

## EPA and NHTSA Adopt Standards to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles for Model Year 2018 and Beyond

The U.S. Environmental Protection Agency (EPA) and National Highway Traffic Safety Administration (NHTSA) jointly adopted a second round of standards for medium- and heavy-duty vehicles that will cut carbon pollution and improve fuel efficiency, while bolstering energy security and spurring manufacturing innovation. The Phase 2 program promotes a new generation of cleaner, more fuel efficient trucks by encouraging the development and deployment of new and advanced cost-effective technologies through model year 2027.

The Phase 2 program will include technology-advancing standards that substantially reduce GHG emissions and fuel consumption, resulting in an ambitious, yet achievable program that will allow manufacturers to meet standards over time through a mix of different technologies at reasonable cost.

**Ambitious and Significant:** The Phase 2 standards are expected to lower CO<sub>2</sub> emissions by approximately 1.1 billion metric tons, save vehicle owners fuel costs of about \$170 billion, and reduce oil consumption by up to 2 billion barrels over the lifetime of the vehicles sold under the program. The technology-advancing Phase 2 program goes beyond the successful Phase 1 program, with standards based not only on currently available technologies but emerging technologies that are not yet in widespread use.

**Achievable and Flexible:** The performance-based standards provide multiple technological pathways to compliance and were informed by a comprehensive assessment of advanced technologies and extensive stakeholder outreach. The standards phase in beginning in model year 2021 and culminate in standards for

model year 2027. First-time GHG and fuel efficiency standards for trailers start in 2018 for EPA and in 2021 for NHTSA. The long phase in and incremental increases in stringency give industry time to ensure products are reliable and durable, and provide long-term regulatory certainty.

**Affordable and Cost-Effective:** At every step of the Phase 2 program, the standards have fuel savings that more than offset the costs and have favorable payback periods for truck owners. The typical buyer of a new long-haul truck in 2027 could recoup the extra cost of the technology in under two years through fuel savings. The program will also benefit consumers and businesses by reducing the costs for transporting goods. In total, the program will result in up to \$230 billion in net benefits to society over the lifetime of vehicles sold under the program. This includes fuel savings, carbon reductions, health benefits, energy security benefits, along with travel benefits, and refueling benefits.

The Phase 2 standards are fully aligned between EPA and NHTSA, and the agencies have worked closely with CARB to create a program that the California Air Resources Board can adopt, resulting in a truly national program that will allow manufacturers to continue to build a single fleet of vehicles and engines for the US market.

## Improvements to the Final Program

The agencies have had unprecedented outreach to stakeholders during the process of developing, proposing and finalizing the Phase 2 program, involving well over 400 meetings with stakeholders. The changes and updates to the final rules are based on extensive efforts to reflect the newest data and a large volume of detailed stakeholder and public feedback – making Phase 2 even better and resulting in a program that:

- Achieves 10 percent more GHG reductions
- Has more robust compliance provisions such as more repeatable and accurate test procedures, enhanced enforcement audits, and protection against defeat devices.
- Includes more stringent diesel engine standards and an improved vocational vehicle program with a regulatory structure better tailored to match the right technology for the job.
- Maintains the structure and incremental phase-in of the proposed standards, allowing manufacturers to choose their own technology mix and giving them the lead time needed to ensure those technologies are reliable and durable.
- Increases flexibilities to minimize impacts on small businesses.

## CO<sub>2</sub> and Fuel Consumption Standards

The Phase 2 standards maintain the underlying regulatory structure developed in the Phase 1 program, such as the general categorization of medium- and heavy-duty vehicles and the separate engine standards. Under Phase 2, agencies are additionally adopting first time CO<sub>2</sub> and fuel efficiency standards for certain trailers used with heavy-duty combination tractors. Specifically,

EPA's CO<sub>2</sub> emissions standards and NHTSA's fuel consumption standards are tailored to each of four regulatory categories of heavy-duty vehicles: (1) Combination Tractors; (2) Trailers Pulled by Combination Tractors; (3) Heavy-duty Pickup Trucks and Vans; and (4) Vocational Vehicles, which include all other heavy-duty vehicles such as buses, refuse trucks, and concrete mixers. The program also includes separate standards for the engines that power combination tractors and vocational vehicles.

## Combination Tractors

Class 7 and 8 combination tractors and their engines account for roughly 60 percent of total GHG emissions and fuel consumption from the heavy-duty sector. This is due to their large payloads and high number of vehicle miles traveled. These combination tractors play a major role in freight transport in the United States. The CO<sub>2</sub> and fuel consumption standards for combination tractors and engines start in model year 2021, increase incrementally in model year 2024, and phase in completely by model year 2027. The standards differ by vehicle weight class, roof height, and cab type (sleeper or day). The fully phased-in standards will achieve up to 25 percent lower CO<sub>2</sub> emissions and fuel consumption compared to the Phase 1 standards. Manufacturers will be able to meet the tractor standards through improvements in the engine, transmission, driveline, aerodynamic design, lower rolling resistance tires, extended idle reduction technologies, and other accessories of the tractor. Since engine technology delivers significant benefits a separate engine standards was developed to ensure that manufacturers implement engine technologies to deliver those benefits.

## Trailers

Recognizing the trailer as an integral part of the tractor-trailer vehicle that significantly contributes to the emissions and fuel consumption of the tractor, the Phase 2 program includes standards for trailers used with heavy-duty combination tractors. The standards begin in model year 2018 for EPA's standards, and are voluntary for NHTSA from 2018 to 2020, with mandatory standards beginning in 2021. In general, the trailer standards apply only for box vans, flatbeds, tankers, and container chassis. The standards increase in stringency in model years 2021 and 2024, with final standards in model year 2027. The fully phased-in trailer standards achieve up to 9 percent lower CO<sub>2</sub> emissions and fuel consumption compared to an average model year 2017 trailer. Technologies that could be used to meet the standards include: aerodynamic devices, lower rolling resistance tires, automatic tire inflation systems, and weight reduction.

## Vocational Vehicles

Vocational vehicles consist of a wide variety of truck and bus types, including delivery trucks, refuse haulers, public utility trucks, transit, shuttle, and school buses. This segment also includes very specialized vehicles such as emergency vehicles, and cement and dump trucks. Vocational vehicles represent about 17 percent of the total medium- and heavy-duty fuel consumption. The new CO<sub>2</sub> and fuel consumption standards for vocational vehicles start in model year 2021, with increased stringency in model year 2024, and a fully phased-in stringency level in 2027. The vocational vehicle standards are differentiated using vehicle weights and driving cycle, and chassis

intended for emergency vehicles, cement mixers, coach buses, school buses, transit buses, refuse trucks, and motor homes may optionally use application-specific standards. The fully phased-in Phase 2 standards achieve up to 24 percent in CO<sub>2</sub> emissions and fuel consumption relative to Phase 1. The agencies project that the vocational vehicle standards could be met through improvements in the engine, transmission, driveline, lower rolling resistance tires, workday idle reduction technologies, weight reduction, and some application of hybrid technology.

## Heavy-Duty Pickup Trucks and Vans

Heavy- and medium- duty pickup trucks and vans represent about 23 percent of the fuel consumption and GHG emissions from the heavy- and medium-duty vehicle sector. The agencies are adopting CO<sub>2</sub> emission and fuel consumption standards for heavy-duty pickups and vans that apply in largely the same manner as the Phase 1 standards. Under this approach, all manufacturers face the same standards, but the average emission and fuel consumption rates applicable to each manufacturer depend on the manufacturer's sales mix, with higher capacity vehicles (payload and towing) having less stringent targets. The standards for this segment take the form of a set of target standard curves, based on a "work factor" that, as in Phase 1, combines a vehicle's payload, towing capabilities, and whether or not it has 4-wheel drive. The standards become 2.5 percent more stringent every year from model years 2021 to 2027, with fully phased-in reductions in CO<sub>2</sub> emissions and fuel consumption of about 16 percent beyond Phase 1. We believe most manufacturers will choose to meet the performance standards through increased use of the same technologies already being used to meet the 2014-2018 standards. These technologies include improvements in engines, transmissions, and lower rolling resistance tire technologies. Under Phase 2, the agencies expect newer, advanced technologies such as engine stop start and powertrain hybridization will also become available in this segment of the market. These newer technologies are NOT mandated but some manufacturers may choose to use them to meet the standard.

## Engine Standards

As with the Phase 1 program, the agencies are adopting separate standards and test cycles for tractor engines, vocational diesel engines, and vocational gasoline engines. For diesel engines, the standards begin in model year 2021 and phase in to model year 2027, with interim standards in model year 2024. We are also adopting a revised test cycle weighting for tractor engines to better reflect actual in-use operation. The final diesel engine standards will reduce CO<sub>2</sub> emissions and fuel consumption by up to 5 percent for tractor engines and up to 4 percent for vocational engines compared to Phase 1. Technologies that could be used to meet the standards include: combustion optimization; improved air handling; reduced friction within the engine; improved emissions after-treatment technologies; and waste heat recovery.

## Program Flexibilities

This rule includes averaging, banking, and trading (ABT) compliance provisions for the engine and vehicle standards in this program. These provisions allow manufacturers to trade credits, bank credits for future years, and average credits, which in turn allows manufacturers to certify

engines or vehicles that do not perform up to the standard and offset them with engines or vehicles that perform better than the standard. With these ABT provisions, manufacturers can balance market fluctuations impacting their sales volumes and projected compliance plans. This program was established under Phase 1, and EPA and NHTSA are continuing it with some minor revisions. The ABT flexibilities are designed to help increase the rate at which new technologies can be implemented, reduce the cost of compliance, and address potential lead time challenges in meeting the standards.

As with similar flexibilities in the light-duty Corporate Average Fuel Economy program and other mobile source pollution control programs, the Phase 2 ABT program includes rigorous compliance provisions to ensure that the energy savings and environmental goals of the program are met and the standards are applied equitably among all manufacturers.

We are not adopting a full ABT program for the trailer standards because the nature of the industry makes it a challenge for trailer manufacturers to benefit from this type of program. Instead, we are finalizing an averaging program available in MY 2027 for manufacturers of dry and refrigerated box vans.

Broadly, these provisions provide additional lead time for small business manufacturers, as well as simplified testing and compliance requirements. We are also finalizing exemptions for non-box specialty trailer types that remove or reduce the burden for many small businesses. Finally, we are including reduced standards and/or simplified compliance requirements for manufacturers of specialized vehicle chassis, such as those intended for emergency vehicles, cement mixers, coach buses, school buses, transit buses, refuse trucks, and motor homes.

## **For More Information**

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

[www3.epa.gov/otaq/climate/regs-heavy-duty.htm](http://www3.epa.gov/otaq/climate/regs-heavy-duty.htm)

For more information on this rule, please contact the U.S. Environmental Protection Agency, Office of Transportation and Air Quality at:

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