vague and ambiguous. EPA needs to define these terms to provide manufacturers notice of precisely what individual measurements and individual results the Agency seeks. [EPA-HQ-OAR-2010-0162-1812.2, p.43]

<u>Response:</u>

This proposed amendment has not been finalized.

Organization: Volvo Group

The proposed regulation states in §1036.1 that the rules shall not apply to emission standards for criteria emissions (HC, CO, NOx, or PM). Notwithstanding that clear statement, the proposed regulation contains references to criteria emissions that appear to conflict with the clear statement in §1036.1. These two references are found at proposed section 1036.205(g)(1) (regarding emission data to be included in the application for certificate) and proposed section 1036.501(f) (regarding required emission sampling and test procedures). In these proposed sections, the language refers to “each pollutant except PM.” These statements could be read to include gaseous criteria emissions (HC, CO and NOx), although such a reading is contradictory to §1036.1. The final rule should clearly state which pollutant is being referred to, not the one pollutant that is not included. [EPA-HQ-OAR-2010-0162-1812.2, p.43]

Response:

The references in question have been revised or completely removed for the final rule to eliminate the ambiguity that the commenter has noted.

17.3. Regulation Comment Overview Summary

Comment	Commenter	Response
The heavy-duty evaporative emission standards in § 1037.103 are redundant with the existing standards at 40 CFR §§ 86.1810 and 86.1816. [EPA-HQ-OAR-2010-0162-1762.1, p.23]	AAPC	We have decided to not finalize §1037.103 at this time. We expect to reproposed this section in a future rulemaking.
The proposed 40 CFR 1037.104(c) notes that "40 CFR 86.1818-08(f)(2) does not apply…". The regulatory reference should be "40 CFR 86.1818-12(f)(2)". This statement is redundant with the proposed 40 CFR 1037.104(d)(8), which states that "the provisions of 40 CFR 86.1818(-12?) do not apply. [EPA-HQ-OAR-2010-0162-1762.1, p.25]	AAPC	The reference has been changed to §86.1818-08(f)(2). This text appears to be redundant, but it is merely a note to readers to highlight the provision in §1037.104(d)(8).
40 CFR 1037.104(i)(5) conflicts with the proposed 40 CFR 1037.10 introductory text. 40 CFR 1037.10 states, in part, "only subparts A, B, and I of this part apply for vehicles subject to the standards of § 1037.104…". However the proposed 40 CFR 1037.104(i)(5) specifically includes § 1037.755, which is in subpart H. [EPA-HQ-OAR-2010-0162-1762.1, p.26]	AAPC	This has been corrected.
The proposed 40 CFR 1037.115(c)(2) incorrectly identifies the global warming potential of the air conditioning refrigerant HFC-134a as "124"; the commonly accepted value is 1,430. [EPA-HQ-OAR-2010-0162-1762.1, p.26]	AAPC	This has been corrected.

The proposed §1037.125(f) prohibits manufacturers from requiring "components or service identified by brand, trade, or corporate name. In conflict, §1037.125(i) requires manufacturers to specify replacement tires so that the vehicle conforms to the original certified vehicle configuration. [EPA-HQ-OAR-2010-0162-1762.1, p.26]	AAPC	We do not believe it will be necessary to identify tire brands to ensure that operators use proper replacement tires. A statement like the one suggested by Volvo would likely be sufficient.
Volvo Group is concerned with section (i) which reads, 'Tire maintenance and replacement. Include instructions that will enable the owner to replace tires so that the vehicle conforms to the original certified vehicle configuration.' Will a statement such as, 'Vehicle configuration certified to EPA GHG emission standard with drive tire Crr=x and steer tire Crr=y per ISO28580:2009', be sufficient for compliance? [EPA-HQ-OAR-2010-0162-1812.2, p.42]	Volvo	
The proposed 40 CFR 1037.150(a) specifies the use of the equations in subpart H to calculate credits for vehicles produced in model years prior to 2014. However, vehicles certified under 40 CFR 1037.104 are specifically excluded from subpart H by 40 CFR 1037.10. [EPA-HQ-OAR-2010-0162-1762.1, p.26]	AAPC	This has been corrected.
The proposed definition of "Light-duty truck" at 40 CFR 1037.801 is inconsistent with the definitions used in light-duty greenhouse gas and Corporate Average Fuel Economy ("CAFE") regulations. The proposed definition does not match the 40 CFR § 86.1818-12(b)(2) definition for "light truck", which in turn references NHTSA's definition of a "non-passenger automobile" at 49 CFR 523.5. For consistency between regulations, and to avoid potential confusion, EPA should modify the proposed definition to match those used for light-duty greenhouse gas and CAFE regulations. [EPA-HQ-OAR-2010-0162-1762.1, p.26]	AAPC	While we agree that the proposed definition of "light-duty truck" is slightly different than the definition of "light truck" in §1818-12(b)(2), we do not agree that they need to be the same. "Light-duty truck" is used in part 1037 along with "light-duty vehicle". The term "light truck is used in part 86 along with "passenger automobile". We believe that using the same terms in part 1037 as for the criteria program is consistent with the long term goal of applying parts 1036 and 1037 for criteria standards.

The emissions standards for vocational vehicles and heavy duty tractors in part 1037.105-106, the Vehicle Family definitions in 1037.230, and the averaging set definitions of section 1037.740 all define vehicle standards, families, and averaging sets with hard GVWR break points at 19,500 and 33,000 lbs. GVWR . These category definitions are inconsistent with the diesel engine service class definitions for LHDDE, MHDDE, and HHDDE in 40 CFR Part 86.085-2 and in Part 1036.140 of the NPRM. AAPC recommends that the categories for vehicle standards, families, and averaging sets be revised to be consistent with the diesel engine service class definitions so that vehicles intended for similar functions will be held to standards consistent with the requirements for their engines. [EPA-HQ-OAR-2010-0162-1762.1, p.21]	AAPC	The concept of diesel engine service classes being based on primary intended rather than actual vehicle weight class is used for engines because an engine manufacturer cannot be certain of an engine's actual use when designing it and its emission controls. This does not apply for vehicle manufacturers.
Cummins agrees with the Agencies' intent that the primary intended service class designations and flexibilities for the proposed GHG/FC standards should be the same as those for the criteria pollutant standards. For example, an engine classified as MHD should be allowed in some cases to be used in vehicles above 33,000 lb gross vehicle weight rating (GVWR). [EPA-HQ-OAR-2010-0162-1765.1, p.30]	Cummins	We are revising the part 865 and part 1037 definitions to be consistent.

The EPA's Addition Of Part 1068 Requirements Is Unclear And Perhaps Inappropriately Overbroad. In the NPRM, the EPA amends Part 1068 by, among other things, making Part 1068 applicable to all "[h]eavy-duty motor vehicles and motor vehicle engines as specified in 40 CFR parts 1036 and 1037." (40 CFR §1068.1(a)(2) at 75 Fed. Reg. 74434.) The language of the proposed regulation is unclear in that the phrase "as specified in 40 CFR parts 1036 and 1037," which directly follows vehicles and engines, may modify either (first) what sections of Part 1068 apply to HD engines and vehicles or (second) to what HD engines and vehicles the entirety of Part 1068 applies. In other words, the language does not make it clear whether the EPA means "[vehicles and engines] as specified in…." [EPA-HQ-OAR-2010-0162-1818.1, p.23] DTNA Agrees With The EPA's Extension Of Parts 85 And 1068 Exemptions To The Present GHG Program. However, We Believe That Duplicative NHTSA And EPA Exemption Processes Are Redundant And Burdensome. National security, test, precertification, and other exemptions are necessary for development of vehicles and for satisfying the various needs of our customers (including the armed forces). In turn, we agree that the criteria pollutant exemption procedure established in Parts 85 and 1068 should be carried over to the present program. However, we believe that duplicative NHTSA and EPA exemption processes are redundant and burdensome. [EPA-HQ-OAR-2010-0162-1818.1, p.46]	DTNA	The text in §1068.1 has been clarified to address these comments.
In its proposed revision to 40 CFR 1068.1(a) ("Does this part apply to me?), EPA writes that the "provisions" of part 1068 apply to "[h]eavy-duty motor vehicles and motor vehicle engines as specified in 40 CFR parts 1036 and 1037." That shows that the scope of part 1068 with respect to heavy-duty vehicles and engines is limited to the subparts specified in parts 1036 and 1037; however, those parts are confusing regarding which provisions of part 1068 actually apply to heavy-duty engines and vehicles. Specifically, proposed subparts 1036.601(a) and 1037.601(a), both limit the provisions of part 1068 that are applicable to (i) exemption and importation provisions (subparts C and D, except certain delineated provisions) and (ii) the recall provisions (subpart F). Navistar assumes this is what EPA intends. At the same time, however, proposed subparts 1036.15(d) and 1037.15(b) confusingly refer to "seven areas" that part 1068 covers including "prohibited acts and penalties," "rebuilding and other aftermarket changes," "exclusions and exemptions," "importing," "selective enforcement audits of your production," "recall," and "procedures for hearings." But not all of these referenced "areas" are actually proposed to apply to heavy-duty engines and vehicles in proposed subpart 1036.601. [EPA-HQ-OAR-2010-0162-1871.1, pp.48-49]	Navistar	

The EPA did not propose changes to 40 CFR §86.007-11(f), in which the EPA recognizes the unique fuel-related needs of Guam and the other Pacific territories. The regulations remain: '[m]odel year 2007 and later diesel-fueled heavy-duty engines and vehicles for sale in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands shall be subject to the same standards and requirements as apply to 2006 model year diesel heavy-duty engines and vehicles,' with appropriate labels. We interpret the regulations to mean that the only certifications required for engines or vehicles bound for these territories are those applicable in 2006; no CO_2, CH_4, or N_2O standards apply. We agree with the EPA's choice to leave the standards unchanged in the territories, because doing otherwise would require manufacturers to reexamine and possibly reconfigure 2006 engines to 2014 CO_2, CH_4, and N_2O standards.. [EPA-HQ-OAR-2010-0162-1818.1, pp.24-25]	DTNA	The regulations in this rule will not apply the greenhouse gas standards to engines intended for these territories.
§1036.530(b)(1) references ASTM D240-09 as the appropriate test method for calculating the carbon content of the test fuel. The correct test method is ASTM D5291. A similar correction needs to be made to §1036.810(b)(1) as well. [EPA-HQ-OAR-2010-0162-1940.1, p.14]	EMA	The regulations have been corrected.
The NGV Interests seek clarification as to which standards – gasoline or diesel – apply to NGVs. Based on communications with EPA staff, we believe that the answer is diesel for MHD and HHD engines, and the Natural Gas Vehicle Interests agree that this treatment is appropriate, as these engines are currently required to meet the diesel criteria pollutant standards (40 CFR Part 86). We suggest the following change (in bold) to the proposed regulations in order to further clarify treatment of natural gas engines: 1036.150(c) Engine cycle classification. Engines meeting the definition of spark-ignition, but regulated as diesel engines under 40 CFR part 86 must be certified to the requirements applicable to compression-ignition engines under this part. **This includes spark-ignited natural gas engines, except for spark-ignited natural gas engines that are derived from gasoline platforms.** Similarly, engines meeting the definition of compression-ignition, but regulated as Otto-cycle under 40 CFR part 86 must be certified to the requirements applicable to spark-ignition engines under this part. [EPA-HQ-OAR-2010-0162-2119.1, p.4-5]	NGVI	We are finalizing the regulations to apply the GHG standards on the same basis as the criteria standards.

The NPRM does not account for or provide exceptions for the regular operation of vehicles built in the US on imported chassis but intended for export. An example of this would be a fire apparatus built on a European chassis that will be sold to a customer in the Pacific Rim. Although we would prefer to export products on our own or other U.S. manufactured chassis, the dictates of foreign customers does not always make this possible. Many foreign customers require that their vehicles be built on European chassis because these chassis are smaller, narrower, and they fit with the capabilities of local service facilities. [EPA-HQ-OAR-2010-0162-1593.1, p.2] Development programs of this type which will eventually evolve into international orders require prototyping with subsequent road testing to validate the durability, cooling capacity, safety, performance etc… of the design. All subsequent vehicles that are produced under these programs will require road testing to work through the many unforeseen variables that can result from each uniquely configured vehicle. Foreign customers visiting our U.S. facilities need to view and drive the vehicle(s) to confirm that they will be acceptable. [EPA-HQ-OAR-2010-0162-1593.1, p.2] We recommend the following <u>underlined</u> revision to part 40 CFR 85.1511(b)(1) and (5): (1) Exemption for repairs or alterations. Vehicles and engines may qualify for a temporary exemption under the provisions of 40 CFR 1068.325(a). Such vehicles or engines may not be registered or licensed in the United States for use on public roads and highways, <u>but may be operated on public roads to validate durability, quality, and performance of the finished vehicles and engines prior to export. [EPA-HQ-OAR-2010-0162-1593.1, pp.2-3]</u> <u>(5) Development exemption. Vehicles or engines to be used for development of completed vehicles intended for export may be imported by any person subject to the requirements of 40 CFR 85.1705 and 85.1708. Development vehicles or engines may be operated on and registered for use on public roads or highways provided that the operation is an integral part of the development program. The exemption shall be limited to the duration of the development program.</u> [EPA-HQ-OAR-2010-0162-1593.1, p.3] The NPRM does not account for or provide exceptions for the regular operation of vehicles built in the US but intended for sale to the US department of defense or other national security agencies. Manufactures of these types of vehicles are constantly engaged in research and development programs at the request of, or for the benefit of, the US military,	Oshkosh	The exemption provisions in 40 CFR part 85 are being replaced by the provisions of part 1068. The import allowances Oskosh requests are available under §1068.325(a) for repairs, and §1068.325(b) and (d) for exports. The allowance for military vehicles is available upon request under §1068.225.

but without government contracts being issued to the vehicle manufacturer. The DOD fuel mandates do not allow engines in these vehicles to operate within emissions and fuel consumption requirements of the NPRM. The military needs to be able to operate their vehicles on fuel available anywhere in the world. Often this means using high sulfur or JP8 fuel incompatible with newer cleaner diesel engines. [EPA-HQ-OAR-2010-0162-1594.1, p.2] Development programs of this type require prototyping with subsequent road testing to validated the durability, cooling capacity, performance etc… of the design. Military customers may also need to view and drive the vehicle(s) to confirm that it will meet their requirements. An exception is appropriate to allow military truck manufactures to develop new products for the U.S. military. [EPA-HQ-OAR-2010-0162-1594.1, p.2] We recommend the following <u>underlined</u> revision to part 40 CFR §1036.5: § 1036.5 Which engines are excluded from this part's requirements? <u>(d) The provisions of this part do not apply to Military Tactical Wheeled Vehicles specified by or sold to the U.S. Department of Defense or other U. S. governmental entity.</u> [EPA-HQ-OAR-2010-0162-1594.1, p.2]		

Volvo Group has concerns with respect to provisions of §1037.620 related to the shipment of incomplete vehicles to secondary vehicle manufacturers. Most significantly, Volvo Group is concerned that the proposal does not adequately or precisely define allocation of liability between original and secondary vehicle manufacturers, leaving original manufacturers at risk of liability for actions or activities not within their control. In addition, the proposal does not adequately define how the exemption provided for small business applies to secondary vehicle manufacturers, most of who likely would qualify for this exemption. The proposal sets forth four categories of vehicles for purposes of shipment of incomplete vehicles to secondary manufacturers: (1) tractors; (2) vehicles meeting the definition of "tractor" but intended for vocational use; (3) other vocational vehicles; and (4) uncertified vehicles that will be certified by secondary vehicle manufacturers. See 75 FR 74152, 74395. Volvo Group's concerns with EPA's proposal for the first and third categories are identical, and are discussed jointly below. Volvo Group has additional concerns with EPA's approach for regulating the second and fourth categories, which also are discussed below. [EPA-HQ-OAR-2010-0162-1812.2, p.27-28] Because the proposal does not specify who would be liable in the event that a vehicle is not completed to a certified configuration when it reaches the ultimate purchaser, it creates substantial risks for original manufacturers that do not control the activities of secondary manufacturers. EPA should clarify the regulation to provide that where an original manufacturer furnishes instructions necessary and required to assemble incomplete vehicles to a complete and certified configuration, it has complied with the requirements of the 40 CFR §1037 and is not liable for any subsequent activities taken with respect to the incomplete vehicle. If necessary, the regulation might also be clarified to state that, except where specifically exempted, it is a violation of CAA § 203(a) and 40 CFR §86.1854-12 for a secondary, or other downstream, manufacturer that does not hold a certificate of conformity to assemble an incomplete vehicle in a manner that is not in conformance with OEM instructions and does not result in a certified configuration. EPA's proposal allows secondary vehicle manufacturers to obtain a certificate of conformity for purposes of complying with 40 CFR Part 1037 where the secondary vehicle manufacturer "has substantial control over the design and assembly of emission controls." In addition, the proposal states that EPA "would consider the degree to which the secondary manufacturer would be able to ensure that the engines and vehicle will conform to the regulations in their final configurations" in determining whether a manufacturer has	Volvo	Section 1037.620 has been revised to eliminate the text related to vehicles meeting the definition of "tractor" but intended for vocational use. With respect to Volvo's liability concern, we have revised this section to clarify that secondary manufacturers would be subject to penalties if they cause the unlawful introduction into commerce of a vehicle by failing to meet their obligations under the regulations. We have also revised the regulations to allow vehicle manufacturers to sell uncertified to small businesses that are exempt under 103.150. Note, however, that this allowance applies only for small business that have substantial control over the design and assembly of emission controls, such vehicle hybridizers.

"substantial control." Volvo Group is concerned that this provision, again, does not adequately shield original manufacturers from liability for the actions or inactions of secondary manufacturers. The provision also does not account for secondary manufacturers that qualify for the small business exemption and thus would not be certificate holders. As such, it should be clarified to provide that original manufacturers are not liable for incomplete vehicles delivered to manufacturers that qualify for this exemption. In addition, the language proposed at 40 CFR § 1037.620(c)(9)(iii) – which voids the exemption for vehicles shipped to companies that do not hold certificates or otherwise fail to comply with the requirements of the regulation – is highly inappropriate insofar as it requires original manufacturers to police the activities of entities over which they have no control, and who will often fall within the small business exemption to this rule.		
In general, Volvo Group objects to the use of the phrase "good engineering judgment" when it is used to describe methods for demonstrating compliance since it is ambiguous and could lead to arbitrary decisions. Volvo Group would prefer that, in any instance where certification can be denied or compliance certificates voided, the Agencies provide more specific criteria for evaluation. [EPA-HQ-OAR-2010-0162-1812.2, p.37]	Volvo	We continue to believe that certain provisions require the use of "good engineering judgment." This applies for instances where the regulation cannot spell out every technical detail of how a manufacturer should comply with the regulation. The consequences of disagreements with a manufacturer's decision are defined in §1068.5 and would depend on whether we believe the manufacturer made the decision in good faith. Where the manufacturer makes its decision in good faith, EPA could require a different approach for future work if we believe it would represent better engineering judgment. However, a manufacturer would be deemed to have violated the regulations if we determine that the manufacturer deliberately used incorrect information, acted irrationally, or otherwise failed to make a decision in good faith.
Vehicle families are overly burdensome and irrelevant and vocational tractor standards must be considered. [EPA-HQ-OAR-2010-0162-1812.2, p.35]	Volvo	We have revised the regulations to address this comment.

Where a manufacturer is using the AB&T provision, the end of model year volume report due 45 days after the end of the model year should be combined with the AB&T reporting and provided on the same timeline as the AB&T reports. See 75 FR 74152,74390. There is no value to three separate reports. Volvo further recommends having only one AB&T report. In addition, proposed 40 CFR § 1037.630(c)(3) calls for a report within 90 days of the end of the model year which details vehicles exempted from the regulation by the Off-Road Use Exemption in that section. This should also be combined into one report with the above. [EPA-HQ-OAR-2010-0162-1812.2, p.40]	Volvo	We have revised the reporting requirements to address this comment.
Volvo Group is disappointed by the lack of any substance to this part. *See* 75 FR 74152,74390). Due to the potential for cost and resource burdens imposed by in-use testing, lack of any established correlation between this rule and actual in-use conditions, as well as penalties for non-compliance, the Agencies should clarify that provisions of this rule are not subject to in-use testing beyond selective enforcement audits or confirmatory testing of certification engines. [EPA-HQ-OAR-2010-0162-1812.2, p.40]	Volvo	While engines and vehicles are not subject to in-use testing using the field testing procedures, EPA may perform in-use testing according to the procedures specified for certification. For example, EPA may remove an engine from an in-use vehicle and measure its emissions on the engine dynamometer.
Due to the variance in chemical composition of some alternative fuels, specifically natural gas (methane), it is requested that a specification be explicitly stated in the appropriate section of 40 CFR § 1065 and referenced in proposed 40 CFR § 1037.501(d).	Volvo	We believe that it would be unnecessarily restrictive to narrowly define a CNG test fuel. Instead we will rely on the energy content correction of §1036.530.

TRALA believes that enforcement of the Proposed Standards should occur only once, and that is when the new engine/vehicle is originally introduced into commerce. In contrast, EPA is 'proposing separate standards that would apply for a specified period of time in use' - and also suggesting that liability for any nonconformities would rest with the fleet or vehicle owner/operator (75 Fed. Reg. at 74163). TRALA believes that EPA needs to proceed with care before endeavoring to enforce GHG controls after a vehicle is 'in-use' and then assigning liabilities for non-conformities to the fleet or vehicle owner/operator. Section 207 of the Clean Air Act specifies, for example, that compliance by vehicles and engines 'in use' is done through manufacturer warranties that are provided to the ultimate purchaser (42 U.S.C. § 7541 (a)(l)). The Clean Air Act also limits inspections after sales to ultimate consumers to only those scenarios where 'the owner of such vehicle or engine voluntarily permits such inspection to be made, except as may be provided by any State or local inspection program' . EPA also should clarify that tampering does not include modifications to in-use GHG-related controls or equipment. EPA suggests, for example, that the tampering policy would apply to vehicle speed limiters (75 Fed. Reg. at 74185). [EPA-HQ-OAR-2010-0162-1816.1, p.2-3] Section 203(a)(3)(A) of the Clean Air Act makes it unlawful for 'any person to render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser.' With respect to this provision, EPA's 'tampering' policy states, in relevant part, that '[a]djustments or alterations of a particular part or system parameter, if done for purposes of maintenance or repair according to the vehicle or engine manufacturer's instructions, or if the dealer has a reasonable basis for knowing that such adjustment or alteration will not adversely affect emissions performance' does not constitute tampering (Mobile Source Enforcement Memorandum No. 1A, § B.1c (EPA 1974)). Memorandum No. 1A goes on to specify when a 'reasonable basis for knowing' exists that a given act will not violate the tampering policy. [EPA-HQ-OAR-2010-0162-1816.1, p.3] EPA has explained that 'it is clear that EPA's primary objective in enforcing the statutory prohibition on 'tampering' must be to assure unimpaired emission control of motor vehicles throughout their useful life' (Mobile Source Enforcement Memorandum No.1lA, § A.3 (EPA 1974)). [EPA-HQ-OAR-2010-0162-1816.1, p.3] The tampering policy, by the express terms of Memorandum No. 1A, does not appear to apply to GHG-based controls because such controls are not part of a vehicle's 'emission control' system as that term has historically been understood. We do not believe	TRALA	We disagree with the commenters' argument that the operator should be exempt from tampering restrictions for components added to meet greenhouse gas standards. Section 203 of the Clean Air Act states that it is prohibited – for any person to remove or render inoperative any device or element of design installed on or in a motor vehicle or motor vehicle engine in compliance with regulations under this subchapter prior to its sale and delivery to the ultimate purchaser, or for any person knowingly to remove or render inoperative any such device or element of design after such sale and delivery to the ultimate purchaser. Significantly, this prohibition applies very broadly to "any person" tampering with "any device or element of design" installed to comply with "regulations under this subchapter" (subchapter II) before or after sale. Since these regulations are being adopted under Title II, any person removing or rendering inoperative any component added to comply with these regulations is potentially in violation of the Clean Air Act. Historically, EPA has allowed modifications where a person has a reasonable technical basis for knowing that such modifications will not increase an engine's or vehicle's emissions. However, we do not believe it is appropriate to address the specific examples presented by ATA, since this allowance is very dependent on the

that vehicle speed limiters, for example, are part of the vehicle's 'emission control' system. TRALA thus recommends that EPA clarify that nothing in the Proposed Standards is intended to make vehicle owners/operators liable under section 203a)(3)(A) of the Clean Air Act for modifications to the vehicle's GHG controls. [EPA-HQ-OAR-2010-0162-1816.1, p.3] EPA's and NHTSA's shared premise underpinning the Proposed Standards is that vehicle GHG controls -- with an inevitable focus on physical vehicle attributes such as fairings, skirts and low-rolling- resistance tires - are categorically different from traditional mobile source emission control programs. We agree. Memorandum No. 1A should remain properly focused on attempts to defeat what has traditionally been understood as efforts to modify vehicle emission control components. In contrast, Memorandum No. 1A should not apply to GHG controls - with the result that owner/operator-based modifications to such controls should not be considered tampering. [EPA-HQ-OAR-2010-0162-1816.1, p.4] This is a just policy outcome because owner/operator-based modifications to GHG controls would almost certainly be done for operational, safety or other reasons unrelated to operation of the GHG controls themselves - for example, removal or modification to a fairing may be necessary to safely access a specific truck loading rack. [4] Would the mere act of doing so, even for safety reasons, be considered tampering? TRALA would hope not. [EPA-HQ-OAR-2010-0162-1816.1, p.4]		detailed circumstances of the modifications. Contrary to these comments, we did not propose to hold operators liable for in-use performance unrelated to tampering. The in-use compliance with the standards being adopted will be addressed in the same manner as compliance with the criteria standards. Finally, the regulations being adopted do not provide any new authority for EPA to inspect in-use vehicles.
ATA does not consider fuel-efficient add-on equipment on a tractor as emission control devices subject to the provisions under Clean Air Act Section 203. While the agencies could argue that emissions of carbon or fuel consumption would be reduced by “x” percentage if certain equipment were to be added onto a tractor, it is a stretch to infer Congress ever intended for a piece of plastic or a streamlined mirror to be an emission control device. We do not contest that modifications made to an engine with improved fuel efficiency be subject to enforcement actions if tampered. To shift liability onto the shoulders of fleets will result in unintended consequences regarding the success of this rule. Fleets will not specify fuel-efficient equipment when they place their orders with manufacturers if they will be subject to inspections and the possibility of enforcement actions. In the alternative, fleets will invest in fuel-efficient equipment in the aftermarkets which will not benefit original equipment manufacturers (OEM’s) in meeting their targets nor the agencies’ objectives. ATA’s member fleets are concerned with potential liability under the Clean Air Act’s anti-tampering provisions and have raised several examples of questions during a recent industry stakeholder meeting.	ATA	

- Example 1: Is incidental damage or the failure to repair this equipment in a timely manner considered tampering with an emission control device subject to an enforcement action under this scenario? - Example 2: The fleet has a blowout on a drive axle LRR tire and replaces it with a conventional tire during the period the original tire would have remained under warranty. Is the company tampering with an emission control device subject to an enforcement action? - Example 3: A company purchases a model year 2014 Class 8 tractor equipped with a roof fairing. In Chicago and New York, there are specific locations whereby a truck cannot make it under a viaduct or bridge because it is under the 13' 6" clearance height. Some straight trucks are made with 12' 6" boxes in order to accommodate runs in the French Quarter and other similar areas. Is a company subject to enforcement action if they periodically alter their fairing heights to accommodate these types of situations? - Example 4: A company does not maintain their tire pressure to manufacturer specifications thereby reducing their fuel efficiency compared to inflating to manufacturer specifications. Could the company by cited for tampering with an emission control device for failure to maintain proper tire inflation? Enforcement should only occur when a vehicle is first placed into commerce. Section 207 of the Clean Air Act states that compliance by vehicles and engines "in use" is done through manufacturer warranties that are provided to purchasers. EPA should also clarify that tampering does not include modifications to in-use GHG-related controls or equipment. An over-riding presumption must be recognized that fleets purchasing expensive, fuel-efficient technologies have the intent to both use and maintain such equipment. To do otherwise would be economically counter-productive and ill-conceived. EPA should expressly state in the final rule that vehicle owners/operators are not liable under Section 203(a)(3)(A) of the Clean Air Act for modifications or maintenance of a vehicle's GHG controls aside from efforts to defeat engine standards arising under the proposed rule. ATA further believes that tampering with fuel-efficient add-on devices are not part of a vehicle's "emission control system" as that term has historically been understood. [EPA-HQ-OAR-2010-0162-2263.1, pp.3-5]		

Maintenance Proper maintenance of aftertreatment systems, including selective catalytic reduction (SCR) systems, is key to ensuring that those systems operate as intended to reduce emissions. Bosch believes that the protocols and procedures set forth in EPA's extant guidance for the certification of HD diesel engines using SCR are comprehensive and sufficient, and it strongly agrees that revisions or additions "to the provisions for the specification of emission-related maintenance as outlined in 40 CFR Part 86" are not warranted. [EPA-HQ-OAR-2010-0162-1630.1, pp.38-39]	Robert Bosch LLC	SCR maintenance is beyond the scope of this rule.
Onboard Diagnostics EPA references in the preamble the upcoming onboard diagnostics (OBD) requirements for HD engine manufacturers, and it points out that the OBD systems being developed are based on engine components and systems that affect criteria pollutant emissions. EPA goes on to state that "monitoring of these components and systems for criteria pollutant emissions will have an equally beneficial effect on CO2 emissions." Bosch fully agrees, and maintains that OBD provisions specific to HD GHG emissions are unnecessary. [EPA-HQ-OAR-2010-0162-1630.1, p.38]	Robert Bosch LLC	No further requirements for GHG-specific OBD are being finalized.
As EPA has stated through long-standing guidance in years where new standards take effect, it is illegal for engine or vehicle manufacturers to stockpile engines or vehicles from the previous year for purposes of circumventing Clean Air Act requirements. Notwithstanding this, certain heavy-duty engine and vehicle manufacturers have engaged in extensive stockpiling practices during at least the past two emissions standards changes in 2007 and 2010. These practices have resulted in the sale of large quantities of older model, higher-emitting engines in the United States, creating not only excess pollution but also undermining the competitiveness of newer, cleaner engines. As a result, companies such as Volvo Group have been punished in the marketplace through their timely implementation of engines complying with new standards. EPA currently has authority to enforce against this illegal activity. However, some companies have nonetheless stockpiled engines. The final regulation must clearly reiterate the illegality of such activity. [EPA-HQ-OAR-2010-0162-1812.2, p.18] As a general matter, Volvo Group supports the codification and clarification of existing guidance designed to prevent the unnecessary stockpiling of engines by vehicle and engine manufacturers during years when emissions standards change. Volvo Group further	Volvo	We did not propose provisions to address stockpiling in this rule.

supports EPA's recognition of particular challenges manufacturers may face during years when new emissions standards take effect. While the rule should account for the need by manufacturers for some flexibility in transitioning to new technology, it also must provide objective, clear and unambiguous rules for manufacturers to follow. To remain in accord with the spirit and intent of the Clean Air Act, the rule also must create a level playing field (i.e. one that does not effectively punish manufacturers who comply in a timely manner with new EPA standards, while rewarding those who do not), and must ensure that cleaner engines are introduced into the marketplace as quickly as possible, taking into account the need for flexibility in transition to the use of new, often very complex technologies. [EPA-HQ-OAR-2010-0162-1812.2, p.19]		

Volvo Group believes that EPA correctly recognizes that derated engines will generally have higher specific CO2 output (CO2/bhp-hr) compared to the highest rated engine in a family on the weighted cycle tests. EPA also correctly points out that derated engines will normally have a lower in-use CO2 output than a higher rated engine in the same application. Hence, we support EPA's proposal to use the highest torque rating as the family certification engine without requiring derates to meet the same specific CO2 output. [EPA-HQ-OAR-2010-0162-1812.2, p.36] However, Volvo Group is concerned that a manufacturer could create a rating strictly for certification, but with minimal or no actual production. Such a rating could be highly efficient without meeting durability and reliability goals and might be sold only in applications that can rarely use full power (e.g. fire trucks, motorcoaches). This would also preclude running a Selective Enforcement Audit (SEA), since there would be no production to audit. By requiring substantial production volume this potential is eliminated. Volvo Group proposes that at least 10% of the engine family sales volume must meet the declared GHG emissions and fuel efficiency of the certification engine. [EPA-HQ-OAR-2010-0162-1812.2, pp.36-37]	Volvo	We have text to §1036.205(e) to address this concern.
Volvo Group is adamant that it be explicitly stated in the regulation that the manufacturer is not responsible for the presence of installed emission-related components during in-use audits (after the vehicle is introduced into commerce by the manufacturer). The manufacturer does not have any control over the vehicle once it leaves the manufacturing facility and this is where manufacturer responsibility should end. This also applies to vehicles leaving the manufacturer's possession and going to a vehicle modification facility or body builder, as this is done by the dealer or end user after the manufacturer introduces As discussed above, the manufacturer should not be held responsible for the vehicle configuration after it is introduced into commerce. It is unclear in this section how an in-use auditor will be able to verify the presence or absence of any emission-related component which is not readily identifiable or easily accessible (graduated RSL, under-hood intake plenum aero treatment, etc.). In addition, the added complexity of the label required by these provisions and the questionable value of that information needs to be considered here. See our previous comments on labeling. [EPA-HQ-OAR-2010-0162-1812.2, pp.39-40]	Volvo	We do not believe it is appropriate to state that "the manufacturer is not responsible for the presence of installed emission-related components during in-use audits". However, we note that §206 of the Clean Air Act states clearly that recall liability is based on vehicles that are "properly maintained and used".

17.4. Response to AAPC Comments Contained in Attachment I

Near term issues – NPRM Items Applicable to Current Product (86 Subpart N, 1036, 1037, 1065)

a. §1037.5 Regulation timing (2014/2015 MY) insufficient time for implementation
b. § 86.1362–2010 (f) and § 1036.501: RMC changing to requiring continuous measurement versus bag.
c. N_2O measurement feasibility & accuracy
   i. None of the Part 1065 instruments have been proven for robustness, test efficiency or accuracy.

EPA Response: The four base technologies allowed for N_2O measurement in 40 CFR Part 1065 are well established technologies that have been used in automotive and analytical chemistry laboratories for the last 20 to 30 years.

The GC-ECD method for analysis of N_2O was established in the 1970s and is a robust, accurate, well developed method.

The FTIR method has been around for many years and recent improvements have been made to test cell based laboratory instruments to improve the LOD and low level measurement accuracy. EPA has one of these instrument and is in the process of evaluating its performance.

The photoacoustic spectrometer has been used in test cell based applications for the measurement of ethanol for the last 10 years. As the methodology develops for the measurement of N_2O, we believe that this technology may also provide a viable means for measurement.

As a response to the recent requirement to certify to an N_2O standard, an instrument manufacturer has developed both NDIR and QCL based analyzers. NDIR technology is a well established technology for the measurement of CO and CO_2 in chassis and engine test cells. The QCL technology is new and has been reported to have no interference issues from CO, CO_2, and H_2O which are issues with other IR based measurement technologies. EPA is in the process of evaluating these new analyzers and we believe that these analyzers will also provide a viable, accurate, means for measurement of N_2O.

2. Longer term issues – NPRM Preamble Goal [V,F(3)] to Migrate LD to Part 1066 / 1065
   a. Departure from Part 86 to Part 1066

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

b. Alternative – Update Part 86 with Relevant Concepts from Part 1065

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

c. Facility Impact of Part 1066

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

d. Test Efficiency Impacts

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

e. Part 1066 References to Part 1065

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

f. Some Specific Part 1066 Concerns (partial list)

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

g. Some Specific Part 1065 Concerns (partial list)

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

h. Part 1065 Was Developed with a Primary Focus on HD Diesel

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

i. Part 1065's On-Going Evolution

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

j. N_2O Analysis Accuracy: We are not aware of any of the N_2O analyzers specified in 1065.275 having been shown to robustly, quickly, and accurately measure N_2O in the 10 mg/mi range or below. Historically industry & government have required for other criteria pollutants for this measurement accuracy to be on the order of 2% of reading. We know of none of these instruments having such accuracy for N_2O primarily due to LOD and significant interferences from other constituents. The last instrument GC-ECD is an off-line device not intended for real time process applications. Even calibration gases needed to show these low level measurements are accurate (requirement per Part 1065) are not available from NIST today.

EPA Response: EPA is not aware of any N_2O analyzer issues with respect to the speed and robustness of analysis for the analyzers specified in 40 CFR part 1065. We do acknowledge that the GC-ECD instrument is more of a bench top analytical chemistry laboratory type instrument, but this type of batch measurement is no different (except that the GC-ECD analysis is faster) than that required for speciation of NMOG in the exhaust using a GC-FID.

We believe that the photoacoustic, NDIR, and FTIR based instruments now have the capability to measure accurately in the 10 mg/mi and below. The new generation FTIR and NDIR instruments have a much lower LOD with corresponding improvements in accuracy, including improvements the handling of spectral interference.

10 ppm N_2O calibration gases have been available from NIST as SRMs in the past and NIST is currently working on a 1 ppm and 300 ppb SRM. The use of a gas divider with a 10 ppm SRM should adequately cover the expected range of N_2O concentrations seen in dilute exhaust.

k. What Measurement Technologies Will EPA Implement: These regulations have multiple options as to how to accurately measure emissions. The LD OEM's have a desire to mimic what the EPA laboratory will eventually implement, since for correlation purposes we try to closely follow what EPA is doing. We need to know this direction well before any rule takes affect so that sufficient lead time exists for OEM's to make the necessary facility modifications (typically many years are needed).

EPA Response: While EPA understands the desire to mimic the equipment and procedures as they are carried out in EPA's laboratory, the entity applying for certification is only required to meet the requirements in the CFR. Therefore, EPA will only grant the lead time appropriate for implementation of what is required by the CFR and not what specifically is being or will be utilized in EPA's laboratory.

l. Part 1066 Analysis / Impact to LD

EPA Response: EPA would like to thank AAPC for commenting on the applicability of 1066 with respect to light-duty chassis testing. At this time, EPA will not be requiring light-duty chassis testing to 40 CFR Part 1066.

3. Note that someone needs to address comments 86.1362-2010 through 1037.525(b)&(c) on pages 7 and 8 of Attachment I.

4. Comments on pages 9 through 16 of Attachment I regarding 1066 are addressed in the accompanying Excel file: “SwRI, Horiba, Volvo, and AAPC GHG NPRM Comments with EPA Response.xls”.

17.5. OEM GHG NPRM Comments

Comment	Commenter	Response
DTNA Agrees With The EPA's Extension Of Parts 85 And 1068 Exemptions To The Present GHG Program. However, We Believe That Duplicative NHTSA And EPA Exemption Processes Are Redundant And Burdensome. National security, test, precertification, and other exemptions are necessary for development of vehicles and for satisfying the various needs of our customers (including the armed forces). In turn, we agree that the criteria pollutant exemption procedure established in Parts 85 and 1068 should be carried over to the present program. However, we believe that duplicative NHTSA and EPA exemption processes are redundant and burdensome. [EPA-HQ-OAR-2010-0162-1818.1, p.46]	DTNA	The agencies have made every effort to achieve alignment with their respective standards, and thereby reduce the compliance burden of industry, in this program. However, EPA and NHTSA operate under and promulgate rules under entirely distinct statutory authorities. While this joint program has achieved significant alignment for compliance with these separate laws, each agency has an independent obligation to carry out the purpose of its underlying statute. Therefore, the agencies do not believe that, to the extent that any parts of the program have failed to achieve total alignment, those aspects can be characterized as either duplicative or redundant.
The proposed regulation 49 CFR 535.6 should include the specific carbon-intensity of gasoline and diesel in order to establish the proper CO2 emission-to-fuel consumption conversion. Along with those values (10,180 gCO2/gallon for diesel and 8,887 gCO2/gallon for gasoline), the regulation should explicitly state that the diesel value applies to fuel consumption calculations for natural gas engines and vehicles regulated under the compression-ignition standards, and the gasoline value applies to calculations for NG engines and vehicles subject to the spark-ignition standards. [EPA-HQ-OAR-2010-0162-2119.1, p.5] We also request that proposed regulation 40 CFR 535.4 be amended to clarify that a vehicle that uses a pilot-ignited natural gas engine (which uses a small diesel fuel ignition system), is a "dedicated truck", insofar as it is operated solely on an alternative fuel, consistent with 49 U.S.C. 32901(a)(8). [EPA-HQ-OAR-2010-0162-	NGVI	NHTSA is adding these changes in Part 535.6(a) and (d) to clarify how its fuel consumption values will be converted from CO2 performance.. NHTSA is adding changes in 535.4, 535.5 and 535.6 to clarify how these vehicles are defined and how

2119.1, p.5]		standards are determined and testing conducted.
NHTSA Rule Does NOT Appear to Address Export Exemptions We recommend the following underlined change to § 535.3 Applicability to provide clarification and consistency between the engine and vehicle portions of the rule: [EPA-HQ-OAR-2010-0162-1590.1, p.3] § 535.3 Applicability. (a) This part applies to vehicle and chassis manufacturers of all new heavy-duty trucks, as defined in 49 CFR part 523, and to the manufacturers of all engines manufactured for use in the applicable vehicles (hereafter referenced as heavy-duty engines). [EPA-HQ-OAR-2010-0162-1590.1, p.3] (b) Vehicle manufacturer, for the purpose of this part, means a manufacturer that manufactures heavy-duty pickup trucks and vans or truck tractors as complete vehicles. [EPA-HQ-OAR-2010-0162-1590.1, p.3] (c) Chassis manufacturer, for the purpose of this part, means a manufacturer that manufactures the chassis of a vocational vehicle. [EPA-HQ-OAR-2010-0162-1590.1, p.3] (d) The heavy-duty engines excluded from the requirements of this part include: [EPA-HQ-OAR-2010-0162-1590.1, p.3] (1) Engines used in medium-duty passenger vehicles (2) Engines fueled by other than petroleum fuels, natural gas, liquefied petroleum gas, and methanol. <u>(3) Engines meeting the criteria of 40 CFR 85.1709 Export Exemptions [EPA-HQ-</u>	Oshkosh	NHTSA agrees is adding export vehicles and engines to Part 535.3(f) as requested by Oshkosh. The NPRM also add an exemption for off-road military vehicles as Parts 523.6(a)(5) and 535.4(g).

OAR-2010-0162-1590.1, p.3] (e) Small business manufacturers as defined by the Small Business Administration at 13 CFR 121.201, and as reported to and approved by the Administrators of EPA and NHTSA, are exempted from the requirements of this regulation. § 535. [EPA-HQ-OAR-2010-0162-1590.1, p.3] Export Product Provisions Needed The NPRM does not account for or provide exceptions for the regular operation of vehicles built in the US on imported chassis but intended for export. An example of this would be a fire apparatus built on a European chassis that will be sold to a customer in the Pacific Rim. Although we would prefer to export products on our own or other U.S. manufactured chassis, the dictates of foreign customers does not always make this possible. Many foreign customers require that their vehicles be built on European chassis because these chassis are smaller, narrower, and they fit with the capabilities of local service facilities. [EPA-HQ-OAR-2010-0162-1593.1, p.2] Development programs of this type which will eventually evolve into international orders require prototyping with subsequent road testing to validate the durability, cooling capacity, safety, performance etc… of the design. All subsequent vehicles that are produced under these programs will require road testing to work through the many unforeseen variables that can result from each uniquely configured vehicle. Foreign customers visiting our U.S. facilities need to view and drive the vehicle(s) to confirm that they will be acceptable. [EPA-HQ-OAR-2010-0162-1593.1, p.2] The NPRM does not account for or provide exceptions for the regular operation of vehicles built in the US but intended for sale to the US department of defense or other national security agencies. Manufactures of these types of vehicles are constantly engaged in research and development programs at the request of, or for the benefit of, the US military, but without government contracts being issued to the vehicle manufacturer. The DOD fuel mandates do not allow engines in these vehicles to operate within emissions and fuel consumption requirements of the NPRM. The military needs to be able to operate their vehicles on fuel available anywhere in the world. Often this means using high sulfur or JP8 fuel incompatible with newer cleaner diesel engines. [EPA-HQ-OAR-2010-0162-1594.1, p.2] Development programs of this type require prototyping with subsequent road testing		

to validated the durability, cooling capacity, performance etc… of the design. Military customers may also need to view and drive the vehicle(s) to confirm that it will meet their requirements. An exception is appropriate to allow military truck manufactures to develop new products for the U.S. military. [EPA-HQ-OAR-2010-0162-1594.1, p.2]

We recommend the following underlined revision to part 49 CFR §523.6:

§ 523.6 Heavy-duty truck.

(a) A heavy-duty truck is any Class 2b through 8 non-passenger vehicle that is a commercial medium and heavy duty on highway vehicle or a work truck, as defined in 49 U.S.C. 32901(a)(7) and (19). For the purpose of this regulation heavy-duty trucks are divided into three regulatory categories as follows:

(1) Heavy-duty pickup trucks and vans;

(2) Heavy-duty vocational trucks; and

(3) Truck tractors with a GVWR above 26,000 pounds. [EPA-HQ-OAR-2010-0162-1594.1, p.3]

(b) The heavy-duty truck classification does not include:

(1) Vehicles defined as medium duty passenger vehicles in 40 CFR 86.1803-01 on December 20, 2007.

(2) Recreational vehicles including motor homes.

(3) Vehicles excluded from the definition of “heavy-duty truck” because of vehicle weight or weight rating (such as light duty vehicles and light duty trucks as defined in § 523.5).

(4) Heavy-duty off-road vehicles.

(5) Military Tactical Wheeled Vehicles specified by or sold to the U.S. Department of Defense or other U. S. governmental entity. [EPA-HQ-OAR-2010-0162-1594.1, p.3]		

List of SwRI, Horiba, Volvo, and AAPC Comments to 40 CFR Part 1066

#	40 CFR Part	Section	Submitter	High Level Summary of Issue/change requested	EPA Response
1	1066	110(d)(1)&(2)	SwRI, Horiba, and Volvo	SwRI, Horiba, and Volve comment that single roll drives should be allowed to drive tandem axles.	EPA agrees with the need for the proposed changes and will make the changes as requested.
2	1066	110(d)(5)	SwRI	SwRi comments that it is impracticle to restrict the road load force error to less than ±1 % or ±2.2 lbf during transient tests as the load may vary between ±4,000 lbf, of which 1% would be 80 lbf.	EPA agrees with the need for a change to grant flexability and will make a change as requested.

3	1066	310(b)	SwRI	SwRI comments that variation in available cooling for a test vehicle could produce large test result variations. They recommend setting a minimum limit of $30 ft^2$ on the fan opening and a minimum flow rate of 130,000 cfm at a vehicle speed of 30 mph.	EPA will make the requested change, but the specifications will be a recommendation in 1066. While we believe that these specifications are important when procuring a road speed modulated fan, we believe that the fan speed requirements will ensure that the fan produces the desired cooling over the vehicle.
4	1066	110(d)(2)	Horiba	Horiba comments that the HD roll diamter limit of 1.85 is too restrictive and larger roll diamters should be allowed.	EPA agrees and will make the change. We believe that a roll diamter limit should be in place, but realize that rolls with a diamter of greater than 1.85 m are practicle. Therefore we will set the limit at 3.10 meters.

5	1066	310(f) - (i)	Horiba	Wheel slip is typically not a problem with light and medium duty vehicles (as long as shot bags are loaded in the vehicle to accuratly represent the GVW being tested) but can be quite an issue when testing tractors that are trying to accelerate a significant load. Our existing solution for HD chassis cell applications involves a vehicle pull down mechansm, either acting on the fifth wheel, or on the axle, to simulate the actual normal forces that the tire roll interface would see if a fully loaded vehicle were being actually tested. This should be included in the text of 1066 in order to get accurate results from the test. There might be other methods to achieve the desired results.	EPA agrees and will add a requirement to 310(f) that requires the use of a "pull down mechanism" to minimize the potential for wheel slip.
6	1066	125(c)	Volvo	Believes that the runout specification of 0.025 mm is for light-duty dynamometers and is too stringent for heavy-duty dynamometers.	The runout limit is 0.25 mm, not 0.025 mm, and EPA believes that it is appropriate for both light and heavy-duty dynamometer applications.
7	1066	1	AAPC	“Model year 2014 and later heavy-duty highway vehicles we regulate under 40 CFR part 1037.” **Comment:** Insufficient time to modify test facilities plus the issue of incompatibility with other testing per Part 86 testing	

8	1066	110(b)	AAPC	(b) Accuracy and precision. "The dynamometer's output values for road load must be NIST-traceable. We may determine traceability to a specific international standards organization to be sufficient to demonstrate NIST-traceability. The force measurement system must be capable of indicating force readings to a resolution of 0.1 % of the maximum forces simulated by the dynamometer during a test." **Comment:** As written, resolution requirement is a function of dyno force simulation, which changes on a test-by-test basis (vehicle weight, dyno coefficients, drive schedule type, driver style). Some OEMs will need to upgrade dynamometer instrumentation to meet the requirement as written for testing vehicles which do not require large simulated forces from a dynamometer. Recommend a fixed value for resolution as is given in EPA's "Requirements for Single Roll Electric Chassis Dynamometers, 1991", in which the requirement is "0.05% of rated output or ± 0.2 ft-lbs".	EPA agrees with the need for the proposed changes and will make the changes as requested.
9	1066	110(c)(1)	AAPC	(c)(1) "For light-duty vehicles and for heavy-duty vehicles with a gross vehicle weight rating (GVWR) at or below 14,000 lbs, the dynamometer must be able to fully simulate a driving schedule with a maximum speed of 80.3 mph and a maximum acceleration rate of 8.0 mph/s in two-wheel drive and four-wheel drive configurations." **Comment:** For a 2WD vehicle at 12,000 lbs ETW, power absorption requirement can exceed 500 hp at 8 mph/sec. This would require extensive and costly	EPA will make a change in this section to provide clarification that dynos only need to meet this requirement up to the largest vehicle tested. Currently this section does not apply to light-duty testing. However in the future there may be a

				dynamometer system upgrades for the majority of OEMs.	requirement to test 2bs and 3 on the US06. In this case, the dynamometer will need to be able to achieve the acceleation rate of 8 mph/s.
10	1066	110(d)	AAPC	(d) “Component requirements. The dynamometer must have an independent drive roll for each axle being driven by the vehicle.”**Comment:** Suggest adding “during an emission test” after “vehicle” to better agree with 1066.310(h). Otherwise it may require 4wd dynes which have significant facility costs / lead times and is contrary to 1066.310(h)	EPA agrees with the need for the proposed changes and will make the changes as requested.
11	1066	110(d)(4)	AAPC	(d) (4) “M = mass of vehicle in lbm or kg. Determine the vehicle’s mass based on the test weight, taking into account the effect of rotating axles as specified in §1066.304.” **Comment:** Depending on how §1066.304 is interpreted, this may indicate a shift from dynamometer inertia simulation based on ETW as described in § 86.129-80 to inertia simulation based on vehicle test weight as described by §1066.304 and SAEJ2264. This may require software changes for dyno computers and test control systems to make a switch from ETW to Test Weight basis for inertia simulation.	To address this, EPA will add a definition of "test weight" in 1066.701 which will refer you to the standard setting part. This way ETW can be used for light-duty testing and test mass will be used for heavy-duty.

12	1066	110(d)(5)	AAPC	(d)(5) “Measured values of road load force may not differ from the corresponding calculated values at any operating conditions by more than ±1% for ±2.2lbf, whichever is greater.” **Comment:** A suggested method of verification would be helpful, as current verification methods may not be suitable for checking performance at ‘any operating condition’.	EPA agrees that a change is needed and we will make a change in this section.

13	1066	115(b) Table	AAPC	**Comment:** For the linearity verifications (1066.120), the following values must be computed: | xmin(a1-1)+a0 |, a1, SEE, and r2. Dynamometer control software will have to be modified to output the appropriate data in the linearity verification report. For the runout and diameter verification (1066.125), all measurements must be corrected to 25 deg. C and use a 2 kg mass. These differ from the 20 deg. C temperature and 5 lb weight specified in the Dynamometer Performance Evaluation and Quality Assurance Procedures document that was chaired by members of EPA, CARB, and OEMs and is currently in use by several emission labs. Speed measurement verification (1066.135), must be performed within 35 days before testing using an external standard. Much more frequent verification requirement. Previously verification was performed "After initial installation and After any repairs or replacement of dynamometer speed detecting devices and computer clock". New accuracy requirement is ±0.050 mph or ±0.080 kph. Previously, requirement was less precise, i.e., 0.05 mph. May need dynamometer software change due to precision difference. Torque transducer Calibration/ Verification (1066.140): Uses Part 1065.310. Calibration weights and lever arm (weight and length)	Regarding 1066.120, EPA would like the linearity check results on this format. Therefore software change will have to be made if your dynamometer is not set up with this format. Regarding 1066.125, 1066.135, and 1066.170; EPA will make the requested change. Regarding 1066.140, the yearly requirement for torque transducer calibration/verificatoin is good practice and EPA will not make a change to reduce the frequency of this. Regarding 1066.155, EPA will make the requested tolerance change but we will not make the requested frequency change as this is something that should be check weekly. Regarding 1066.160, EPA will make the precision change, but we will not change the frequency of the verfication as this

				must have NIST-traceable uncertainty of less than 0.5%. Weights applied during calibration must be adjusted to the local gravitational constant, as defined by NOAA. Frequency of verification (within 370 days before testing) is more frequent than current process (i.e., "Upon installation of a new dynamometer (Acceptance Test). After any dynamometer repairs or adjustments that may affect torque response or measurement). Parasitic Loss (1066.155): Greater frequency (within 7 days before testing) than current practice. Tighter tolerance (±0.5 lbf instead of ±1.0 lbf.). Parasitic Friction Compensation Verification (1066.160): Greater frequency (within 7 days before testing) than current practice. More precise tolerance (±0.10 hp instead of ±0.1 hp). Unloaded Coastdown (1066.165): Error specification (Ferrormax) is Max [±1.0 % of pt or (2.2 lbf/ Fref) · 100 %]. This specification is much easier to pass than current requirement (± 2.2 lbf at all speeds). The proposed frequency of the above verifications represents an increase in the amount of site down-time that must be dedicated for performing dynamometer verifications and calibrations. Current regulations in § 86.118-00 allow for relatively unobtrusive weekly and monthly performance checks, where more demanding verifications/calibrations only	something that should be done weekly. Regarding 1066.170, EPA will make the requested change vehicles with a GVWR of 14,000 lbs or less only. Overall, EPA realized that what is being required is more stringent than what is in part 86.118-00, however 86.118 was originally written in 1978 for hydrokinetic dynamomters, which are not used currently for testing, thus the dynamometer procedures need to be updated to ensure accurate testing.

			need to occur if the performance checks fail. Following the above verification frequency schedules will reduce test site through-put, and seems to be unnecessary based on the performance of current dynamometer systems as they apply to current regulations.	

14	1066	210(b)(5)	AAPC	1066.210 Coastdown procedures for heavy-duty vehicles. “Use the following equation of motion instead of theequation specified in SAE J2263:”Comment: Generally uses SAE J2263, however the final equation of motion is different than J2263. May need to modifycoastdown software.(J2263-Equation 7)**Comment:** The current industry standard is to use the equations as written in SAE J2263 which has a three-term (A,B,C)format. The previous version of the document, J1263, uses a two-term (A, C) format. The three-term format is preferred fora better representation of road forces, and should be used instead of equation 1066.210-3 given above. The three-termequation in J2263 also better correlates with the three-term road load equation that is used for dynamometer load simulation(A+BV+CV^2).	For heavy-duty vehicles, the B term in the equation is negligable. Therefore it is set to zero for heavy-duty vehicle coast downs. EPA does realize that the B term is significant for vehicles with a GVWR at or below 14,000 lbs, which are categorized as light-duty vehicles. EPA does not have any plans to set the B term to zero for light-duty testing at this time.
15	1066	301(b)(2)	AAPC	(2) “Cruise cycles. Cruise test cycles are typically specified in the standard-setting part…” **Comment:** Where are these cruise test cycles, 1066.510?	They are in the standard-setting part, specifically in 1037.510.

16	1066	304(a)	AAPC	To determine road load power and test weight, follow SAE J2263 and SAE J2264 (incorporated by reference § 1066.710), with the following exceptions: Test weight: The rotational inertia of drive-axle and nondrive-axle components that rotate with the wheels is expressed as additional “linear” mass. For Class 7 combination and Class 8 heavy-duty vehicles, without dual drive tires (or other driveline components which are likely to increase real rotational inertia to greater than 1.5% per axle) and if the actual effective mass of rotating components is unknown, the effective mass of all rotating components may be estimated as 4.0% of the vehicle test mass. **Comment:** Need clarification as to whether “test weight” as written in §1066.304 refers to “Test Mass” as defined in SAE J2263 and SAE J2264, or “Equivalent Test Weight” as defined in SAE J2264. SAE J2264 details both the ETW and Test Mass approaches for dynamometer inertia simulation, but only includes an adjustment in ‘linear’ mass to account for rotating drive components in the Test Mass approach. Current regulations (§86.129-80) specify that ETW is used for dynamometer inertia simulation. OEMs may need to modify dynamometer and/or test site software to accept additional input/specification of axle inertia, or to use Test Mass instead of ETW if	To address this, EPA will add a definition of "test weight" in 1066.701 which will refer you to the standard setting part. This way ETW can be used for light-duty testing and test mass will be used for heavy-duty.

				that is the intent.	
17	1066	307	AAPC	**Comment:** General concern with synchronization of part 86 references, now and in the future. Also a concern with parsing out CFR sections from Part 86, and the potential of losing important elements	We believe that this is a valid concern, but not for HD chassis testing. This concern will be addressed if and when EPA proposes the use of 1066 for light-duty chassis testing.

18	1066	310(b)	AAPC	(b) "… a road-speed modulated cooling fan … that achieves a linear speed of cooling air at the blower outlet that is within ±3 mph of the corresponding roll speed when vehicle speeds are between 5 to 30 mph, and within ±10 mph of the correspondingroll speed at higher vehicle speeds. The fan must provide no cooling air for vehicle speeds below 5 mph…" **Comment:** Dramatically different requirements than today's fixed speed Hartzel fan and very expensive to implement. Requiring variable speed fans versus traditional fixed speed Hartzel fan. Concern over impact to emissions, cost, physical size and weight requiring multiple people to move. The fan's size/weight/and safety tie downs make it very difficult or impossible to meet the 7 minute time limit from end of FTP to start of EVAP per §86.130-96 and §86.138-96,and (CARB) Part III, section 9.5 through 9.7.). Multiple fans used in adjacent test sites may exceed OSHA noise standards. In test labs that use aisles directly in front of cells for vehicle movement, these large fans will protrude into the aisle raising a major concern over adverse impact to physical building / test process / efficiency. Because of these concerns, variable speed fans should be kept optional	EPA does not expect to require the use of a road speed fan for light duty testing.

19	1066	310(b)	AAPC	(b) During dynamometer operation, position a road-speed modulated cooling fan that appropriately directs cooling airto the vehicle. This generally requires squarely positioning the fan within 30 centimeters of the front of the vehicle anddirecting the airflow to the vehicle's radiator. Use a fan system that achieves a linear speed of cooling air at the blower outletthat is within ±3 mph of the corresponding roll speed when vehicle speeds are between 5 to 30 mph, and within ±10 mph ofthe corresponding roll speed at higher vehicle speeds. The fan must provide no cooling air for vehicle speeds below 5 mph,unless we approve your request to provide cooling during low-speed operation based on a demonstration that this isappropriate to simulate the cooling experienced by in-use vehicles. If the cooling specifications in this paragraph (b) areimpractical for special vehicle designs, such as vehicles with rear-mounted engines, you may arrange for an alternative fanconfiguration that allows for proper simulation of vehicle cooling during in-use operation.**Comment:** Use and validation of road-speed modulated fans may require an investment in new equipment for OEMs whohave traditionally used fixed speed fans. Will use of a lower speed fan be allowed? Will open hood be allowed?	EPA does not expect to require the use of a road speed fan for light duty testing.

20	1066	310(h)	AAPC	(h) "Use good engineering judgment to test four-wheel drive and all-wheel drive vehicles. This may involve testing on a dynamometer with a separate dynamometer roll for each drive axle. This may also involve operation on a single roll, which would require disengaging the second set of drive wheels, either with a switch available to the driver or by some other means; however, operating such a vehicle on a single roll may occur only if this does not decrease emissions or energy consumption relative to normal in-use operation." **Comment:** 2wd testing has been the accepted practice. 4wd testing is very complex and costly (OEM's have very few 4wd test cells).	EPA agrees that a change is needed and we will make a change in this section.
21	1066	310(h)	AAPC	(h) Use good engineering judgment to test four-wheel drive and all-wheel drive vehicles. This may involve testing on a dynamometer with a separate dynamometer roll for each drive axle. This may also involve operation on a single roll, which would require disengaging the second set of drive wheels, either with a switch available to the driver or by some other means; however, operating such a vehicle on a single roll may occur only if this does not decrease emissions or energy consumption relative to normal in-use operation. **Comment:** If 4WD dynamometer testing is required for a significant number of vehicles, then substantial facility investment	EPA agrees that a change is needed and we will make a change in this section.

				will have to be made to accommodate the increased demand. Uniform industry methods/processes would need to be developed for securing vehicles on 4wd dynamometers in order to minimize facility-to-facility testing variation. “normal inuse operation” should be clarified and may need to address 2WD vehicles that use a non-driven axle for regenerative braking	
22	1066	320(b)(3)	AAPC	(3) Dilution air conditions must meet the specifications in 40 CFR 1065.140, except in cases where you preheat your CVS before a cold-start test. We recommend verifying dilution air conditions just before starting each test phase. **Comment:** 40 CFR 1065.140 specifies that dilution air be 20 – 30 deg, C for testing with PM sampling and > 15 deg. C for tests without PM sampling. In cases where the CVS is heated before a cold-start test, does the heater have to be turned off at some point during the test? If so, do the Part 1065 dilution air temperature requirements apply after the heater is turned off?	This comment applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.
23	1066	320(f)	AAPC	(f) “Verify the amount of nonmethane contamination in the exhaust and background HC sampling systems within 8 hours before the start of the first test drive cycle for each individual vehicle tested as described in 40 CFR 1065.515(g).”	EPA agrees that a change is needed and we will make a change in this section.

				Comment: Should be 1065.520(g). Probably beneficial but depends on the details of the implementation (make optional). Also should include other constituents like ethanol NMHCE as an option.	
24	1066	320(b)-(f)	AAPC	(b) (3) "Dilution air conditions must meet the specifications in 40 CFR 1065.140”**Comment:** 1065.140 requires 25 ± 5 °C for PM testing, and further requires the setting of the controls at 25°C. This willrequire dilution air conditioning since today’s test sites just require a range of 20 – 30 ^{0}C. This is an expensive hardwaremodification to the CFV systems.(c) “You may test vehicles at any intake-air humidity and we may test vehicles at any intake-air humidity.”**Comment:** Intake air humidity at any levels is contrary to EPA / Industry established LD practice of maintaining 50 gr/lb ofhumidity and will impact to correlation and FE testing.(e) (4) “Sample PM for at least 10 min using any sample media. You may change sample media during preconditioning. Youmust discard preconditioning samples without weighing them. “**Comment:** Allow for sampling system preconditioning similar per Part 1065.520(f), but with some heat source compatiblefor LD testing(f) “Verify the amount of nonmethane contamination in the exhaust and background HC sampling systems within 8 hours before the start of the first test drive cycle for each individual vehicle tested as described in 40 CFR 1065.515(g).”**Comment:** Burdensome and adversely affects test efficiency. Allow for flexibility of per shift or average, or make optional.	These comments applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.

25	1066	320(f)	AAPC	(f) Verify the amount of nonmethane contamination in the exhaust and background HC sampling systems within 8 hours before the start of the first test drive cycle for each individual vehicle tested as described in 40 CFR 1065.515(g). **Comment:** Requires host-level software changes and hardware changes to bag sampling system.	This comment applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.
26	1066	330(b)(6)	AAPC	(6) Verify that there are no significant vacuum-side leaks according to 40 CFR 1065.345. **Comment:** Check in 40 CFR 1065.345 requires hardware changes to bag sampling system.	This comment applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.
27	1066	330(b)(6)	AAPC	(b) (6) Verify that there are no significant vacuum-side leaks according to 40 CFR 1065.345." **Comment:** Burdensome and adversely affects test efficiency. Allow for flexibility of per shift or per day.	This comment applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.
28	1066	330(b(10)	AAPC	(10) Zero and span all continuous gas analyzers using NIST-traceable gases that meet the specifications of 40 CFR 1065.750. Span FID analyzers on a carbon number basis of one (1), C1. **Comment:** Some facilities will need to upgrade zero air, FID fuel and N2 systems to support 1065.750 requirements, like FID fuel with a HC contamination < 0.05 µmol/molC1. Analytics for detection of contamination will also have to be upgraded; particularly for measurements of N2O, NOx, and O2.	This comment applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.

29	1066	330(b(10)	AAPC	(b)(10) "…on a carbon number basis of one (1), C 1…µmol/mol" **Comment:** Units different and will significantly impact software and procedures.	This comment applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.
30	1066	330(c)(4)	AAPC	(4) If the vehicle cannot accelerate at the specified rate, operate it at maximum available power until the vehicle speed reaches the value prescribed for that time in the driving schedule. Comment: Requires pedal-position sensor or some other vehicle feedback to demonstrate that operator is requesting maximum power when the vehicle cannot maintain the drive trace. Host-level software modifications need to be in place to preclude such instances from invalidating a test.	This is already an existing requirement in part 86.128-79(f). EPA will not remove the requirement from part 1066.
31	1066	330(c)(5)	AAPC	(c) (5)" Decelerate without changing gears, using the brakes or accelerator pedal as necessary to maintain the desired speed. Keep the clutch engaged on manual transmission vehicles and do not change gears after the end of the acceleration event. Depress manual transmission clutches when the speed drops below 15 mph (24.1 km/h), when engine roughness is evident, or when engine stalling is imminent." **Comment:** Different than part 86 and not representative	This is already an existing requirement in part 86.128-79(f). EPA will not remove the requirement from part 1066.

32	1066	330(e)	AAPC	(e)" The driver must attempt to follow the target schedule as closely as possible, consistent with the specifications in paragraph (b) of this section." **Comment:** Different guidance than today's accepted industry / government practice specified in § 86.135-00 (d) & 86.128-00(d) which also precludes smoothing nor excessive throttle perturbations. (e) (i)" Speed variations greater than the specified limits are acceptable for up to 2.0 seconds on any occasion." **Comment:** Implies as many of these "occasions" as necessary during the test interval. Should be limited (e) (ii) "For vehicle preconditioning, up to three additional occurrences of speed variations outside the specified limits are acceptable for up to 15 seconds on any occasion." **Comment:** "Additional" w.r.t. what? Assume this is in reference to (e)(i) allowance of a 2 second deviation, so does this make it 1-2 sec + 3-15 sec deviations? Also these are very wide limits, may impact emissions testing	EPA will make a change to 1066.330 to include language from 86.128-00 to address the concern in the introductory paragraph to 1066.330(e). 86.135-00 is incorporated by reference in 1066.307. The comment to (e)(i) applies to light-duty testing and as such, the current text in 1066.330(e)(i) is comperable to what is in 86.115-79. The requirement in 1066.330(e)(ii) should not apply for preconditioning cycles and paragraph (ii) will be removed.
33	1066	330(h)	AAPC	(h) "At the end of each test interval, continue to operate all sampling and dilution systems to allow the response times to elapse. Then stop all sampling and recording, including the recording of background samples. Finally, stop any integrating devices and indicate the end of the duty cycle in the recorded data."**Comment:** Different than specific time referenced guidance given today. Need to assess	EPA believes that this is an improvement over the 5 second elapse time given in 86.137-90. Note that this currently does not apply to light-duty testing as 1066 is not being proposed for light-

				impact to measurements.	duty testing at this time.
34	1066	330(k)(3)(i)	AAPC	(k) (3) (i) "Drift check all continuous gas analyzers and zero and span all batch gas analyzers no later than 30 minutes after the test cycle is complete, or during the soak period if practical." **Comment:** Probably beneficial, but depending on the specifics could be burdensome and may adversely affect test efficiency. Make optional. Also this drift check in Part 1065 calls for a comparison in gr/bhp, however for a chassis test the units are in gm/mi.	This comment applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.
35	1066	330(k)(3)(iv)	AAPC	(iv) Analyze gaseous batch samples requiring off-line analysis, such as ethanol, no later than 30 minutes after the test cycle is complete. **Comment:** Ethanol analysis <30min very difficult or not possible with today's technology and contrary to Part 1065.530(g) as follows: (ii) Analyze any conventional gaseous batch samples no later than 30 minutes after the duty cycle is complete, or during the soak period if practical. (iv) Analyze non-conventional gaseous batch samples, such as ethanol (NMHCE) as soon as practical using good engineering judgment.	EPA agrees that a change is needed and we will make a change in this section.
36	1066	330(k)(3)(iv)	AAPC	(iv) Analyze gaseous batch samples requiring off-line analysis, such as ethanol, no later than 30 minutes after the test cycle is complete.	EPA agrees that a change is needed and we will make a change in this

				Comment: Not practical to perform analysis within 30 minutes after testing for cartridge and impinger samples.	section.
37	1066	330(k)(4)(iii)	AAPC	(iii) Use these data to validate and correct for drift as described in 40 CFR 1065.550. **Comment:** Part 1065 drift correction requires software changes.	This comment applies to light-duty testing and part 1066 is not being proposed for light-duty testing at this time.
38	1066	330(n)	AAPC	Validate overall driver accuracy by comparing the expected power generated, based on measured vehicle speeds, to the theoretical power that would have been generated by driving exactly to the target trace. You may remove any vehicle speed points and corresponding target trace speed points based on insufficient engine power as allowed in paragraph (e)(5) of this section. The driver power error may not exceed ±1.50 % for a valid test. **Comment:** Need to clarify text to indicate that the calculation applies only to cases of acceleration rates that are greater than or equal to zero. Example implies that equivalent test weights as defined in 86.129-94 do not apply to this testing. Need clarification of whether actual vehicle weight must be used in this calculation.	The intent of this check is to cover cases where the acceleration rates are both greater than and less than zero. This ensures that the vehicle is driven to closely match the driver's trace on both the accels and decels. We believe that the process that we have proposed is more stringent than determining this check over positive accels only and this process is easier to implement, as you will not be required to remove the decels from the data set. We will modify the example to reflect the use of equivalent test weights for vehicles at 14,000

					GVWR and below.
39	1066	705	AAPC	‘‘Guide for the Use of the International System of Units (SI),’’ which we incorporate by reference in § 1066.710. See 40 CFR 1065.25 for specific provisions related to these conventions. **Comment:** Think this should be 1065.20	EPA agrees that a change is needed and we will make a change in this section.