

EPA and NHTSA Propose Historic National Program to Reduce Greenhouse Gases and Improve Fuel Economy for Cars and Trucks

The U.S. Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) are issuing a joint proposal to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce greenhouse gas emissions and improve fuel economy. EPA is proposing the first-ever national greenhouse gas (GHG) emissions standards under the Clean Air Act, and NHTSA is proposing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act.

The standards proposed would apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. They require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide (CO₂) per mile in model year 2016, equivalent to 35.5 miles per gallon (mpg) if the automotive industry were to meet this CO₂ level all through fuel economy improvements.

These proposed rules were developed in response to President Obama's call for a strong and coordinated federal greenhouse gas and fuel economy program for passenger cars, light-duty trucks, and medium-duty passenger vehicles.¹ At the same time, the proposed national program allows automobile manufacturers to build a single light-duty national fleet that satisfies all requirements under both Federal programs and the standards of California and other states. The national program therefore provides critical environmental and energy benefits while ensuring that consumers have a full range of vehicle choices.

Need to Reduce Greenhouse Gas (GHG) Emissions and Improve Fuel Economy from Passenger Cars and Light Trucks

The proposed rules will simultaneously increase energy security, reduce air pollution, increase fuel savings, offer clarity and predictability for manufacturers, and reduce greenhouse gas emissions.

Climate change is one of the most significant long-term threats to the global environment and is caused by greenhouse gases in the atmosphere which effectively trap some of the Earth's heat that would otherwise escape into space. Greenhouse gases are both naturally occurring and anthropogenic. The primary greenhouse gases of concern are directly emitted by human activities and include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

The key effects of climate change observed to date and projected to occur in the future include, but are not limited to, more frequent and intense heat waves, more severe wildfires, degraded air quality, heavier and more frequent downpours and flooding, increased drought, greater sea level rise, more intense storms, harm to water resources, continued ocean acidification, harm to agriculture, and harm to wildlife and ecosystems.

Improving energy security by reducing our dependence on oil has been a national objective since the first oil price shocks in the 1970s. Tight global oil markets led to prices over \$100 per barrel in 2008, with gasoline reaching as high as \$4 per gallon in many parts of the U.S., causing financial hardship for many families. The light-duty vehicles subject to this proposed national program account for about 40 percent of all U.S. oil consumption.

Likewise, transportation sources represent a large and growing share of the U.S. greenhouse gases, and in 2006 they emitted 28 percent of all U.S. greenhouse gases and were the fastest-growing source of these gases in the U.S., accounting for 47 percent of the net increase in total U.S. greenhouse gas emissions from 1990-2006.

Today's proposed greenhouse gas standards are aimed at the largest sources of transportation greenhouse gases—light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles (known as light-duty vehicles). These vehicle categories, which include cars, sport utility vehicles, minivans, pickup trucks used for personal transportation and passenger vans, are responsible for almost 60 percent of all U.S. transportation related greenhouse gases.

Benefits and Costs of the Proposed National Program

The national program proposed by EPA and NHTSA would address the urgent and closely intertwined challenges of global warming and energy independence and security through a strong and coordinated federal greenhouse gas and fuel economy program, for light-duty vehicles. At the same time it would ensure that automobile manufacturers can build a single-national fleet and U.S. consumers will still have a full range of vehicle choices.

Over the lifetime of the vehicles sold during 2012-2016, this proposed national program is projected to reduce U.S. CO₂ emissions by 950 million metric tons and save 1.8 billion barrels of

oil. In total, the combined EPA and NHTSA 2012-2016 standards would reduce CO₂ emissions from the U.S. light-duty fleet by approximately 21 percent by 2030 over the level that would occur in the absence of the national program.

EPA estimates that 2012-2016 model year lifetime costs of the national program are less than \$60 billion, well below the expected benefits, which are expected to exceed \$250 billion. There are also many potential benefits of the rule which are not quantified including reductions in emissions of toxic air pollutants and ambient ozone exposures. The benefits which are calculated into dollar amounts include fuel savings, greenhouse gas (GHG) reductions, particulate matter (PM) benefits, and energy security. The two agencies' standards together comprise the national program, and this discussion of costs and benefits of EPA's GHG standards does not change the fact that both the CAFE and greenhouse gas standards, jointly, are the source of the majority of the benefits and costs of the national program.

Benefits to Consumers

Together, EPA and NHTSA estimate that the average cost increase for a model year 2016 vehicle due to the proposed national program is less than \$1,100. U.S. consumers who pay for their vehicle in cash would save enough in lower fuel costs over the first three years to offset these higher vehicle costs. However, most US consumers purchase a new vehicle using credit rather than paying cash. Consumers using an average 5-year, 60-month loan would see immediate savings due to their vehicle's lower fuel consumption in the form of reduced annual costs of \$130-\$160 a year throughout the duration of the loan (that is, the fuel savings outweigh the increase in loan payments by \$130-\$160 per year).

Whether a consumer takes out a loan or pays for their vehicle in cash, the consumer would save more than \$3,000 due to fuel savings over the lifetime of a model year 2016 vehicle.

EPA's Proposed Standards

EPA is proposing a set of fleet-wide average carbon dioxide (CO₂) emission standards for cars and trucks. These standards are based on CO₂ emissions-footprint curves, where each vehicle has a different CO₂ emissions compliance target depending on its footprint value (related to the size of the vehicle). Generally, the larger the vehicle footprint, the higher the corresponding vehicle CO₂ emissions target. As a result, the burden of compliance is distributed across all vehicles and all manufacturers. Manufacturers are not compelled to build light vehicles of any particular size or type, and each manufacturer will have its own standard which reflects the vehicles it chooses to produce.

Table 1 shows the projected fleet-wide CO₂ emission level requirements for cars under the proposed footprint-based approach. These requirements are projected to increase in stringency from 261 to 224 grams per mile between model year 2012 and model year 2016. Similarly, fleet-wide CO₂ equivalent emission level requirements for trucks are projected to increase in stringency from 352 to 302 grams per mile. The EPA projects that the average light vehicle tailpipe CO₂ level in model year 2012 will be 295 grams per mile while the average vehicle tailpipe CO₂ emissions compliance level for the proposed model year 2016 standard is projected to be 250

grams per mile, corresponding to 35.5 mpg in model year 2016, if all reductions were made through fuel economy improvements.

Table 1 - Projected Fleet-Wide Emissions Compliance Levels under the Proposed Footprint-Based CO₂ Standards (g/mi) and Corresponding Fuel Economy (mpg)					
	2012	2013	2014	2015	2016
Passenger Cars (g/mi)	261	253	246	235	224
Light Trucks (g/mi)	352	341	332	317	302
Combined Cars & Trucks (g/mi)	295	286	276	263	250
Combined Cars & Trucks (mpg)	30.1	31.1	32.2	33.8	35.5

Figures 1 and 2 show the actual footprint curves for cars and trucks. It is important to note that for the car standard curves shown in Figure 1 most model year 2012 - model year 2016 vehicle footprints are between 40-55 square feet. For the truck standard curves in Figure 2 most model 2012 - model year 2016 truck footprints are between 45-65 square feet. Example footprint targets for popular vehicle models are shown in Table 2 illustrating the fact that different vehicle sizes will have varying CO₂ emissions and fuel economy targets under the proposed footprint curve CO₂ standards. Vehicle CO₂ emissions would be measured over the EPA city and highway tests.

Figure 1 - CO₂ (g/mi) Car Standard Curves

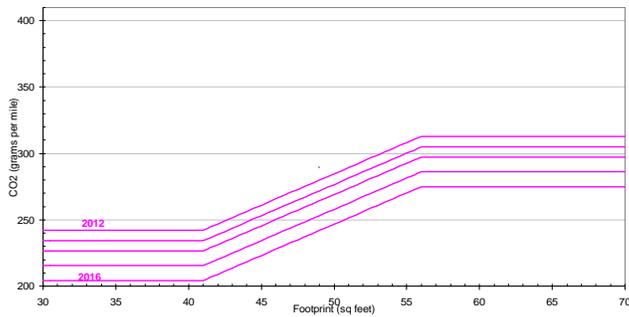


Figure 2 - CO₂ (g/mi) Truck Standard Curves

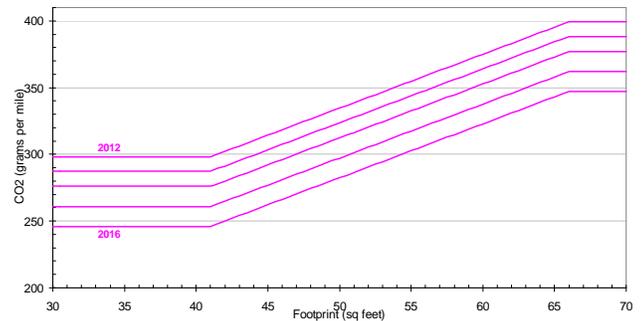


Table 2- Model Year 2016 CO ₂ and Fuel Economy Targets for Various Model Year 2008 Vehicle Types				
Vehicle Type	Example Models	Example Model Footprint (sq. ft.)	EPA CO ₂ Emissions Target (g/mi)	NHTSA Fuel Economy Target (mpg)
Example Passenger Cars				
Compact car	Honda Fit	40	204	41.4
Midsize car	Ford Fusion	46	228	37.3
Full-size car	Chrysler 300	53	261	32.8
Example Light-duty Trucks				
Small SUV	4WD Ford Escape	44	258	32.8
Midsize crossover	Nissan Murano	49	278	30.6
Minivan	Toyota Sienna	55	303	28.2
Large pickup truck	Chevy Silverado	67	347	24.7

EPA is proposing to provide auto manufacturers with the opportunity to earn credits toward the fleet-wide average CO₂ standards for improvements to air conditioning systems, including both hydrofluorocarbon (HFC) refrigerant losses (i.e. system leakage) and indirect CO₂ emissions related to the increased load on the engine. Earning credits for these types of greenhouse gas reductions is conditioned on demonstrated improvements in vehicle air conditioner systems, including both efficiency and refrigerant leakage improvement. Other program flexibilities, such as flex-fuel vehicle credits, temporary lead-time allowance and advanced technology credits would also be available to qualified auto manufacturers and are explained more fully below.

EPA's and NHTSA's technology assessment indicates there is a wide range of technologies available for manufacturers to consider in upgrading vehicles to reduce greenhouse gas emissions and improve fuel economy. These include engine improvements, such as use of gasoline direct injection and downsized engines that use turbochargers to provide performance similar to that of larger engines, the use of advanced transmissions, increased use of start-stop technology, improvements in tire performance, reductions in vehicle weight, increased use of hybrid and other advanced technologies, and the initial commercialization of electric vehicles and plug-in hybrids. EPA is also projecting improvements in vehicle air conditioners including more efficient as well as low leak systems. All of these technologies are already available today, and EPA's and NHTSA's assessment is that manufacturers would be able to meet the proposed standards through more widespread use of these technologies across their fleet.

EPA is also proposing standards that will cap tailpipe nitrous oxide (N₂O) and methane (CH₄) emissions at 0.010 and 0.030 grams per mile, respectively. Even after adjusting for the higher relative global warming potencies of these two compounds, nitrous oxide and methane emissions represent less than one percent of overall vehicle greenhouse gas emissions from new vehicles.

EPA's Program Flexibilities

EPA's and NHTSA's proposed programs provide compliance flexibility to manufacturers, especially in the early years of the national program. This flexibility is expected to provide sufficient lead time for manufacturers to make necessary technological improvements and reduce the overall cost of the program, without compromising overall environmental and fuel economy objectives.

EPA is proposing to establish a system of averaging, banking, and trading of credits integral to the fleet averaging approach, based on a manufacturer's fleet average CO₂ performance. This approach would allow for trading of credits among all vehicles a manufacturer produces, both cars and light trucks. Trading of credits between companies would also be permitted. This program is similar to averaging, banking, and trading (ABT) programs EPA has established in other programs for motor vehicles. EPA is also proposing to include credits for improved air conditioning performance (both reduced leakage of refrigerant and improved air conditioner efficiency) as an aspect of the standards, as mentioned above.

EPA is also proposing several additional credit provisions would apply only in the initial model years of the program. These include credits based on the use of advanced technologies, and generation of credits for superior greenhouse gas emission reduction performance prior to model year 2012. These credit programs would provide flexibility to manufacturers, which may be especially important during the early transition years of the program. In addition, both NHTSA and EPA are continuing to offer credits for vehicles designed to operate on alternative fuels, although these credits would be phased out after model year 2015 under the EPA greenhouse gas program.

- **Flex-fuel and Alternative Fuel Vehicle Credits** - EPA is proposing to allow Flex Fuel Vehicle or FFV credits in line with limits established under the Energy Independence and Security Act of 2007 during model years 2012 to 2015. After model year 2015, EPA proposes to allow FFV credits only based on a manufacturer's demonstration that the alternative fuel is actually being used in the vehicles and actual greenhouse gas emissions performance for the vehicle run on that alternative fuel. FFVs are vehicles that can run both on an alternative fuel and conventional fuel. Most FFVs are E-85 capable vehicles, which can run on either gasoline or a mixture of up to 85 percent ethanol and 15 percent gasoline. Dedicated alternative fuel vehicles are vehicles that run exclusively on an alternative fuel.
- **Optional Temporary Lead-time Allowance Alternative Standards (TLAAS)** - Manufacturers with limited product lines may be especially challenged technologically in the early years of the program. Manufacturers that have traditionally paid fines to NHTSA in lieu of meeting Corporate Average Fuel Economy (CAFE) standards may be especially challenged in bringing their fleets into compliance with the greenhouse gas emission standards. Under the Clean Air Act, manufacturers of light duty motor vehicles cannot pay fines in lieu of complying with motor vehicle emissions standards. EPA is proposing an optional, temporary alternative standard, which is only slightly less stringent, and limited to the first four model years (2012-2015) of the national program, so that these manufacturers can have sufficient lead time to meet the tougher model year 2016 greenhouse gas standards, while preserving consumer choice of vehicles during this time.

In model year 2016, the TLAAS option ends, and all manufacturers, regardless of size, must comply with the same CO₂ standards, while under the CAFE program companies would continue to be allowed to pay civil penalties in lieu of complying with the CAFE standards. However, because companies must meet both the CAFE standards and the EPA CO₂ standards, the national program in effect means that companies will not have the civil penalty option, thereby resulting in more fuel savings and CO₂ reductions than would be the case under the CAFE program alone.

Specifically, this temporary standard would apply to manufacturers who sold less than 400,000 model year 2009 vehicles in the U.S. and would allow them to establish a separate averaging fleet comprising on average 25,000 vehicles per year (and no more than 100,000 total vehicles during this four year period). This limited vehicle fleet would be subject to a slightly less stringent greenhouse gas standard of 125 percent of the vehicle's otherwise applicable footprint target level. The alternative fleet could not generate credits for use by the remainder of the manufacturer's fleet.

- **Advanced Technology Credits** - EPA is proposing additional credit opportunities to encourage the commercialization of advanced greenhouse gas/fuel economy control technologies, such as electric vehicles, plug-in hybrid electric vehicles, and fuel cell vehicles. These proposed advanced technology credits are in the form of a multiplier that would be applied to the number of vehicles sold, such that each eligible vehicle counts as more than one vehicle in the manufacturer's fleet average. EPA is also proposing to allow early advanced technology credits to be generated beginning in model years 2009 through 2011.
- **Off-Cycle Innovative Technology Credits** - EPA is proposing a credit opportunity intended to apply to new and innovative technologies that reduce vehicle CO₂ emissions, but for which the CO₂ reduction benefits are not captured over the 2-cycle test procedure used to determine compliance with the fleet average standards (i.e., "off-cycle"). Eligible innovative technologies would be those that are relatively newly introduced in one or more vehicle models, but that are not yet implemented in widespread use in the light-duty fleet. Further, any credits for these off-cycle technologies must be based on real-world greenhouse gas emission reductions not captured on the current 2-cycle tests and verifiable test methods, and represent average U.S. driving conditions.
- **Early Credits** - EPA is also proposing early credits in model years 2009-2011 through over-compliance with a baseline standard. The baseline standard would be set to be equivalent, on a national level, to the California standard. Potentially, credits could be generated by over-compliance with this baseline in one of two ways: over-compliance by the fleet of vehicles sold in California and the CAA section 177 states (i.e. those states adopting the California program), or over-compliance with the fleet of vehicles sold in the 50 states. EPA is also proposing early credits based on over-compliance with CAFE, but only for vehicles sold in states outside of California and the CAA section 177 states.

With the goal of promoting informed choices by consumers, EPA is also asking for public comments on how to improve fuel economy labels.

Background of EPA's Proposal

The EPA's proposal represents the second-phase of its response to the Supreme Court's 2007 decision in *Massachusetts v. EPA* which held that greenhouse gases were air pollutants for purposes of the Clean Air Act (CAA). The Court held that the Administrator must determine whether or not emissions of greenhouse gases from new motor vehicles and new motor vehicle engines cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain for EPA to make a reasoned decision. The Court remanded the case back to the Agency for reconsideration in light of its holding.

The Administrator responded to the Court's remand by issuing two proposed findings under section 202(a) on April 24, 2009. First, the Administrator proposed to find that the science supports a positive endangerment finding that a mix of certain greenhouse gases in the atmosphere endangers the public health and welfare of current and future generations. This is referred to as the endangerment finding. Second, the Administrator proposed to find that the emissions of four of these gases--carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons -- from new motor vehicles and new motor vehicle engines contribute to the atmospheric concentrations of these key greenhouse gases and hence to the threat of climate change. This is referred to as the cause or contribute finding. Finalizing today's proposed light vehicle regulations is contingent upon EPA finalizing both the endangerment finding and the cause or contribute finding.

Public Participation Opportunities

We welcome your comments on this rule. Comments will be accepted for 60 days beginning when this proposal is published in the Federal Register. All comments should be identified by Docket ID No. EPA-HQ-OAR-2009-0472 and submitted by one of the following methods:

Internet: www.regulations.gov

E-mail: A-and-R-Docket@epa.gov

Mail:

Environmental Protection Agency
Air and Radiation Docket and Information Center (6102T)
1200 Pennsylvania Avenue NW
Washington, DC 20460

Hand Delivery:

EPA West building
EPA Docket Center (Room 3340)
1301 Constitution Avenue NW
Washington, DC

You should consult the Federal Register notice for this proposal for more information about how to submit comments, when the comment period will close, and about where and when public hearings will be held. A copy of Federal Register notice can be found on our website listed below.

For More Information

You can access the rule and related documents on EPA's Office of Transportation and Air Quality (OTAQ) Web site at:

www.epa.gov/otaq/climate/regulations.htm

For more information on this rule, please contact Tad Wysor at:

U.S. Environmental Protection Agency
Office of Transportation and Air Quality
2000 Traverwood Drive
Ann Arbor, MI 48105
(734) 214-4332
E-mail: wysor.tad@epa.gov

footnote:

¹ President Obama Announces National Fuel Efficiency Policy, The White House, May 19, 2009. Available at: www.whitehouse.gov/the_press_office/President-Obama-Announces-National-Fuel-Efficiency-Policy/. Remarks by the President on National Fuel Efficiency Standards, The White House, May 19, 2009. Available at: www.whitehouse.gov/the_press_office/Remarks-by-the-President-on-national-fuel-efficiency-standards/.