

EPA and NHTSA Set Standards to Reduce Greenhouse Gases and Improve Fuel Economy for Model Years 2017-2025 Cars and Light Trucks

The U.S. Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) are issuing final rules extending the National Program to further reduce greenhouse gas (GHG) emissions and improve fuel economy for model years (MYs) 2017 through 2025 light-duty vehicles. EPA is establishing national GHG emissions standards under the Clean Air Act, and NHTSA is establishing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act, as amended by the Energy Independence and Security Act (EISA).

EPA's standards apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, in MYs 2017 through 2025. The final standards are projected to result in an average industry fleetwide level of 163 grams/mile of carbon dioxide (CO₂) in model year 2025, which is equivalent to 54.5 miles per gallon (mpg) if achieved exclusively through fuel economy improvements. Light-duty vehicles are currently responsible for nearly 60 percent of U.S. transportation-related petroleum use and GHG emissions.

This new phase in this broadly supported national program conserves billions of barrels of oil, cuts carbon pollution, protects consumer choice, and enables long-term planning for automakers.

Building on Success

This MYs 2017-2025 program builds on the success of the first phase of the National Program for MYs 2012-2016 vehicles, which is projected to result in an average light-duty vehicle tailpipe CO₂ level of 250 grams per mile by MY 2016, equivalent to 35.5 mpg (if achieved exclusively through fuel economy). Vehicles meeting the MYs 2012 and 2013 standards are on the road today, already saving consumers money at the pump.

Combined with the MYs 2012-2016 standards, today's final program will result in MY 2025 vehicles emitting one-half of the GHG emissions of a MY 2010 vehicle, representing the most significant federal action ever taken to reduce GHG emissions and improve fuel economy.

As with the first phase of the National Program, this second phase of the program was built on strong support from a wide range of stakeholders, including the automobile manufacturers. After President Obama announced plans for the second phase National Program on July 29, 2011, thirteen auto manufacturers representing over 90 percent of U.S. vehicle sales announced support for the program, as well as the State of California. The United Auto Workers, consumer organizations, environmental organizations, veterans groups, state/local governments, and nearly 300,000 individuals have also expressed strong support for the program.

Continuing the National Program ensures that auto manufacturers can build a single fleet of U.S. vehicles that satisfy requirements of both federal programs as well as California's program, thus helping to reduce costs and regulatory complexity while providing significant energy security and environmental benefits to the nation as a whole.

Benefits to Consumers

These standards will provide significant savings for consumers at the pump. Higher costs for new vehicle technology are projected to add, on average, about \$1,800 for consumers who buy a new vehicle in MY 2025. Those consumers who drive their MY 2025 vehicle for its entire lifetime will save, on average, \$5,700 to \$7,400 (7 and 3 percent discount rates, respectively) in fuel savings, for a net lifetime savings of \$3,400 to \$5,000 (when compared to a vehicle meeting the MY 2016 standards). For those consumers who purchase their new MY 2025 vehicle outright, the discounted fuel savings will offset the higher vehicle cost in less than 3.5 years, and fuel savings will continue for as long as the consumer owns the vehicle.

Those consumers who purchase a new MY 2025 vehicle with a standard 5-year loan will immediately benefit as the monthly fuel savings offset the higher monthly payment by about \$12 or about \$140 per year. These savings assume a gasoline price of \$3.87 in 2025 with small future increases throughout the vehicle's lifetime; if gas prices soar consumers would save even more money as a result of these more fuel-efficient vehicles.

The final standards preserve consumer choice -- that is, the standards should not affect consumers' opportunity to purchase the size of vehicle with the performance, utility and safety features that meet their needs. The standards have been designed in a way that does not create incentives to manufacture vehicles of any particular size (for example, there is no incentive to downsize).

Benefits from Greenhouse Gas Reductions and Less Oil Dependency

Over the lifetimes of the vehicles sold in MYs 2017-2025 standards, this program is projected to save approximately 4 billion barrels of oil and reduce GHG emissions by 2 billion metric tons, with net benefits to society in the range of \$326 billion to \$451 billion (7 and 3 percent discount rates, respectively). These savings come on top of savings that would already be achieved through the continuation of the MY 2016 standards.

The combined National Program for MYs 2012-2016 and MYs 2017-2025 is projected to save families more than \$1.7 trillion in fuel costs and reduce America's dependence on oil by more than 2 million barrels per day in 2025, which is equivalent to one-half of the oil that we currently import from OPEC countries each day. In addition, the combined program will cut 6 billion metric tons of greenhouse gases over the lifetimes of the vehicles sold in MYs 2012-2025 – more than the total amount of carbon dioxide emitted by the United States in 2010. Consumers who purchase a new MY 2025 vehicle will save more than \$8,000 in fuel costs over that vehicle's lifetime (when compared to a vehicle meeting the MY 2011 CAFE standards).

EPA's Greenhouse Gas Standards

EPA is finalizing a set of fleet-wide average carbon dioxide (CO₂) emission standards for cars and light 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 vehicles of any particular size or type (nor does the rule create an incentive to do so), and no single vehicle is required to meet its individual target. Each manufacturer will have its own fleet-wide standard that reflects the vehicles it chooses to produce, and the GHG program provides a wide range of credit programs and flexibilities for manufacturers to meet the standards.

Table 1 shows the projected fleet-wide CO₂ emission targets under this footprint-based approach. The car CO₂ emission levels are projected to increase in stringency from 212 to 143 grams per mile (g/mi) between MYs 2017 and 2025. Similarly, fleet-wide CO₂ emission levels for trucks are projected to increase in stringency from 295 in MY 2017 to 203 g/mi in MY 2025. EPA projects that the average light vehicle (combined car and truck) tailpipe CO₂ compliance level in MY 2017 will be 243 g/mi, phasing down by MY 2025 to 163 g/mi, corresponding to 54.5 mpg in MY 2025 if all reductions were made through fuel economy improvements.

Table 1 - Projected Fleet-Wide Emissions Compliance Targets under the Footprint-Based CO ₂ Standards (g/mi) and Corresponding Fuel Economy (mpg)										
	2016 base	2017	2018	2019	2020	2021	2022	2023	2024	2025
Passenger Cars (g/mi)	225	212	202	191	182	172	164	157	150	143
Light Trucks (g/mi)	298	295	285	277	269	249	237	225	214	203
Combined Cars & Trucks (g/mi)	250	243	232	222	213	199	190	180	171	163
Combined Cars & Trucks (mpg)	35.5	36.6	38.3	40.0	41.7	44.7	46.8	49.4	52.0	54.5

Figures 1 and 2 show the actual footprint curves for cars and trucks, respectively. For passenger cars, the CO₂ compliance values associated with the footprint curves would be reduced on average by 5 percent per year from the MY 2016 projected passenger car industry-wide compliance level through MY 2025. To address the challenges facing light-duty trucks, as we transition from the MY 2016 standards to MY 2017 and later, while preserving the utility (e.g., towing and payload capabilities) of those vehicles, EPA’s standards provide a lower annual rate of improvement for light-duty trucks in the early years of the program. The average annual rate of CO₂ emissions reduction in MYs 2017 through 2021 is 3.5 percent per year and 5 percent per year for MYs 2022 through 2025.

Regulatory Announcement

Figure 1 CO2 (g/mile) Car Standards Curves

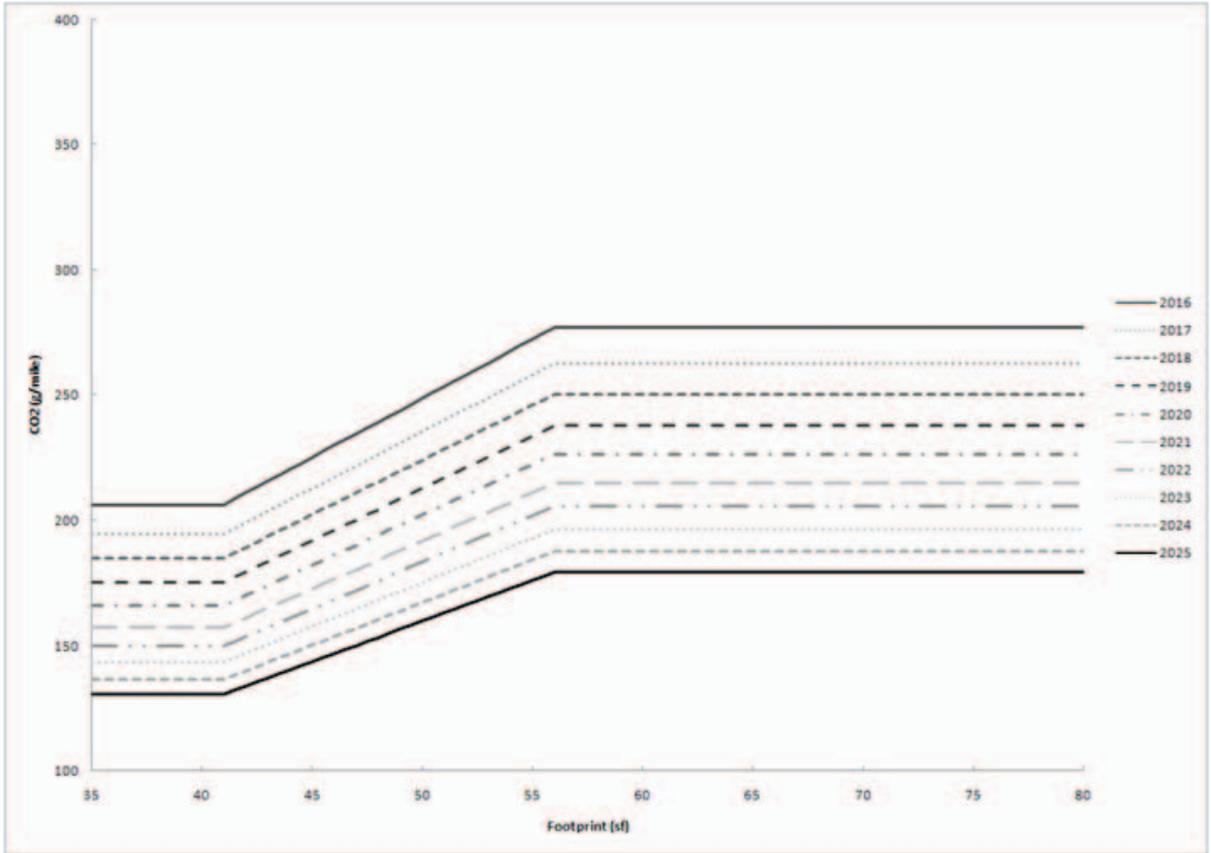
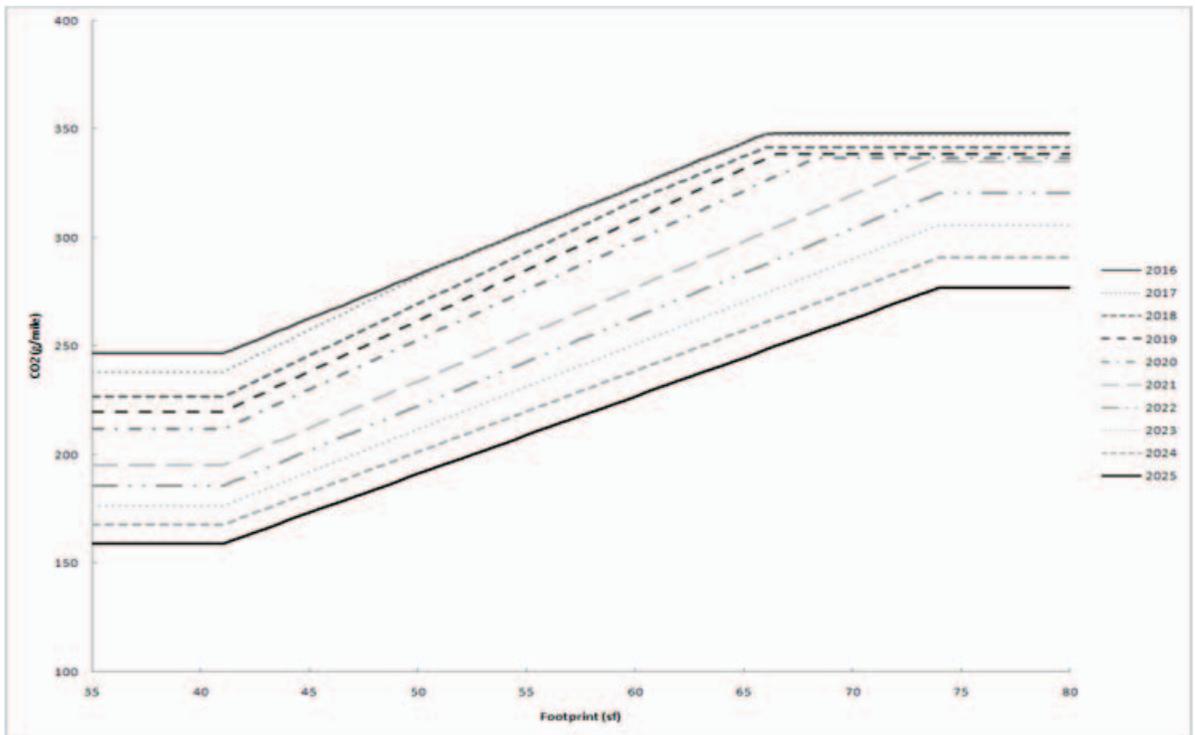


Figure 2 CO2 (g/mile) Truck Standard Curves



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 footprint-based standards. Vehicle CO₂ emissions will be measured over the EPA city and highway tests.

Table 2 Model Year 2025 CO₂ and Fuel Economy Targets for Representative MY 2012 Vehicles

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	131	61.1
Mid-size car	Ford Fusion	46	147	54.9
Full-size car	Chrysler 300	53	170	48.0
Example Light-duty Trucks				
Small SUV	4WD Ford Escape	43	170	47.5
Midsized crossover	Nissan Murano	49	188	43.4
Minivan	Toyota Sienna	56	209	39.2
Large pickup truck	Chevy Silverado (extended cab, 6.5 foot base)	67	252	33.0

* Real-world CO₂ is typically 25 percent higher and real-world fuel economy is typically 20 percent lower than the CO₂ and CAFE values discussed here.

** The fuel economy mpg targets shown in the last column would be higher if using the MPG-equivalent values corresponding to the CO₂ emissions targets, i.e., if all CO₂ reductions were achieved exclusively with higher fuel economy technologies.

Vehicle Technologies to Reduce GHGs and Improve Fuel Economy

EPA projects that manufacturers will comply with the MYs 2017-2025 standards by using a wide range of technologies, including continual advances in gasoline engines and transmissions, vehicle weight reduction, lower tire rolling resistance, vehicle aerodynamics, diesel engines, and more efficient vehicle accessories. EPA expects that the majority of improvements will come from advancements in internal combustion engines, although we also expect to see some increased electrification of the fleet through the expanded production of stop/start, hybrid vehicles, plug-in hybrid electric vehicles, and electric vehicles. EPA also expects that vehicle air conditioning systems will continue to become more efficient, reduce leakage, and use alternative refrigerants with lower hydrofluorocarbon emissions.

Mid-Term Evaluation

Given the long time frame at issue in setting standards for MYs 2022-2025, and given NHTSA's obligation to conduct a separate rulemaking in order to establish final standards for vehicles for those model years, EPA and NHTSA will conduct a comprehensive mid-term evaluation and agency decision-making process. As part of this undertaking, EPA and NHTSA will develop and compile up-to-date information for the evaluation, through a collaborative, robust and transparent process, including public notice and comment. EPA and NHTSA fully expect to conduct this mid-term evaluation in coordination with the California Air Resources Board (CARB), given our interest in maintaining a National Program to address GHG emissions and fuel economy. The comprehensive evaluation process will lead to final agency action by both agencies.

EPA's Program Flexibilities

EPA's final program includes provisions that offer compliance flexibility to auto manufacturers. Together these flexibilities are expected to provide sufficient lead time for manufacturers to make necessary technological improvements and to reduce the overall cost of the program, without compromising overall environmental objectives. The flexibilities also provide incentives to facilitate market penetration of the most advanced vehicle technologies.

Credit Banking and Trading - EPA will continue the same comprehensive program for averaging, banking, and trading of credits established in the MYs 2012-2016 program. Together, these provisions help manufacturers in planning and implementing the orderly phase-in of GHG-reducing technology in their production, consistent with typical redesign schedules. Credits may be carried forward, or banked, for five years, or carried back three years to cover a deficit in a previous year. A manufacturer may transfer credits across all vehicles it produces, both cars and light trucks. Trading of credits between companies is also permitted. To facilitate the transition to the increasingly more stringent MYs 2017-2025 standards, EPA is finalizing under its Clean Air Act authority a one-time CO₂ credit carry-forward provision beyond 5 years, allowing credits generated from MYs 2010 through 2016 to be used through MY 2021.

Air Conditioning Improvement Credits - As with the MYs 2012-2016 program, manufacturers will be able to generate CO₂-equivalent credits to use in complying with the CO₂ standards for (1) improvements in air conditioning (A/C) systems that reduce tailpipe CO₂ through efficiency improvements, and (2) for reduced refrigerant leakage--through better components and/or use of alternative refrigerants with lower global warming potential. Currently A/C systems use refrigerants containing hydrofluorocarbons (HFC) which are highly potent greenhouse gases, and EPA's A/C credits will give manufacturers an incentive to accelerate the use of refrigerants with much lower HFC emissions.

Off-Cycle Credits - Off-cycle technologies achieve CO₂ reductions that are not reflected in current test procedures. Such off-cycle technologies might include solar panels on hybrids, engine start-stop or active aerodynamics. EPA is expanding and streamlining the MYs 2012-2016 off-cycle credit provisions for demonstrating and obtaining these credits. For MYs 2014 and later, EPA is finalizing a pre-approved list of technologies and credit values. Further, manufacturers will be

able to apply for off-cycle technology credits beyond those listed (or for different credit values for the listed technologies) if they present sufficient data to EPA.

Incentives for Electric Vehicles, Plug-in Hybrid Electric Vehicles, Fuel Cell Vehicles, and Compressed Natural Gas Vehicles - To facilitate market penetration of the most advanced vehicle technologies as rapidly as possible, EPA is finalizing an incentive multiplier for compliance purposes for all electric vehicles (EVs), plug-in hybrid electric vehicles (PHEVs), fuel cell vehicles (FCV) and compressed natural gas (CNG) vehicles sold in MYs 2017 through 2021. This multiplier approach means that each EV/PHEV/FCV/CNGV would count as more than one vehicle in the manufacturer's compliance calculation. EVs and FCVs will start with a multiplier value of 2.0 in MY 2017, phasing down to a value of 1.5 in MY 2021. PHEVs and CNG vehicles will start at a multiplier value of 1.6 in MY 2017 and phase down to a value of 1.3 in MY 2021. There are no multipliers for MYs 2022-2025.

For EVs, PHEVs and FCVs, EPA is setting 0 g/mi as the tailpipe compliance value for EVs, PHEVs (electricity usage) and FCVs for MYs 2017-2021, with no limit on the quantity of vehicles eligible for 0 g/mi tailpipe emissions accounting. For MYs 2022-2025, 0 g/mi will only be allowed up to a per-company cumulative sales cap:

- 1) 600,000 vehicles for companies that sell 300,000 EV/PHEV/FCVs in MYs 2019-2021;
- 2) 200,000 vehicles for all other manufacturers.

For sales above these thresholds, manufacturers will be required to account for the net upstream GHG emissions for the electric portion of operation, using accounting methodologies set out in the rule.

Incentives for Advanced Technologies Including Hybridization for Full-Size Pickup Trucks - EPA is finalizing an additional CO₂ per vehicle credit, for mild and strong hybrid electric (HEV) full-size pickup trucks, if this advanced technology is utilized across a designated percentage of a manufacturers' full-size pickup trucks. This incentive further encourages manufacturers to begin to transform the most challenged category of vehicles in terms of the penetration of advanced technologies.

Eligibility for this credit is conditioned on a minimum penetration of the technology in a manufacturer's full size pickup truck fleet. Mild HEVs pickup trucks will be eligible for a per vehicle credit of 10 g/mi during MYs 2017-2015 if the technology is used with at least 20% of a company's MY 2017 full-size pickup production and ramping up to at least 80% in MY 2021. Strong HEV pickup trucks will be eligible for 20 g/mi per vehicle credit during MYs 2017-2025 if the technology is used on at least 10% of the company's full size pickups.

In addition to the specific hybridization credits, because there are other technologies besides mild and strong hybrids which can significantly reduce GHG emissions and fuel consumption in pickup trucks, EPA is also finalizing a performance-based incentive CO₂ emissions credit for full-size pickup trucks that achieve a significant CO₂ reduction below the applicable target. To avoid double-counting, the same vehicle will not receive credit under both the HEV and performance based approaches.

Treatment of Compressed Natural Gas (CNG), Plug-in Hybrid Electric Vehicles (PHEVs), and Flexible Fuel Vehicles (FFVs) - EPA is finalizing a methodology for determining CO₂ levels for plug-in hybrid electric vehicles (PHEVs) and dual fuel compressed natural gas (CNG) vehicles. This methodology assumes how much of the time these vehicles will operate using the alternative fuel, and how much on gasoline. This methodology (called a “utility factor”) assumes that owners of these vehicles will use the cheaper non-gasoline fuel most of the time, since that was a main reason for purchasing the vehicle.

As proposed, EPA is not establishing a utility factor for flexible fueled vehicles (FFVs) using E-85 and gasoline, since there is not a significant cost differential between an FFV and a conventional gasoline vehicle and historically consumers have only fueled these vehicles with E85 a very small percentage of the time. FFVs continue to be treated as they are treated in MY 2016 where emissions are weighted based on actual alternative fuel usage.

Provisions for Intermediate and Small Volume Manufacturers - In the MYs 2012-2016 rule, EPA provided less stringent CO₂ standards through MY 2016 to manufacturers with U.S. sales of less than 50,000 vehicles under the Temporary Lead time Allowance Alternative Standards (TLAAS) program. For MYs 2017-2025 standards, EPA is providing additional lead time flexibility to these intermediate volume manufacturers to help ease their transition to the primary program standards. The lead time flexibility is available through MY 2020 and intermediate volume manufacturers are required to meet the primary standards starting in MY 2021.

EPA is allowing small volume manufacturers (SVMs) with U.S. sales of less than 5,000 vehicles to petition EPA for alternative CO₂ standards, which will be established for eligible SVMs on a case-by-case basis. These SVMs are exempt under the MYs 2012-2016 CO₂ standards. EPA is also allowing manufacturers that are able to demonstrate that they are operationally independent from their parent company and have U.S. sales of less than 5,000 vehicles to be eligible for SVM GHG provisions.

In addition, EPA is continuing to exempt small businesses (companies with less than 1,000 employees, as defined by the Small Business Administration) from all GHG standards and program requirements.

Public Participation

EPA developed this final rule after consideration of extensive public input. EPA and NHTSA heard from nearly 400 testifiers at three public hearings held in Detroit, Philadelphia and San Francisco during January 2012. The agencies received written comments from nearly 300,000 individuals and more than 140 organizations, including auto manufacturers and suppliers, state and local governments and their associations, consumer groups, labor unions, fuels and energy providers, auto dealers, academics, national security experts and veterans, environmental and other non-governmental organizations.

Background on the MYs 2017-2025 National Program

Following the successful adoption of a National Program for GHG and fuel economy standards for MYs 2012-2016 vehicles, President Obama requested the agencies to continue their efforts to develop a second phase of the National Program, with standards for MYs 2017-2025 light-duty vehicles. In a May 21, 2010, Presidential Memorandum, the President requested that EPA and NHTSA work together to develop a national program that would "...produce a new generation of clean vehicles." The President specifically requested that the agencies develop "...a coordinated national program under the CAA [Clean Air Act] and the EISA [Energy Independence and Security Act of 2007] to improve fuel efficiency and to reduce greenhouse gas emissions of passenger cars and light-duty trucks of model years 2017-2025." The President recognized our country could take a leadership role in addressing the global challenges of improving energy security and reducing greenhouse gas pollution, stating that "America has the opportunity to lead the world in the development of a new generation of clean cars and trucks through innovative technologies and manufacturing that will spur economic growth and create high-quality domestic jobs, enhance our energy security, and improve our environment."

The agencies worked with the State of California to address all elements requested in the May 21, 2010 Presidential Memorandum and completed an initial assessment of the technologies, strategies and underlying analyses that would be considered in setting standards for MYs 2017-2025, in consultation with a wide range of stakeholders. EPA and NHTSA issued an Interim Joint Technical Assessment Report (TAR) and a Notice of Intent (NOI) to conduct a joint rulemaking on September 30, 2010.¹ Following an opportunity for public comment, the agencies published a Supplemental NOI (SNOI)² in December 2010 highlighting many of the key comments received in response to the September NOI and the TAR and outlining plans for key technical analyses that would be undertaken in developing the proposed rulemaking.

On July 29, 2011, President Obama announced plans for the MYs 2017-2025 national program and EPA and NHTSA issued another SNOI³, outlining plans for the MYs 2017-2025 proposed program. The State of California and thirteen auto manufacturers representing over 90 percent of U.S. vehicle sales provided letters of support for the program concurrent with the SNOI. The joint proposal to extend the National Program to MYs 2017-2025 light-duty vehicles was issued on November 16, 2011 and published in the Federal Register on December 1, 2011.⁴

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:

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

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

E-mail: OTAQPUBLICWEB@epa.gov

1 75 FR 62739, October 13, 2010.
2 75 FR 76337, December 8, 2010.
3 76 FR 48758, August 9, 2011
4 76 FR 74854, December 1, 2011.