

**IN THE UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

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CENTER FOR BIOLOGICAL DIVERSITY, et al.

Petitioners,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY,

Respondent.

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**APPENDIX TO RESPONSE TO MOTIONS TO DISMISS**

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I.

Revised Determination:

EPA, Revised Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles, 83 Fed. Reg. 16,077 (Apr. 13, 2018)

been submitted to EPA under all sections of the Toxic Substances Control Act (TSCA). Some of the information may be claimed or determined to be Confidential Business Information (CBI).

**DATES:** Access to the confidential data occurred on or about February 28, 2018.

**FOR FURTHER INFORMATION CONTACT:** For technical information contact: Scott Sherlock, Environmental Assistance Division (7408M), Office of Pollution Prevention and Toxics, Environmental Protection Agency, 1200 Pennsylvania Ave. NW, Washington, DC 20460-0001; telephone number: (202) 564-8257; email address: [Sherlock.scott@epa.gov](mailto:Sherlock.scott@epa.gov).

For general information contact: The TSCA-Hotline, ABVI-Goodwill, 422 South Clinton Ave., Rochester, NY 14620; telephone number: (202) 554-1404; email address: [TSCA-Hotline@epa.gov](mailto:TSCA-Hotline@epa.gov).

#### SUPPLEMENTARY INFORMATION:

##### I. General Information

###### A. Does this action apply to me?

This action is directed to the public in general. This action may, however, be of interest to all who manufacture, process, or distribute industrial chemicals. Since other entities may also be interested, the Agency has not attempted to describe all the specific entities that may be affected by this action.

###### B. How can I get copies of this document and other related information?

The docket for this action, identified by docket identification (ID) number EPA-HQ-OPPT-2003-0004, is available at <http://www.regulations.gov> or at the Office of Pollution Prevention and Toxics Docket (OPPT Docket), Environmental Protection Agency Docket Center (EPA/DC), West William Jefferson Clinton Bldg., Rm. 3334, 1301 Constitution Ave. NW, Washington, DC. The Public Reading Room is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the OPPT Docket is (202) 566-0280. Please review the visitor instructions and additional information about the docket available at <http://www.epa.gov/dockets>.

##### II. What action is the Agency taking?

Under GSA/FEDSIM solicitation number GSC-QFOB-18F-33169, task order number 47QFCA-18-F-0009, contractor CGI of 12601 Fair Lakes Circle, Fairfax, VA, is assisting the Office of Pollution Prevention and Toxics (OPPT) by providing technical support; development of operations and

maintenance of Central Data Exchange (CDX) chemical safety and pollution prevention (CSPP) applications; and Chemical Information Systems (CIS) OPPT Confidential Business Information Local Area Network (CBI LAN) applications.

In accordance with 40 CFR 2.306(j), EPA has determined that under GSA/FEDSIM solicitation number GSC-QFOB-18F-33169, task order number 47QFCA-18-F-0009, CGI required access to CBI submitted to EPA under all sections of TSCA to perform successfully the duties specified under the contract. CGI personnel were given access to information submitted to EPA under all sections of TSCA. Some of the information may be claimed or determined to be CBI.

EPA is issuing this notice to inform all submitters of information under all sections of TSCA that EPA has provided CGI access to these CBI materials on a need-to-know basis only. All access to TSCA CBI under this contract is taking place at EPA Headquarters in accordance with EPA's *TSCA CBI Protection Manual*.

Access to TSCA data, including CBI, will continue until February 25, 2023. If the contract is extended, this access will also continue for the duration of the extended contract without further notice.

CGI personnel have signed nondisclosure agreements and were briefed on appropriate security procedures before they were permitted access to TSCA CBI.

**Authority:** 15 U.S.C. 2601 *et seq.*

Dated: March 29, 2018.

**Pamela S. Myrick,**

*Director, Information Management Division,  
Office of Pollution Prevention and Toxics.*

[FR Doc. 2018-07644 Filed 4-12-18; 8:45 am]

**BILLING CODE 6560-50-P**

#### ENVIRONMENTAL PROTECTION AGENCY

[EPA-HQ-OAR-2015-0827; FRL-9976-61-OAR]

##### Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles

**AGENCY:** Environmental Protection Agency (EPA).

**ACTION:** Notice; withdrawal.

**SUMMARY:** In this notice, the Environmental Protection Agency (EPA) Administrator has reconsidered the previous Final Determination of the Mid-term Evaluation of greenhouse gas emission standards for model year

2022-2025 light-duty vehicles. The Administrator determines that the current standards are based on outdated information, and that more recent information suggests that the current standards may be too stringent. The Administrator thus concludes that the standards are not appropriate in light of the record before EPA and, therefore, should be revised as appropriate. EPA is also withdrawing the previous Final Determination issued by the agency on January 12, 2017, with this notice. EPA, in partnership with the National Highway Traffic Safety Administration, will initiate a notice and comment rulemaking in a forthcoming **Federal Register** notice to further consider appropriate standards for model year 2022-2025 light-duty vehicles, as appropriate. On March 22, 2017, EPA published a **Federal Register** notice providing its intention to reconsider the Final Determination of the Mid-term Evaluation of greenhouse gas emissions standards for model year 2022-2025 light-duty vehicles, this notice was published jointly with the Department of Transportation (DOT). On August 21, 2017, EPA and DOT jointly published a **Federal Register** notice providing a 45-day public comment period on the reconsideration and EPA held a public hearing on September 6, 2017.

**FOR FURTHER INFORMATION CONTACT:** Christopher Lieske, Office of Transportation and Air Quality (OTAQ), Assessment and Standards Division (ASD), Environmental Protection Agency, 2000 Traverwood Drive, Ann Arbor MI 48105; telephone number: (734) 214-4584; email address: [lieske.christopher@epa.gov](mailto:lieske.christopher@epa.gov) fax number: 734-214-4816.

#### SUPPLEMENTARY INFORMATION:

##### I. Introduction

In this notice, the Administrator of the Environmental Protection Agency (EPA) is making a new determination of the Mid-term Evaluation (MTE) of greenhouse gas (GHG) emission standards for model year (MY) 2022-2025 light-duty vehicles. The Administrator determines that the standards are not appropriate in light of the record before EPA, and therefore, should be revised as appropriate. EPA is also withdrawing the January 12, 2017 Final Determination (January 2017 Determination) with this notice. EPA, in partnership with the National Highway Traffic Safety Administration (NHTSA), will initiate a notice and comment rulemaking in a forthcoming **Federal Register** notice to further consider appropriate standards for MY 2022-2025 light-duty vehicles, as appropriate.

The Administrator makes this finding due to the significant record that has been developed since the January 2017 Determination. Many of the key assumptions EPA relied upon in its January 2017 Determination, including gas prices and the consumer acceptance of advanced technology vehicles, were optimistic or have significantly changed and thus no longer represent realistic assumptions. For example, fuel price estimates used by EPA in the original rulemaking are very different from recent EIA forecasts. EPA needs to update these estimates in the analysis and more accurately reflect changes in US oil production. Economic inputs such as the social cost of carbon, the rebound effect, and energy security valuation should also be updated to be consistent with the literature and empirical evidence.

EPA has also both developed and received additional data and assessments since the January 2017 Determination regarding technology effectiveness and technology costs which warrant additional consideration.

In making this finding, the Administrator has also considered that the reach and success of the program established in the 2012 rulemaking is significantly limited when consumers cannot afford new cars. New information and data provided show the potential significant negative effects of higher vehicle costs.

Based on our review and analysis of the comments and information submitted, and EPA's own analysis, the Administrator believes that the current GHG emission standards for MY 2022–2025 light-duty vehicles presents challenges for auto manufacturers due to feasibility and practicability, raises potential concerns related to automobile safety, and results in significant additional costs on consumers, especially low-income consumers. On the whole, the Administrator believes the MY 2022–2025 GHG emission standards are not appropriate and, therefore, should be revised as appropriate. EPA, in partnership with NHTSA, will further explore the appropriate degree and form of changes to the program through a notice and comment rulemaking process. This Determination is not a final agency action. As EPA explained in the 2012 final rule establishing the MTE process, a determination to maintain the current standards would be a final agency action, but a determination that the standards are not appropriate would lead to the initiation of a rulemaking to adopt new standards, and it is the conclusion of that rulemaking that

would constitute a final agency action and be judicially reviewable as such.<sup>1</sup>

## II. Background

The 2012 rulemaking establishing the National Program for federal GHG emissions and corporate average fuel economy (CAFE) standards for MY 2017–2025 light-duty vehicles included a regulatory requirement for the EPA to conduct a Mid-term Evaluation (MTE) of the GHG standards established for MY 2022–2025.<sup>2</sup> EPA included this self-required reevaluation due to the long time frame at issue in setting standards for MYs 2022–2025, and given NHTSA's obligation to conduct a de novo rulemaking in order to establish final standards for vehicles for those model years.<sup>3</sup> EPA's regulations at 40 CFR 86.1818–12(h) state that “in making the determination as to whether the existing standards are appropriate, the Administrator shall consider the information available on the factors relevant to setting greenhouse gas emission standards under section 202(a) of the Clean Air Act for model years 2022–2025, including but not limited to:

1. The availability and effectiveness of technology, and the appropriate lead time for introduction of technology;
2. The cost on the producers or purchasers of new motor vehicles or new motor vehicle engines;
3. The feasibility and practicability of the standards;
4. The impact of the standards on reduction of emissions, oil conservation, energy security, and fuel savings by consumers;
5. The impact of the standards on the automobile industry;
6. The impacts of the standards on automobile safety;
7. The impact of the greenhouse gas emission standards on the Corporate Average Fuel Economy standards and a national harmonized program; and
8. The impact of standards on other relevant factors.”<sup>4</sup>

EPA regulations on the MTE process required EPA to issue a Final Determination no later than April 1, 2018 on whether the GHG standards for MY 2022–2025 light-duty vehicles remain appropriate under section 202(a) of the Clean Air Act.<sup>5</sup> The regulations also required the issuance of a draft Technical Assessment Report (TAR) by November 15, 2017, an opportunity for public comment on the draft TAR, and,

<sup>1</sup> 77 FR 62784, (**Federal Register**, Vol 77, No 199, pp 62784–62785).

<sup>2</sup> 40 CFR 86.1818–12(h).

<sup>3</sup> 77 FR 62784.

<sup>4</sup> 40 CFR 86.1818–12(h)(1).

<sup>5</sup> *Id.*; see also 77 FR 62624 (October 15, 2012).

before making a Final Determination, an opportunity for public comment on whether the GHG standards for MY 2022–2025 remain appropriate. In July 2016, the draft TAR was issued for public comment jointly by the EPA, NHTSA, and the California Air Resources Board (CARB).<sup>6</sup> Following the draft TAR, EPA published a Proposed Determination for public comment on December 6, 2016 and provided less than 30 days for public comments over major holidays.<sup>7</sup> EPA published the January 2017 Determination on EPA's website and *regulations.gov* finding that the MY 2022–2025 standards remained appropriate.<sup>8</sup>

On March 15, 2017, President Trump announced a restoration of the original mid-term review timeline. The President made clear in his remarks, “[i]f the standards threatened auto jobs, then commonsense changes” would be made in order to protect the economic viability of the U.S. automotive industry.”<sup>9</sup> In response to the President's direction, EPA announced in a March 22, 2017,<sup>10</sup> **Federal Register** notice, its intention to reconsider the Final Determination of the MTE of GHGs emissions standards for MY 2022–2025 light-duty vehicles. The Administrator stated that EPA would coordinate its reconsideration with the rulemaking process to be undertaken by NHTSA regarding CAFE standards for cars and light trucks for the same model years.

On August 21, 2017,<sup>11</sup> EPA published a notice in the **Federal Register** announcing the opening of a 45-day public comment period and inviting stakeholders to submit any additional comments, data, and information they believed were relevant to the Administrator's reconsideration of the January 2017 Determination. EPA held a public hearing in Washington, DC on September 6, 2017.<sup>12</sup> EPA received more than 290,000 comments in response to the August 21, 2017 notice.<sup>13</sup>

<sup>6</sup> 81 FR 49217 (July 27, 2016).

<sup>7</sup> 81 FR 87927 (December 6, 2016).

<sup>8</sup> Docket item EPA–HQ–OAR–2015–0827–6270 (EPA–420–R–17–001).

<sup>9</sup> See <https://www.whitehouse.gov/briefings-statements/remarks-president-trump-american-center-mobility-detroit-mi/>.

<sup>10</sup> 82 FR 14671 (March 22, 2017).

<sup>11</sup> 82 FR 39551 (August 21, 2017).

<sup>12</sup> 82 FR 39976 (August 23, 2017).

<sup>13</sup> The public comments, public hearing transcript, and other information relevant to the Mid-term Evaluation are available in docket EPA–HQ–OAR–2015–0827.

### III. The Administrator's Assessment of Factors Relevant to the Appropriateness of the MY 2022–2025 GHG Emission Standards

In the following sections, the Administrator provides his assessment on why the current standards for MY 2022–2025 are not appropriate based on the regulatory provisions found in 40 CFR 86.1818–12(h). The Administrator considered the complete record, including all comments provided on the reconsideration, in his determination.

*Factor 1: The Availability and Effectiveness of Technology, and the Appropriate Lead Time for Introduction of Technology; and Factor 3: The Feasibility and Practicability of the Standards*

The Administrator finds, based on the record, including new data and information provided since January 2017, that the January 2017 Determination was optimistic in its assumptions and projections with respect to the availability and effectiveness of technology and the feasibility and practicability of the standards. Accordingly, the Administrator now determines that the MY 2022–2025 GHG emissions standards may not be feasible or practicable and there is greater uncertainty as to whether technology will be available to meet the standards on the timetable established in the regulations. This is a result of: (1) The changes in trends of electrification since the January 2017 Determination; (2) reliance on future technology advances; and (3) the acceptance rate of the necessary technology by consumers.

a. The Changes in Trends of Electrification Since the January 2017 Determination

The agency's January 2017 Determination was completed at a time when the trends and data associated with MY 2012–2015 showed that the majority of the major car-manufacturing companies were "over-complying" with their relative GHG compliance requirements and building up credits. EPA's latest data<sup>14</sup> alongside new reports and data submitted by stakeholders<sup>15</sup> show that starting in MY 2016 many companies, for the first time, had to rely on credits in order to comply with the program, and predicts this will occur again for Model Year 2017. While these companies did remain in compliance, they are relying on banked credits which suggests that it may be increasingly difficult for them to comply going forward as they use up their supply of credits. Additionally, the stringency curve dramatically increases

<sup>14</sup> EPA, Greenhouse Gas Emission Standards for Light-Duty Vehicles—Manufacturer Performance Report for the 2016 Model Year, Office of Transportation and Air Quality, EPA-420-R-18-002, January 2018, <https://www.epa.gov/regulations-emissions-vehicles-and-engines/greenhouse-gas-ghg-emission-standards-light-duty-vehicles>.

<sup>15</sup> See e.g., Analysis of EPA Vehicle Technology Walks in Prior Final Determination Response to Comments (Alliance Attachment 2); Evaluation of the Environmental Protection Agency's Lumped Parameter Model Informed Projections from the Proposed Determination (Novation Analytics, September 2017) (Alliance Attachment 3); and Critical Assessment of Certain Technical and Economic Assumptions Made in EPA's Final Determination on the Appropriateness of the Model Year 2022–2025 Light-Duty Vehicle Greenhouse Gas Emission Standards under the Midterm Evaluation (Trinity Consultants, NERA Economic Consulting, October 2017) (Alliance Attachment 6).

at around the same time these credits could run out, further complicating the feasibility of compliance for MY 2022–2025.

The figure below shows that since a peak in 2013, electrified light-vehicle (LV) sales have decreased both as a total and as a percentage of all light-vehicle sales. This calls into question EPA assumptions for the 2012 rulemaking and the January 2017 Determination that sales of electrified LVs will be sufficient to support compliance with the MY 2022–2025 standards.

Multiple commenters also questioned the feasibility of the standards due to flagging consumer demand for fuel-efficient vehicles including electric vehicles. The Alliance of Automobile Manufacturers (Alliance) stated that the level of technology modeled by EPA is insufficient to meet the standards and that the actual level of technology needed is misaligned with market realities. Global Automakers similarly charged that "decline in vehicle sales, lower gas prices, an increased preference for light trucks over cars, and sluggish demand for high fuel economy vehicles—are taking place as the stringency of the standards increase at an unprecedented rate. There is, simply put, a misalignment between the increasing stringency of the standards and the decreasing consumer demand for fuel efficiency" and that "revised findings would support the conclusion that adjustments to the regulations are needed." Global Automakers submitted the figure below to show the sluggish demand for electrification in the U.S. market from 1999 through early 2016.



provided that presently only electric vehicles (e.g., strong hybrid, plug-in hybrid (PHEV), or electric vehicle (EV)) meet MY 2025 standards, even with credit assumptions, and that those vehicles make up a minimal amount of the market share indicating a less than adequate acceptance by consumers. Despite automakers continuing to offer an increasing amount of advanced technology vehicles for sale, consumer adoption remains very low. These comments provide data that raises concerns about EPA's 2017 Determination.

Toyota provided comment that "compliance with the current requirements through the 2025 MY require gasoline hybrid electric vehicles or more sophisticated forms of vehicle electrification at sales volumes significantly higher than the agencies' estimates and at levels the market is unable or unwilling to support absent significant changes in market signals." Toyota further provided that they continue to disagree with EPA's past assessment that lighter, more aerodynamic vehicles powered by less expensive conventional gasoline powertrains will be sufficient to comply with the standards. Fiat Chrysler Automobiles (FCA) similarly indicated, "FCA continues to provide data that shows more technology is necessary than the agencies have assumed for 2022–2025MY compliance. The advanced technologies needed, including higher levels of electrification will negatively affect affordability, lowering sales, and ultimately impacting jobs." Mercedes Benz estimated that it will need more than 25 percent battery electric vehicles (BEVs) and around 5 percent PHEVs in its fleet to meet the standards in MY 2025, noting that these estimates are significantly higher than the 7 percent BEV and 3 percent PHEV shares projected by EPA for the overall fleet. One commenter stated that they believe standards can be met with only small increases in the efficiency of fossil fuel engines.

EPA also received comments from several non-governmental organizations stating that the existing record supports the previous determination. Several commenters also provided technical information and/or analysis. The Union of Concerned Scientists (UCS) provided that they do not believe the auto manufacturers are correct about the degree of electrification that they claim will be necessary to meet the standards.

Several commenters supported extending incentives for advanced technologies. The Alliance recommended that EPA extend the

advanced technology multiplier incentives beyond MY 2021 and that manufacturers should not be held responsible for upstream power plant emissions (i.e., manufacturers should be allowed to use the 0 g/mile emissions factor for electric powered vehicles rather than having to account for upstream electricity generation emissions). Toyota similarly commented that EPA should extend the current advanced technology sales multiplier and 0 g/mi allowance through MY 2025. Mercedes Benz requested that EPA extend the multipliers through at least MY 2025 to support further commercialization of electric and hybrid vehicles. Jaguar Land Rover supported the reconsideration of the final determination as a way "to enable a future final determination that provides incentives for very clean technologies."

NGV America urged the agency provide a level playing field for natural gas vehicles. As stated in their comments, "Regulatory incentives currently in place for vehicle manufacturers provide no benefit for renewable natural gas and include requirements that prevent automakers from realizing benefit from selling natural gas vehicles," including the driving range requirement on alternative fuel that is required for natural gas vehicles but not for electric vehicles.

Several commenters also supported flexibilities for advanced technology vehicles. CALSTART stated that to spur the EV market, the agencies could consider maintaining the current credits for full zero emission vehicles, and delay the upstream emissions factors for such vehicles. Securing America's Future Energy (SAFE) commented in support of extending the advanced technology credits out to MY 2025 to help facilitate and accelerate the transition to energy sources other than oil. Edison Electric Institute and California Electric Transportation Coalition also commented in support of extending the advanced technology credits. The National Coalition for Advanced Transportation (NCAT) commented that to the extent that EPA seeks to make adjustments to increase flexibility, it urges the agency to recognize and support the role of EVs and other advanced technology vehicles.

The Alliance and Toyota commented that the current full size pick-up truck incentives should be available to all light-duty trucks. They further commented that the program's sales volume thresholds should be removed because they discourage the application of technology, since manufacturers

cannot be confident of achieving the sales thresholds.

Based on consideration of the information provided, the Administrator believes that it would not be practicable to meet the MY 2022–2025 emission standards without significant electrification and other advanced vehicle technologies that lack a requisite level of consumer acceptance.

#### b. Reliance on Future Technology

EPA received comments from the auto manufacturers that EPA should exclude technologies that are protected by intellectual property rights and have not been introduced and certified to Tier 3 emissions requirements. Specifically, the Alliance stated that EPA should exclude from its technology assessments dynamic skip fire, variable compression ratio engines, Mazda's SkyActiv X, and other technologies that are protected by intellectual property rights and have not been introduced and certified to Tier 3 emissions requirements. Toyota's information stated that "[n]ot yet implemented technologies, such as advanced cylinder deactivation and 48V mild hybrid systems, can play a role in improving efficiency and reducing CO<sub>2</sub> emissions moving forward; however, we do not project these technologies as sufficient to meet the 2025 MY requirements."

Regarding the use of Atkinson cycle engines, the Alliance commented that the EPA analysis oversimplified and did not consider the financial consequence of aggressive penetration. New information from Global Automakers provided that "it is difficult to maintain confidence in the agency's optimism about the wide consumer acceptance, supply availability, safety and learning for new, unproven technologies such as the broad application of naturally aspirated Atkinson cycle engines."

In general, the Alliance, Global Automakers and others found that EPA's modeling overestimates the role conventional technologies can play in meeting future standards and that industry believes more strong hybrids and plug-in electric vehicles will be needed to meet current standards, raising concerns about cost and affordability. Both the Alliance and Global Automakers submitted detailed information regarding various aspects of EPA modeling, raising several technical issues, and submitted several new studies in support of their comments.<sup>17</sup>

<sup>17</sup> See "Analysis of EPA Vehicle Technology Walks in Prior Final Determination Response to Comments" (Alliance Attachment 2), "Evaluation of the Environmental Protection Agency's Lumped Parameter Model Informed Projections from the

Other commenters were more optimistic about the availability of advanced technologies. Suppliers provided comments about specific technologies available to meet the standards. The Motor and Equipment Manufacturers Association (MEMA) commented that suppliers continue to improve a myriad of technologies as industry pushes innovation—specifically, more capable 48-volt systems, higher efficiency turbo engines, various advances in thermal management and control technologies, and new composites and materials for improved light-weighting. Manufacturers of Emission Controls Association (MECA) noted that automakers have announced plans to adopt 48-volt mild hybrids at a faster rate than originally planned and commented on new technologies that will be in production prior to 2021 but were not considered in the draft TAR, including dynamic cylinder deactivation, variable compression ratio and electric boost. MECA gave an example that dynamic cylinder deactivation combined with 48-volt systems which they stated has the potential to improve fuel economy by up to 20 percent. One commenter stated that they believe existing standards are achievable now without expensive or “boutique” technologies and are becoming even more cost-effective as time passes.<sup>18</sup> Other commenters performed analyses of the technical feasibility of meeting the MY2025 standards,<sup>19</sup> including analyses of a number of engine and other technologies that they believe EPA did not fully consider.

Based on EPA’s review of the comments and information received since the January 2017 Determination, technologies continue to develop. Some technologies, such as continuously variable transmissions, have been adopted in many more vehicle applications than originally anticipated by EPA in the 2012 rulemaking and

Proposed Determination” (Novation Analytics, September 2017) (Alliance Attachment 3), and “Critical Assessment of Certain Technical and Economic Assumptions Made in EPA’s Final Determination on the Appropriateness of the Model Year 2022–2025 Light-Duty Vehicle Greenhouse Gas Emission Standards under the Midterm Evaluation” (Trinity Consultants, NERA Economic Consulting, October 2017) (Alliance Attachment 6).

<sup>18</sup> See comments in the docket from the Advanced Engine Systems Institute.

<sup>19</sup> See “Efficiency Technology and Cost Assessment for the U.S. 2025–2030 Light-Duty Vehicles” (International Council on Clean Transportation, March 2017, Attachment 5 to ICCT comments), “Technical Assessment of CO<sub>2</sub> Emission Reductions for Passenger Vehicles in the Post-2025 Timeframe” (Environmental Defense Fund).

have continued to demonstrate potential further improvements in efficiency. Other technologies such as the dual clutch transmissions EPA projected in the 2012 rulemaking have not gained significant customer acceptance and as such, have proven difficult for manufacturers to deploy. A third category, of recently adopted technologies such as dynamic skip fire (2019 Chevrolet Silverado) and variable compression ratio engines (2019 Infiniti QX50), may have the potential to offer additional technology pathways to aid future compliance. As such, it is appropriate that the EPA continue to evaluate these and other technology developments in the forthcoming rulemaking.

Some commenters supported strengthening the standards in any future reconsideration and at a minimum retaining the standards due to certain new information and analysis available since the rule was adopted in 2012. For example, one commenter stated that they believe the costs of compliance are declining and believes that final compliance costs will be less than initially estimated.

To note, ethanol producers and agricultural organizations commented in support of high octane blends from clean sources as a way to enable GHG reducing technologies such as higher compression ratio engines. They provided information suggesting that mid-level (e.g., E30) high octane ethanol blends should be considered as part of the Mid-term Evaluation and that EPA should consider requiring that mid-level blends be made available at service stations. The petroleum industry noted that high octane fuel is available today for vehicles that require it and commented that EPA has no basis for including octane number as a factor in the Mid-term Evaluation because it was not considered in the prior rulemakings or the draft TAR. The Alliance and Global Automakers commented that higher octane gasoline enables opportunities for use of more energy-efficient technologies (e.g., higher compression ratio engines, improved turbocharging, optimized engine combustion) and that manufacturers would support a transition to higher octane gasoline, but do not advocate any sole pathway for producing increased octane.

Several state and local governments commented on the appropriateness of the MY 2022–2025 standards. CARB referenced its independent midterm review completed in March 2017 where it found the MY 2022–2025 GHG emission standards to be appropriate and that the latest information

continues to support maintain or strengthening the current standards.<sup>20</sup>

Other state government agencies stated that the standards are appropriate, continue to apply, and that they believe compliance will be even easier than expected with newer conventional technologies.

The Aluminum Association provided new studies regarding the use of aluminum in light-weighting and noted additional forthcoming studies which could inform EPA’s reconsideration, commenting that the aluminum industry continues to provide and improve light-weighting solutions to help meet rigorous GHG and fuel efficiency regulations without sacrificing safety.

EPA has given careful consideration to these comments and agrees that these commenters have identified both current and promising technologies that may be able to deliver significant improvements in reducing GHG emissions once fully deployed. However, EPA also recognizes that there is significant uncertainty both in the pace of development of these technologies and in the degree of efficiency improvements they will ultimately be able to deliver. EPA believes that this uncertainty further supports its determination to reconsider the current standards through a subsequent rulemaking.

#### c. The Acceptance of the Necessary Technologies by Consumers

In addition to the issues related to new technologies needing to be developed to meet the MY 2022–2025 emission standards, consumers’ preferences must change to ensure that the current standards can be met—that is, consumers will need to be willing to purchase vehicles with new technologies. However, as shown below, consumers’ preferences are not necessarily aligned to meet emission standards and there is uncertainty on this issue that merits further consideration. Consumers’ preferences are driven by many factors and fuel economy is merely one factor that increases and decreases based on the price of gasoline.

The Alliance and Global Automakers state that the standards will be effective only if people buy a mix of vehicles that

<sup>20</sup> CARB, Advanced Clean Cars Midterm Review, Resolution 17–3 (March 24, 2017), available at: <https://www.arb.ca.gov/msprog/acc/mtr/res17-3.pdf>; CARB, California’s Advanced Clean Cars Midterm Review, *Summary Report for the Technical Analysis of the Light Duty Vehicle Standards* (January 18, 2017) (p. ES–3), available at: [https://www.arb.ca.gov/msprog/acc/mtr/acc\\_mtr\\_finalreport\\_full.pdf](https://www.arb.ca.gov/msprog/acc/mtr/acc_mtr_finalreport_full.pdf). See CARB comments at docket item EPA–HQ–OAR–2015–0827–9197.

is sufficiently fuel-efficient on average to meet the standards, but that current trends do not indicate an acceptance by consumers of the increased costs and tradeoffs in other desirable vehicle attributes that are needed to comply with more stringent GHG standards going forward. The only MY 2017 vehicles that could comply with the MY 2025 standard have a very low consumer acceptance rate today and make up less than 5 percent of the total market share (see Figure 2 above). Despite the auto industry providing an increasing number of battery-electric vehicle models and plug-in hybrid electric vehicle models, combined national sales of these vehicles still account for just over one percent of the market. According to data submitted by the Global Automakers, sales of hybrids peaked in 2013 at 3.1 percent, but only accounted for 2 percent of the market in 2016.

The Alliance, Global Automakers, Mercedes-Benz, and National Corn Growers Association expressed concerns about low adoption rates of electrified vehicles (strong hybrids, PHEVs, and EVs). Global Automakers stated that customers are not buying electrified vehicles at a rate sufficient for compliance. Mitsubishi and Mercedes-Benz pointed to low gasoline prices and limited infrastructure for electric vehicle charging as an additional obstacle for electric vehicle adoption. Mitsubishi considered the standards unachievable if consumers are not willing to buy more electrification in their vehicles.

Some commenters countered that consumers do prioritize fuel economy that sales numbers decreased because of the cyclical nature of the industry, and that there is enough flexibility in the market to meet consumer needs. Also, a number of commenters asserted that there is a growing understanding and acceptance of electrification in vehicles, pointing to an increased percentage of EV sales and automakers announcing plans for electrification. Contrary to these comments, as shown in Figure 1, EV sales have decreased and when looking at very small numbers, percentage growth may be misleading.

A further issue is the growing preference for light duty trucks over cars. In 2012, the car and light truck shares were projected to be 67 percent to 33 percent respectively for MY 2025. According to EPA's 2017 Fuel Economy Trends Report, the split in MY 2016 was 55 percent cars and 45 percent trucks. With regard to MY 2016 compliance, the Alliance commented that the large shift in consumer buying patterns toward the light-truck fleet has negatively impacted

industry compliance because the light-truck standards were relatively more demanding during this period of time.

Several commenters expressed concern over potential adverse effects on other vehicle attributes due to the standards. The Alliance, Global Automakers, and other stakeholders noted that consumers consider a wide range of features in their purchase decisions. Mercedes-Benz cited low sales of its S550E PHEV which, though more efficient than its internal combustion engine counterpart, had slower acceleration and reduced trunk space. The National Automobile Dealers Association (NADA) and International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW) noted that consumers' preferences vary with time and market conditions, such as fuel prices. The Alliance, Global Automakers, and Mitsubishi stated that current low gas prices make the standards more difficult to achieve. The Alliance and NADA pointed to a recent study from Resources for the Future that found greater willingness to pay for performance than for fuel economy, and the potential for misestimating willingness to pay if not taking into account other vehicle attributes.<sup>21</sup> Global Automakers expressed concern that, if EPA cannot calculate consumers' willingness to pay for attributes, it may overestimate the probability of success for the standards. One commenter stated that consumers slightly undervalue or fully value future fuel savings while other commenters cited a poll in Ohio supporting achieving an average of 40 mpg in 2025. Consumers Union cited research that found that fuel economy is the top factor that consumers want to be improved in their next vehicle.

Commenters shared perspectives on the current and projected state of the vehicle market and demand. Global Automakers commented that overall vehicle sales have leveled off, and it believes that sales may decline in coming years. CFA noted that vehicle models with larger fuel economy improvements had larger sales increases while sales for those with lower improvements had lower increases. EPA intends to continue to consider vehicle sales and the potential impact of the EPA standards on vehicle sales as a relevant factor in the forthcoming rulemaking.

Various comments raised questions about how to predict the impacts of the

<sup>21</sup> To note, there are numerous peer-reviewed studies related to this subject and many of them are available in the docket associated with this action. EPA intends to summarize and assess the studies on this topic as part of the forthcoming rulemaking.

standards on vehicle sales. The Alliance and NADA argued that EPA has not yet conducted an "appropriate analysis" of the sales impacts of the standards, and NADA asks the agencies to "fully understand" consumer vehicle purchase decisions. The Alliance referenced work by Ford suggesting that the standards would reduce sales volumes by four percent using cost estimates from the draft TAR. Other commenters provided that neither EPA nor NHTSA has found vehicle demand modeling methods robust enough to predict sales impacts; and EDF stated EPA and NHTSA could consider using a static forecast (that is, assuming market shares to be unaffected by the standards).

Auto industry and dealer comments discussed implications for vehicle fleet turnover. The Alliance noted that low fleet turnover would reduce the effectiveness of the GHG program. NADA suggested that the GHG program should seek to maximize fleet turnover.

Several commenters discussed a study by researchers at Indiana University. The Indiana University's 'Total Cost of Ownership' analysis found that the MY2017–2025 standards would decrease sales using a "2016 perspective" but that it would increase sales when using inputs from the 2012 final rulemaking. Some commenters raised concerns related to the study related to future benefits of improved fuel economy and different assumptions in consumer willingness to pay. Graham, a coauthor of the IU study, supported the assumptions of the report in a response to those comments.

EPA agrees that impacts on new vehicle sales and fleet turnover are important factors that were not adequately considered in the January 2017 Determination. As noted above, if new vehicle sales are lower than expected because of higher prices, or lack of consumer acceptance of advanced technologies, significant share of projected GHG reductions and fuel saving gains on a fleet-wide basis may not be realized. EPA intends to more fully consider these potential actions in the forthcoming rulemaking. EPA intends to explore new analytical tools to look at new vehicle sales and fleet turnover as part of its decision-making record for the new rule.

#### *Factor 2: The Cost on the Producers or Purchasers of New Motor Vehicles or New Motor Vehicle Engines*

The cost on the producers (e.g., suppliers, auto manufacturers), intermediaries (e.g., auto dealers), and purchasers (e.g., consumers, car drivers) can be rather significant based on the standards set. For consumers, especially

low-income consumers, moderate increases to the cost of cars can result in significant impacts to disposable income.

Both the Alliance and Global Automakers identified areas where EPA underestimated costs. The Alliance identified three areas related to technology cost that it believes need further assessment: Direct technology costs, indirect cost multipliers, and cost learning curves.<sup>22</sup> Global Automakers asserted that EPA's modeling has consistently underestimated the costs associated with technologies and the amount of technology needed, commenting that a quality check at every step of the process needs to be done with real-world data that has been supplied by manufacturers.

The January 2017 Determination did not give appropriate consideration to the effect on low-income consumers. The Administrator believes that affordability of new cars across the income spectrum, and especially among low-income consumers, is an important factor, both because of its equity impacts and because of its potential impacts on the total energy savings delivered by the standards. In its new rulemaking, EPA plans to thoroughly assess the impacts of the standards on affordability and reconsider the importance of this factor in selecting an appropriate level of the standard.

The Alliance, Mitsubishi, and Vermont Energy Investment Corporation (VEIC) recommended that EPA revisit affordability concerns. The Alliance and Global noted that average vehicle transactions prices have increased. The Alliance stated that consumers do not change the fraction of their budgets for transportation; if vehicles become more expensive, they will have to buy less expensive vehicles with fewer features. Global Automakers expected price increases to lead some low-income households to switch from buying new to used vehicles, and some to be forced out of the market entirely. The Alliance reiterated that the standards have a disproportionate negative impact on low-income households. Mitsubishi

<sup>22</sup> See "Critical Assessment of Certain Technical and Economic Assumptions Made in EPA's Final Determination on the Appropriateness of the Model Year 2022–2025 Light-Duty Vehicle Greenhouse Gas Emission Standards under the Midterm Evaluation" (Trinity Consultants, NERA Economic Consulting, October 2017) (Alliance Attachment 6).

expressed concern that it would have to add electrification to already efficient low-priced vehicles and the increased price could drive buyers to less efficient used vehicles. NADA and Graham expressed concerns that potential buyers will not be able to get loans large enough to cover the increased vehicle prices. Mercedes-Benz pointed out that up to half its sales in some markets are leased; the payback period for technologies to meet the standards may exceed the typical three-year leasing period, and low residual values for advanced technologies could further increase lease payments.

The Alliance stated that the standards have a disproportionate negative impact on low-income households. Other commenters stated that the standards will have a larger proportionate benefit for low-income households and referenced a Greene and Welch study.<sup>23</sup> VEIC requested that the agencies consider that relaxing the standards will increase ownership costs on lower-income drivers. EDF did not find adverse effects on affordability and note that the standards will lead to used vehicle purchasers having more fuel efficient choices.

On the issue of consumer affordability, some stakeholders commented that EPA standards are not making new vehicles less affordable, citing a Synapse Energy Economics report prepared for Consumers Union. The report noted a wider range for vehicle prices at the upper end, due to higher-end vehicles receiving more features, at the same time that the prices of entry-level vehicles have stayed roughly the same for the past 10 years.

EPA concludes that affordability concerns and their impact on new vehicle sales should be more thoroughly assessed, further supporting its determination to initiate a new rulemaking for the 2022–2025 standards.

#### *Factor 4: The Impact of the Standards on Reduction of Emissions, Oil Conservation, Energy Security, and Fuel Savings by Consumers*

The impact of the standards on emissions, oil conservation, energy

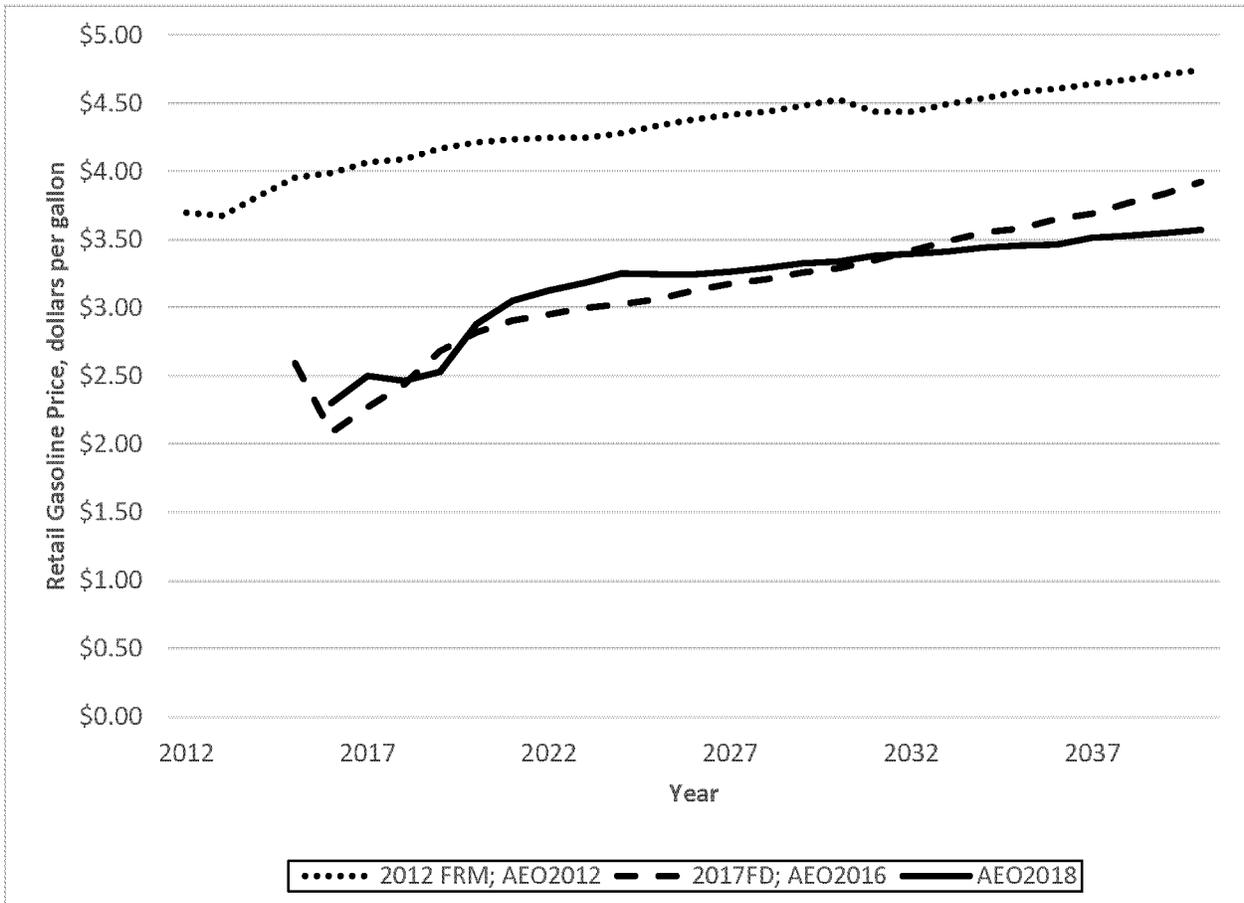
<sup>23</sup> D.L. Greene and J.G. Welch (2017), "The impact of increased fuel economy for light-duty vehicles on the distribution of income in the United States: A Retrospective and Prospective Analysis." March 2017. University of Tennessee, Knoxville.

security, and fuel savings to consumers are significantly affected by many assumptions including but not limited to: (1) The consumer adoption of new lower emitting cars; (2) cost of fuel; and (3) the rebound effects.

Slower or decreased consumer adoption of new lower emitting cars, as mentioned above, would result in decreased effectiveness of the program. As consumer preference changes and/or the cost of new cars increases, consumers may be less willing to purchase new vehicles and thus phase out the higher-emitting older cars. Because of the potential decrease in adoption of newer cars the reduction of emissions from the standards may be less than originally thought. The same logic can be applied to oil conservation. EPA believes that this issue raises enough concern to warrant consideration in the future rulemaking.

With respect to cost of fuel, for example, the lifetime fuel savings to consumers can change by almost 200 percent per vehicle based on the assumption on gas prices according to the 2016 Proposed Determination (Table IV.12). This significant effect on consumer savings due to fuel prices can in turn affect both consumer demand for fuel-efficient vehicles and their driving behavior generally, both of which significantly affect impacts on emissions, oil conservation and energy security. Figure 3 below shows the fuel price projections EPA used in the 2012 final rule, the January 2017 Determination, and the current projections from the Energy Information Administration's Annual Energy Outlook (AEO). As can be seen from the figure, the 2012 rule projected significantly higher fuel prices than current EIA projections, while the 2017 Final Determination used similar projections to EIA. Lower fuel prices mean lower incentives for consumers to purchase fuel efficient vehicles, because the fuel cost savings they get from doing so are also lower. Thus, the projections for fuel cost savings in the 2012 rule may have been optimistic, which increases the challenge manufacturers face in making fuel-efficient vehicles attractive to consumers. This consideration supports EPA's determination that the current standards are inappropriate and should be reconsidered in a new rulemaking.

Figure 3: EIA Annual Energy Outlook Retail Gasoline Price Projections, \$/gallon (all values adjusted to 2017\$)



With respect to the rebound effect (the increase in driving resulting from a lower marginal cost of driving due to greater fuel efficiency), EPA received a range of views and assessments in the recent public comments. Higher rebound values mean that consumers are inherently driving more due to the increase in fuel efficiency of the vehicle and this impact will offset the reduction of emissions, oil conservation, energy security, and fuel savings by customers. EPA believes it is important to fully consider the effects of a rebound effect to project an accurate assessment of the projected fuel savings, and EPA intends to do so in its new rulemaking.

With respect to energy security, the situation of the United States is dramatically different than it was at the time the 2012 standards were promulgated, and even significantly different from its situation in 2016 when the draft TAR was developed.

Regarding emissions, some state and local government commenters pointed to the co-benefits of GHG standards as important criteria pollutant control measures. For example, NACAA commented that the standards would

lead to oxides of nitrogen (NOx) reduction that contribute to attainment and maintenance of the 2008 and 2015 ozone and 2012 fine particulate matter National Ambient Air Quality Standards (NAAQS) and other air benefits. While EPA agrees that there are co-benefits from these standards, EPA notes that the standards are supposed to be based on GHG emissions and that while co-benefits exist with respect to emissions such as criteria pollutants, using GHG emission standards as criteria pollutant control measures is likely a less efficient mechanism to decrease criteria pollutants and those issues are already handled through the NAAQS implementation processes.

Based on the information provided above, the Administrator believes that there is strong basis for concern that the current emission standards from MY 2022–2025 may not produce the same level of benefits that was projected in the January 2017 Determination. This further supports the Administrator’s determination to withdraw the prior Determination and initiate a rulemaking to reconsider the current standards.

*Factor 5: The Impact of the Standards on the Automobile Industry*

The Administrator finds, based on the current record, that the standards potentially impose unreasonable per vehicle costs resulting in decreased sales and potentially significant impact to both automakers and auto dealers. Trinity Consulting & NERA Economic Consulting (TC/NERA)<sup>24</sup> found that the MY 2022–2025 standards would reduce vehicle sales over those four model years from 65 million to 63.7 million, a reduction of 1.3 million vehicles, due to higher vehicle prices.

EPA also recognizes significant unresolved concerns regarding the impact of the current standards on United States auto industry employment. The Center for Automotive Research (CAR),<sup>25</sup> a nonprofit

<sup>24</sup> Trinity Consultants & NERA Economic Consulting, Critical Assessment of Certain Technical And Economic Assumptions Made in EPA’S Final Determination On the Appropriateness of the Model Year 2022–2025 Light-duty Vehicle Greenhouse Gas Emission Standards Under the Midterm Evaluation 2 (Oct. 2017).

<sup>25</sup> McAlinden et al., Center for Automotive Research (2016). The Potential Effects of the 2017–  
Continued

automotive research center, developed a cost-benefit study referenced by multiple commenters that estimated employment losses up to 1.13 million due to the standards if the standards increased prices by \$6,000 per vehicle. Other stakeholders submitted comments critical of the CAR report.

Commenters expressed differing points of view on the potential effects of the standards on employment and the macroeconomy and predicting the exact effect of the GHG emission standards on the macroeconomy is rather difficult.

Some commenters pointed to negative effects on the economy and employment due to higher costs from the standards. The Alliance commented that each job in the auto sector creates 6.5 additional jobs, and stated that auto sector employment is generally related to vehicle sales, which is expected to decline. The Alliance, Global Automakers, and FCA expressed concern that cost increases associated with the MY 2022–2025 standards could reduce sales and employment, and put downward pressure on the macroeconomy. The Alliance and Global Automakers argued that reduced revenues from a sales drop due to the standards would reduce spending on research and development.

Other commenters stated that the standards could lead to macroeconomic and employment benefits through their effects on innovation. Commenters also stated that innovation and investment resulting from the standards have contributed to the recovery of the auto industry and the wider economy. Some commenters stated that reopening the standards increased uncertainties that may reduce investments in advanced technologies.

The UAW, while not objecting to a reevaluation of the standards, stated that EPA should ensure that the regulations recognize the long-term importance of manufacturing a diverse fleet of motor vehicles in the United States by American workers and radically weakening the standards will adversely impact investments in key technologies and put domestic manufacturers behind in making fuel-saving technologies being used to meet the standards. Some commenters stated they believe there would be positive effects on employment from the standards through their effects on investments.

The automotive supplier commenters discussed their views on the importance of the standards in maintaining the

competitive advantage U.S. companies currently have in the global marketplace. For example, MEMA commented that reducing the stringency of the standards in the U.S. increases the likelihood that work on these emissions-reducing technologies would shift to other markets.

A number of commenters cited Carley *et al.*,<sup>26</sup> which included a study of the macroeconomic impacts of the standards, conducted by researchers at Indiana University. The study found that the short-term effects of the standards are negative, but the long-term effects of the standards are positive for employment but will not overtake the negative effects until at least 2025. Several commenters identified concerns in the Carley *et al.* analysis that contributed to short-term negative effects. Graham, a coauthor of the report, responded to these comments by supporting the IU report assumptions.

EPA finds that a more rigorous analysis of job gains and losses is needed to determine the net effects of alternate levels of the standards on employment and believes this is an important factor to consider in adopting appropriate standards. EPA intends to include such an analysis as part of the basis for the new rule.

*Factor 6: The Impacts of the Standards on Automobile Safety*

EPA and NHTSA considered some potential safety impacts in the 2012 rulemaking, and EPA considers safety to be an important factor in the reconsideration of the MY 2022–2025 standards. For example, fleet turnover is important to an overall safety analysis, as newer cars tend to be safer and more efficient than older cars due to safety technology innovation and regulatory requirements. EPA intends to further assess the scope of its safety analysis in the upcoming rulemaking to examine the possible impacts of fleet turnover on safety. The Administrator finds that this safety analysis is an additional reason to undertake the forthcoming rulemaking.

*Factor 7: The Impact of the Greenhouse Gas Emission Standards on the Corporate Average Fuel Economy Standards and a National Harmonized Program*

Many stakeholders commented on the importance of maintaining a National Program for GHG emissions and CAFE standards, and stakeholders urged EPA

and NHTSA to continue coordinating with the California Air Resources Board. For example, Global Automakers commented, “Harmonization between the federal and California programs must be maintained. EPA, NHTSA and California need to work together to maintain the One National Program as all parties committed to at its inception.” Toyota commented that its ultimate objective “remains a true, single national standard governing fuel economy and greenhouse gas emissions in the future.” Nissan and Mitsubishi similarly commented that harmonization between federal and California programs must be maintained, urging California, EPA and NHTSA to work together.

Automotive suppliers also commented on the importance of maintaining the National Program. For example, the MEMA stated “[t]he One National Program provides industry stakeholders with economies of scale and increases domestic investment in emissions-reducing and fuel-efficiency technologies and jobs. Anything that falls short of a National Program will fail to provide the long-term planning certainty the industry needs to make the long-term business and technology investment decisions to meet MYs 2022–2025 standards and beyond.” The International Union, United Automobile, Aerospace and Agricultural Implement Workers of America (UAW) commented that all stakeholders should work towards a single National Program and that “California and non-governmental organizations must have a seat at the table along with manufacturers and workers.”

EPA believes that a national harmonized program is very important and will continue to work toward maintaining a national harmonized program through MY 2025 and beyond. To that end, EPA, in collaboration with NHTSA, will initiate a notice and comment rulemaking in a forthcoming **Federal Register** notice to further consider appropriate standards for MY 2022–2025 light-duty vehicles, as appropriate. This coordination will ensure that GHG emission standards and CAFE standards are as aligned as much as possible given EPA and NHTSA’s different statutory authorities.

EPA and NHTSA have been communicating with stakeholders, including CARB and automobile manufacturers, to try and ensure that a national harmonized program remains intact to minimize unnecessary cost and burdens in the development of the notice and comment rulemaking.

2025 EPA/NHTSA GHG/Fuel Economy Mandates on the U.S. Economy. <http://www.cargroup.org/publication/the-potential-effects-of-the-2017-2025-epanhtsa-ghgfuel-economy-mandates-on-the-u-s-economy/>.

<sup>26</sup> Sanjay Carley, Denvil Duncan, John D. Graham, Saba Siddiki, and Nikolaos Ziropiannis. “A Macroeconomic Study of Federal and State Automotive Regulations,” Indiana University School of Public and Environmental Affairs, March 2017.

*Factor 8: The Impact of Standards on Other Relevant Factors*

The January 2017 Determination also identified regulatory certainty as an additional relevant factor that was considered as part of the determination. EPA understands that automakers and suppliers plan many years in advance.<sup>27</sup> Given such long lead times, regulatory certainty can increase the efficiency of business planning and investment cycles. The Administrator agrees that regulatory certainty is extremely important, but is reconsidering its conclusion that maintaining the current standards is the best way to provide such certainty.

Furthermore, industry cannot effectively plan for compliance with the current MY 2022–2025 GHG standards until it knows the outcome of the upcoming NHTSA rulemaking for MY 2022–2025 CAFE standards. Any regulatory certainty potentially provided by the January 2017 Determination is not supported by the fact that NHTSA had not yet begun their statutorily required rulemaking process, and EPA did not know at that time whether NHTSA would establish coordinated requirements. EPA now believes that the greatest potential regulatory certainty is provided in the long run by undertaking a new rulemaking, in partnership with NHTSA, and ensuring that the resulting standards are harmonized to the greatest degree possible.

**IV. Revised Determination**

Even with the wide range in perspectives, it is clear that many of the key assumptions EPA relied upon in its January 2017 Determination, including gas prices, and the consumer acceptance of advanced technology vehicles, were optimistic or have significantly changed. EPA has also both developed and received additional data and assessments since the January 2017 Determination regarding technology effectiveness and technology costs which warrant additional consideration. In addition, the reach and success of the program is significantly limited when consumers do not purchase new vehicles with low GHG emissions, either because they are priced out of them or are unwilling to spend additional money on advanced fuel-saving technologies.

<sup>27</sup>To note, some commenters raised concerns that reevaluating the standards increases uncertainty that might reduce investment in advanced technologies that could hurt jobs and United States competitiveness. As mentioned below, EPA disagrees with this concern as NHTSA must still complete a rulemaking for MY 2022–2025.

Based on our review and analysis of the comments and information submitted, the Administrator believes that the current GHG program for MY 2022–2025 vehicles presents difficult challenges for auto manufacturers and adverse impacts on consumers. On the whole, the Administrator believes the MY 2022–2025 GHG emission standards are not appropriate and, therefore, should be revised as appropriate. EPA, in partnership with NHTSA, will further explore the appropriate degree and form of changes to the program through a notice and comment rulemaking process.

As stated above, in this notice, the Administrator has determined that the standards are not appropriate in light of the record before EPA, and therefore, should be revised as appropriate. EPA is also withdrawing the January 2017 Determination with this notice. EPA, in partnership with NHTSA, will initiate a notice and comment rulemaking in a forthcoming **Federal Register** notice to further consider appropriate standards for MY 2022–2025 light-duty vehicles. This notice concludes EPA’s MTE under 40 CFR 86.1818–12(h). Finally, EPA notes, as discussed above, that this revised determination is not a final agency action, as explained in the 2012 final rule. The effect of this action is rather to initiate a rulemaking process whose outcome will be a final agency action. Until that rulemaking has been completed, the current standards remain in effect and there is no change in the legal rights and obligations of any stakeholders.

Dated: April 2, 2018.  
**E. Scott Pruitt,**  
*Administrator.*  
 [FR Doc. 2018–07364 Filed 4–12–18; 8:45 am]  
**BILLING CODE 6560–50–P**

**ENVIRONMENTAL PROTECTION AGENCY**

[ER–FRL–9038–6]

**Environmental Impact Statements; Notice of Availability**

*Responsible Agency:* Office of Federal Activities, General Information (202) 564–7156 or <https://www2.epa.gov/nepa>.  
 Weekly receipt of Environmental Impact Statements  
 Filed 04/02/2018 Through 04/06/2018  
 Pursuant to 40 CFR 1506.9.

**Notice**

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other

Federal agencies. EPA’s comment letters on EISs are available at: <https://cdxnodengn.epa.gov/cdx-nepa-public/action/eis/search>.

*EIS No. 20180058, Final, USFS, WI,* Townsend Project, Review Period Ends: 05/14/2018, Contact: Marilee Houtler 715–276–6333

*EIS No. 20180059, Final, WAPA, CO,* Estes to Flatiron Transmission Lines Rebuild Project Larimer County, Colorado Final Environmental Impact Statement (DOE/EIS–0483), Review Period Ends: 05/14/2018, Contact: Mark Wieringa 720–962–7448

*EIS No. 20180060, Draft, USFS, CA,* Tahoe National Forest Over-snow Vehicle Use Designation, Comment Period Ends: 05/29/2018, Contact: Joe Chavez 530–478–6158

*EIS No. 20180061, Final, USFS, OR,* Trout Creek, Review Period Ends: 05/29/2018, Contact: Joan Schmidgall 541–367–3809

*EIS No. 20180062, Draft, NPS, CO,* Great Sand Dunes National Park and Preserve Draft Ungulate Management Plan and EIS, Comment Period Ends: 05/31/2018, Contact: Tucker Blythe 719–378–6311

*EIS No. 20180063, Draft Supplement, BR, WA,* Kachess Drought Relief Pumping Plant and Keechelus Reservoir-to-Kachess Reservoir Conveyance (KDRPP/KKC) Projects Supplemental Draft Environmental Impact Statement, Kittitas and Yakima Counties, Washington, Comment Period Ends: 07/11/2018, Contact: Candace McKinley 509–575–5848 ext. 603

Dated: April 9, 2018.  
**Kelly Knight,**  
*Director, NEPA Compliance Division, Office of Federal Activities.*  
 [FR Doc. 2018–07690 Filed 4–12–18; 8:45 am]  
**BILLING CODE 6560–50–P**

**ENVIRONMENTAL PROTECTION AGENCY**

[EPA–HQ–OPP–2017–0350; FRL–9975–55]

**Pesticide Maintenance Fee: Product Cancellation Order for Certain Pesticide Registrations**

**AGENCY:** Environmental Protection Agency (EPA).  
**ACTION:** Notice.

**SUMMARY:** This notice announces EPA’s order for the cancellations, voluntarily requested by the registrants and accepted by the Agency, of the products listed in Table 1 of Unit III., pursuant to the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

II.

Final Determination:

EPA, Final Determination on the Appropriateness of the Model Year 2022-2025  
Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm  
Evaluation (Jan. 2017)

**Final Determination on the  
Appropriateness of the Model Year  
2022-2025 Light-Duty Vehicle  
Greenhouse Gas Emissions Standards  
under the Midterm Evaluation**

# Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation

U.S. Environmental Protection Agency

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## Executive Summary

The 2012 rulemaking establishing the National Program for federal greenhouse gas (GHG) emissions and corporate average fuel economy (CAFE) standards for model years (MY)2017-2025 light-duty vehicles included a regulatory requirement for the Environmental Protection Agency (EPA) to conduct a Midterm Evaluation (MTE) of the GHG standards established for model years (MY)2022-2025.<sup>1</sup> In this final order, the Administrator is making a final adjudicatory determination (hereafter "determination") that, based on her evaluation of extensive technical information available to her and significant input from the industry and other stakeholders, and in light of the factors listed in the 2012 final rule establishing the MY2017-2025 standards, the MY2022-2025 standards remain appropriate under section 202 (a) (1) of the Clean Air Act. This action leaves those standards entirely as they now exist, unaltered. The regulatory status quo is unchanged. This final order constitutes a final agency action. See 76 FR 48763 (Aug. 9, 2011).

This Final Determination follows the November 2016 Proposed Determination issued by the EPA Administrator and the July 2016 release of a Draft Technical Assessment Report (TAR), issued jointly by the EPA, the National Highway Traffic Safety Administration (NHTSA), and the California Air Resources Board (CARB). Opportunities for public comment were provided for both the Draft TAR and the Proposed Determination. In the Draft TAR, the agencies examined a wide range of issues relevant to GHG emissions standards for MY2022-2025, and shared with the public their initial technical analyses of those issues. The Draft TAR was required by EPA's regulations as the first step in the Midterm Evaluation process. In developing the Proposed Determination, the Administrator considered public comments on the Draft TAR and EPA updated its analyses where appropriate in response to comments and to reflect the latest available data. The Administrator has likewise considered public input on the Proposed Determination in developing this Final Determination.

As the final step in the MTE, the Administrator must determine whether the MY2022-2025 GHG standards, established in 2012, are still appropriate under section 202(a)(1) of the Clean Air Act (Act), in light of the record before the Administrator, given the latest available data and information. EPA's regulations establish April 1, 2018, as the latest date for such a determination, but otherwise do not constrain the Administrator's discretion to select an earlier determination date. The Administrator is choosing to make the Final Determination now, recognizing that long-term regulatory certainty and stability are important for the automotive industry and will contribute to the continued success of the program, which in turn will reduce emissions, improve fuel economy, deliver significant fuel savings to consumers, and benefit public health and welfare.

EPA received more than 100,000 public comments on the Proposed Determination, with comments from about 60 organizations and the rest from individuals. These public comments have informed the Administrator's Final Determination, and EPA has responded to those comments in the accompanying Response to Comments (RTC) document. This record<sup>2</sup>

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<sup>1</sup> 40 CFR 86.1818-12(h).

<sup>2</sup> This record, the basis for the Administrator's determination, is contained in EPA Docket ID No. EPA-HQ-OAR-2015-0827.

represents the most current information available, as informed by public comment, and provides the basis for the Administrator's Final Determination, as called for in the 2012 rule.

The EPA regulations state that in making the required determination, the Administrator shall consider the information available on the factors relevant to setting greenhouse gas emission standards under section 202(a) of the Clean Air Act for model years 2022 through 2025, including but not limited to:

- The availability and effectiveness of technology, and the appropriate lead time for introduction of technology;
- The cost on the producers or purchasers of new motor vehicles or new motor vehicle engines;
- The feasibility and practicability of the standards;
- The impact of the standards on reduction of emissions, oil conservation, energy security, and fuel savings by consumers;
- The impact of the standards on the automobile industry;
- The impacts of the standards on automobile safety;
- The impact of the greenhouse gas emission standards on the Corporate Average Fuel Economy standards and a national harmonized program; and
- The impact of the standards on other relevant factors.<sup>3</sup>

This Final Determination is the Administrator's final decision on whether or not the MY2022-2025 standards are appropriate under section 202(a)(1) of the Clean Air Act, in light of the record now before the Administrator. EPA's regulations specify that the determination shall be "based upon a record that includes the following:

- A Draft Technical Assessment Report addressing issues relevant to the standard for the 2022 through 2025 model years;
- Public comment on the Draft Technical Assessment Report;
- Public comment on whether the standards established for the 2022 through 2025 model years are appropriate under section 202(a) of the Clean Air Act; and
- Such other materials the Administrator deems appropriate."<sup>4</sup>

The EPA has now concluded all the required steps in the MTE process and the record upon which the Administrator is making this Final Determination reflects all the elements specified in the regulations. As discussed above, EPA issued (jointly with NHTSA and CARB) the July 2016 Draft Technical Assessment Report (TAR) and sought public comment on it. EPA updated

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<sup>3</sup> 40 CFR 86.1818-12(h)(1).

<sup>4</sup> 40 CFR 86.1818-12(h)(2).

its Draft TAR assessment in response to public comments as part of the November 2016 Proposed Determination. EPA also sought public comment on the Proposed Determination that the GHG standards for MY2022-2025 remain appropriate under section 202 (a)(1) of the Act. If those comments had included information that led the Administrator to the determination that the standards are inappropriate, EPA would then have had to initiate a rulemaking seeking to amend those standards, as specified in the MTE regulation.<sup>5</sup> However, no factual evidence came to light in the public comments or otherwise that leads the Administrator to a different conclusion than the one set forth in the Proposed Determination. The Administrator is thus making this Final Determination that the standards remain appropriate, and that no further action under the Midterm Evaluation is necessary. Thus the standards remain unchanged and the regulatory status quo is unaltered. See also 76 FR 48763 (Aug. 9, 2011) (“[t]he MY2022-2025 GHG standards will remain in effect unless and until EPA changes them by rulemaking”).

EPA’s updated analyses presented in the Proposed Determination built upon and were directly responsive to public comments on the Draft TAR. The Administrator has fully considered public comments submitted in response to the Proposed Determination, and EPA has responded to comments in the accompanying Response to Comments (RTC) document. The Administrator believes that there has been no information presented in the public comments on the Proposed Determination that materially changes the Agency’s analysis documented in the Proposed Determination. Therefore, the Administrator considers the analyses presented in the Proposed Determination<sup>6</sup> as the final EPA analyses upon which her Final Determination is based.

The Administrator notes that, in response to EPA’s solicitation of comment on the topic, several commenters spoke to the need for additional incentives or flexibilities in the out years of the program including incentives that could continue to help promote the market for very advanced technologies, such as electric vehicles. She notes that her determination, based on the record before her, is that the MY2022-2025 standards currently in effect are feasible (evaluated against the criteria established in the 2012 rule) and appropriate under section 202, and do not need to be revised. This conclusion, however, neither precludes nor prejudices the possibility of a future rulemaking to provide additional incentives for very clean technologies or flexibilities that could assist manufacturers with longer term planning without compromising the effectiveness of the current program. The EPA is always open to further dialogue with the manufacturers, NHTSA, CARB and other stakeholders to explore and consider the suggestions made to date and any other ideas that could enhance firms’ incentives to move forward with and to help promote the market for very advanced technologies, such as electric vehicles (EVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell vehicles (FCEVs).

The basis for the Administrator’s assessment supporting her decision that the MY2022-2025 standards are appropriate is summarized below.

*The Standards Are Feasible at Reasonable Cost, Without Need for Extensive Electrification.* As part of our technical assessment of the technologies available to meet the MY2022-2025 GHG standards, we present a range of feasible, cost-effective compliance pathways to meet the

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<sup>5</sup> 40 CFR 86.1818-12(h) (final sentence).

<sup>6</sup> Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation, EPA-420-R-16-020, and accompanying Technical Support Document, EPA-420-R-16-021, November 2016.

MY2022-2025 standards. This analysis demonstrates that compliance can be achieved through a number of different technology pathways reflecting predominantly the application of technologies already in commercial production. The EPA also considered further developments in technologies where there is reliable evidence that those technologies could be feasibly deployed by 2025. The standards are in fact devised so as not to force manufacturers into a single compliance path, and the analysis showing multiple compliance pathways indicates that the standards provide each manufacturer with the flexibility to apply technologies in the way it views best to meet the needs of its customers. Moreover, given the rapid pace of automotive industry innovation, we believe there are, and will continue to be, emerging technologies that will be available in the MY2022-2025 time frame that could perform appreciably better at potentially lower cost than the technologies modeled in EPA's assessment. We have already seen this type of innovative development since the MY2017-2025 GHG standards were originally promulgated in 2012, including expanded use of continuously variable transmissions and introduction of higher expansion ratio, naturally aspirated gasoline engines (Atkinson). Updated information also shows that some of the technologies we did anticipate in 2012 are costing less, and are more effective, than we anticipated at that time.

EPA further projects that the MY2022-2025 standards can be met largely through advances in gasoline vehicle technologies, such as improvements in engines, transmissions, light-weighting, aerodynamics, and accessories, and, as noted, that there are multiple available compliance pathways based on the predominant use of these technologies. This analysis is consistent with both agencies' findings in the 2012 final rulemaking (FRM). Table ES-1 shows fleet-wide penetration rates for a subset of the technologies EPA projects could be used to comply with the MY2025 standards. The analyses further indicate that very low levels of strong hybrids and electric vehicles (both plug-in hybrid electric vehicles (PHEV) and electric vehicles (EV)) will be needed to meet the standards. EPA analyzed a central case low-cost pathway as well as multiple sensitivity cases, all of which show that compliance can be achieved through a number of different technology pathways without extensive use of strong hybrid or electric vehicles. These sensitivity cases include various fuel price scenarios, cost markups, and technology penetrations (e.g., lower Atkinson penetration, lower mass reduction, alternative transmissions). See Table ES-1, presenting the sensitivity cases as a range of technology penetrations and per-vehicle costs. These costs are lower than those projected in the 2012 rule; at that time, the EPA projected that average per-vehicle costs, although reasonable, would be about \$1,100.<sup>7</sup>

**Table ES-1 Selected Technology Penetrations (Absolute) and Per-Vehicle Average Costs (2015\$) to Meet MY2025 GHG Standards (Incremental to the Costs to Meet the MY2021 Standards)<sup>1</sup>**

	Final Determination	
	Primary Analysis	Range of Sensitivities Analyzed
Turbocharged and downsized gasoline engines (%)	34%	31 - 41%
Higher expansion ratio, naturally aspirated gasoline engines (%)	27%	5 - 41%
8 speed and other advanced transmissions <sup>2</sup> (%)	93%	92 - 94%
Mass reduction (%)	9%	2 - 10%

<sup>7</sup> 77 FR 62853, October 15, 2012; Draft Technical Assessment Report, Table 12.44.

Off-cycle technology <sup>3</sup>	26%	13 - 51%
Stop-start (%)	15%	12 - 39%
Mild Hybrid (%)	18%	16 - 27%
Strong Hybrid (%)	2%	2 - 3%
Plug-in hybrid electric vehicle <sup>4</sup> (%)	2%	2%
Electric vehicle <sup>4</sup> (%)	3%	2 - 4%
<b>Per vehicle cost (2015\$)</b>	<b>\$875</b>	<b>\$800 - \$1,115</b>

## Notes:

<sup>1</sup> Percentages shown are absolute rather than incremental. Values based on AEO 2016 reference case.

<sup>2</sup> Including continuously variable transmissions (CVT).

<sup>3</sup> In addition to modeling the off-cycle credits of stop-start and active aerodynamics, EPA also assessed additional off-cycle technologies as unique technologies that can be applied to a vehicle and that reduce CO<sub>2</sub> emissions by either 1.5 g/mi or 3 g/mi. See Proposed Determination Appendix C.1.1.1.3,

<sup>4</sup> Electric vehicle penetrations include the California Zero Emission Vehicle (ZEV) program.

*The Standards Will Achieve Significant CO<sub>2</sub> and Oil Reductions.* Based on various assumptions, including the U.S. Department of Energy's Annual Energy Outlook (AEO) 2016 reference case projections of the car/truck mix out to 2025, the footprint-based GHG standards curves for MY2022-2025 are projected to achieve an industry-wide fleet average carbon dioxide (CO<sub>2</sub>) target of 173 grams/mile (g/mi) in MY2025 (Table ES-2). The projected fleet average CO<sub>2</sub> target represents a 2-cycle GHG emissions compliance level equivalent to 51.4 mpg-e (if all reductions were achieved exclusively through fuel economy improvements).<sup>8</sup> EPA projects that this GHG compliance level of 51.4 mpg-e could be met by automakers with average real world/label fuel economy of about 36 mpg. Given that the MY2016 real world fleet average fuel economy is about 26 mpg, this means that the fleet must improve real world fuel economy by about 10 mpg over the 9-year period from 2016 to 2025, or about one mpg per year.<sup>9</sup>

As a sensitivity, Table ES-2 also includes target projections based on two AEO 2016 scenarios in addition to the AEO 2016 reference case: a low fuel price case and a high fuel price case. Under the footprint-based standards, the program is designed to ensure significant GHG reductions across the fleet, and each automaker's standard automatically adjusts based on the mix (size and volume) of vehicles it produces each model year. Thus, as shown in Table ES-2, different fuel price cases translate into different projections for the car/truck fleet mix (e.g., with a higher truck share shown in the low fuel price case, and a lower truck share shown in the high fuel price case), which in turn leads to varying projections for the CO<sub>2</sub> targets and MPG-e levels projected for MY2025. These estimated CO<sub>2</sub> target levels reflect changes in the latest projections about the MY2025 fleet mix compared to the projections in 2012 when the standards were first established.

In our analysis for this Final Determination, we are applying the same footprint-based curves to the updated fleet projections for MY2025. It is important to keep in mind that the updated

<sup>8</sup> The projected MY2025 target of 173 g/mi represents an approximate 50 percent decrease in GHG emissions relative to the fuel economy standards that were in place in 2010. It is clear from current GHG manufacturer performance data that many automakers are earning air conditioner refrigerant GHG credits that reduce GHG emissions, but do not improve fuel economy. Accordingly, the projected MY2025 target of 173 g/mi represents slightly less than a doubling of fuel economy relative to the standards that were in place in 2010.

<sup>9</sup> U.S. EPA, Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2016," November 2016, [www.epa.gov/fuel-economy/trends-report](http://www.epa.gov/fuel-economy/trends-report).

MY2025 fleet wide projections reflected in this Final Determination are still projections-- based on the latest available information, which will likely continue to change with future projections - - and that the actual GHG emissions/fuel economy level achieved in MY2025 will not be determined until the manufacturers have completed their MY2025 production. Put another way, each manufacturer will not know what its individual standard is until MY2025, since that individual standard is determined by the type and number of vehicles the manufacturer chooses to produce.

**Table ES-2 Projections for MY2025: Car/Truck Mix, CO<sub>2</sub> Target Levels, and MPG-equivalent<sup>1</sup>**

	2012 Final Rule	Final Determination		
	AEO 2011 Reference	<b>AEO 2016 Reference</b>	AEO 2016 Low	AEO 2016 High
Fuel Price in 2025 (\$/gallon) <sup>2</sup>	\$3.87	<b>\$2.97</b>	\$1.97	\$4.94
Car/truck mix	67/33%	<b>53/47%</b>	44/56%	63/37%
CO <sub>2</sub> (g/mi)	163	<b>173</b>	178	167
MPG-e <sup>3</sup>	54.5	<b>51.4</b>	49.9	53.3

Notes:

<sup>1</sup> The CO<sub>2</sub> and MPG-e values shown here are 2-cycle compliance values. Projected real-world values are detailed in the Proposed Determination TSD Chapter 3; for example, AEO reference fuel price case, real-world CO<sub>2</sub> emissions performance would be 233 g/mi and real-world fuel economy would be about 36 mpg.

<sup>2</sup> AEO 2011 fuel price is 2010\$ (equivalent to \$4.21 in 2015\$); AEO 2016 fuel prices are 2015\$.

<sup>3</sup> Mile per gallon equivalent (MPG-e) is the corresponding fleet average fuel economy value if the entire fleet were to meet the CO<sub>2</sub> standard compliance level through tailpipe CO<sub>2</sub> improvements that also improve fuel economy. This is provided for illustrative purposes only, as we do not expect the GHG standards to be met only with fuel efficiency technology.

EPA estimates that over the vehicle lifetimes the MY2022-2025 standards will reduce GHG emissions by 540 million metric tons and reduce oil consumption by 1.2 billion barrels, as shown in Table ES-3.

**Table ES-3 Cumulative GHG and Oil Reductions for Meeting the MY2022-2025 Standards (Vehicle Lifetime Reductions)**

	Final Determination <sup>1</sup>
GHG reduction (million metric tons, MMT CO <sub>2</sub> e)	540
Oil reduction (billion barrels)	1.2

Note:

<sup>1</sup> Values based on AEO 2016 reference case.

*The Standards Will Provide Significant Benefits to Consumers and to the Public.* The net benefits of the MY2022-2025 standards are nearly \$100 billion (at 3 percent discount rate). Table ES-4 presents the societal monetized benefits associated with meeting the MY2022-2025 standards. The EPA also evaluated the benefit-costs of additional scenarios (AEO 2016 high and low fuel price scenarios). See Proposed Determination Section IV.A. In all cases, the net benefits far exceed the costs of the program. It is also notable that in all cases, the benefits (excluding fuel savings) and the fuel savings, each independently, exceed the costs. That is, the

benefits exceed the costs without considering any fuel savings, and likewise fuel savings exceed the costs even without considering any other benefits.

**Table ES-4 GHG Analysis of Lifetime Costs & Benefits to Meet the MY2022-2025 GHG Standards (for Vehicles Produced in MY2021-2025)<sup>1</sup> (Billions of \$)**

	Final Determination <sup>2</sup>	
	3 Percent Discount Rate	7 Percent Discount Rate
Vehicle Program	-\$33	-\$24
Maintenance	-\$3	-\$2
Fuel	\$92	\$52
Benefits <sup>1</sup>	\$42	\$32
Net Benefits	\$98	\$59

Notes:

<sup>1</sup>All values are discounted back to 2016. See the Proposed Determination Appendix C for details on discounting social cost of GHG and non-GHG benefits, and for a discussion that the costs and benefits reflect some early compliance with the MY2025 standard in MY2021.

<sup>2</sup> Values based on AEO 2016 reference case and 2015\$.

When considering the payback of an average MY2025 vehicle compared to a vehicle meeting the MY2021 standards, we believe one of the most meaningful analyses is to look at the payback for consumers who finance their vehicle, as the vast majority of consumers (nearly 86 percent) purchase new vehicles through financing. The average loan period is over 67 months. Consumers who finance their vehicle with a 5-year loan would see payback within the first year. Consumers who pay cash for their vehicle would see payback in the fifth year of ownership. Consumers would realize net savings of \$1,650 over the lifetime of their new vehicle (i.e., net of increased lifetime costs and lifetime fuel savings). Even with the lowest fuel prices projected by AEO 2016 (see Proposed Determination Appendix C), approximately \$2 per gallon in 2025, the lifetime fuel savings significantly outweigh the increased lifetime costs.

**Table ES-5 Payback Period and Net Lifetime Consumer Savings for an Average MY2025 Vehicle Compared to the MY2021 GHG Standards**

	Final Determination <sup>1</sup>
Payback period – 5-year loan purchase <sup>2</sup> (years)	<1
Payback period – Cash purchase (years)	5
Net Lifetime Consumer Savings (\$, discounted at 3%)	\$1,650

Notes:

<sup>1</sup> Values based on AEO 2016 reference case and 2015\$

<sup>2</sup> Using an interest rate of 4.25 percent.

*The Auto Industry is Thriving and Meeting the Standards More Quickly than Required.* While the Final Determination focuses on the MY2022-2025 standards, we note that the auto industry, on average, has out-performed the first four years of the light-duty GHG standards (MY2012-2015). This has occurred concurrently with a period during which the industry successfully rebounded after a period of economic distress. The recently released GHG Manufacturer

Performance Report for the 2015 Model Year shows that the National Program is working even at low fuel prices and automakers are over-complying with the standards, notwithstanding that the MY2015 standard was the most stringent to date, and that the increase in stringency from the previous model year was also the most pronounced to date.<sup>10</sup> Further, concurrently with outperforming the GHG standards, sales have increased for seven straight years, for the first time in 100 years, to an all-time record high in 2016, reflecting positive consumer response to vehicles meeting the standards.

The Administrator's Final Determination is that the MY2022-2025 standards remain appropriate. In light of the pace of progress in reducing GHG emissions since the MY2022-2025 standards were adopted, the success of automakers in achieving the standards to date while vehicle sales are strong, the projected costs of the standards, the impact of the standards on reducing emissions and fuel costs for consumers, and the other factors identified in 40 CFR 86.1818-12(h), the Administrator concludes that the record does not support a conclusion that the MY2022-2025 standards should be revised to make them less stringent. The Administrator did consider whether it would be appropriate to propose to amend the standards to increase their stringency. In her view, the current record, including the current state of technology and the pace of technology development and implementation, could support a proposal, and potentially an ultimate decision, to adopt more stringent standards for MY2022-2025. However, she also recognizes that regulatory certainty and consequent stability is important, and that it is important not to disrupt the industry's long-term planning. Long lead time is needed to accommodate significant redesigns. The Administrator also believes a decision to maintain the current standards provides support to a timely NHTSA rulemaking to adopt MY2022-2025 standards, as well as to the California Air Resources Board to consider in its review of the California GHG vehicle standards for MY2022-2025 as part of its Advanced Clean Cars program,<sup>11</sup> and thus to a harmonized national program. The Administrator consequently has concluded that it is appropriate to provide the full measure of lead time for the MY2022-2025 standards, rather than adopting (or, more precisely, proposing to adopt) new, more stringent standards with a shorter lead time.

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<sup>10</sup> “Greenhouse Gas Emission Standards for Light-duty Vehicles, Manufacturer Performance Report for the 2015 Model Year, November 2016, EPA-420-R-16-014.[https://www.epa.gov/regulations-emissions-vehicles-and-engines/ghg-emission-standards-light-duty-vehicles-manufacturer\\_](https://www.epa.gov/regulations-emissions-vehicles-and-engines/ghg-emission-standards-light-duty-vehicles-manufacturer_)

<sup>11</sup> California adopted its own GHG standards for MY2017-2025 in 2012 prior to EPA and NHTSA finalizing the National Program. Through direction from its Board in 2012, CARB both adopted a “deemed to comply” provision allowing compliance with EPA’s GHG standards in lieu of CARB’s standards, and committed to participate in the Midterm Evaluation ([https://www.arb.ca.gov/msprog/consumer\\_info/advanced\\_clean\\_cars/consumer\\_acc\\_mtr.htm](https://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/consumer_acc_mtr.htm)).

## I. Introduction

### A. Background on the Midterm Evaluation

The Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) have conducted two joint rulemakings to establish a coordinated National Program for federal greenhouse gas (GHG) emissions and corporate average fuel economy (CAFE) standards for light-duty vehicles. Light-duty vehicles, which include passenger cars, sport utility vehicles, crossover utility vehicles, minivans, and pickup trucks, make up about 60 percent of all U.S. transportation-related GHG emissions and fuel consumption.<sup>12</sup> The agencies finalized the first set of National Program standards covering model years (MYs) 2012-2016 in May 2010<sup>13</sup> and the second set of standards, covering MY2017-2025, in October 2012.<sup>14</sup> The National Program is one of the most significant federal actions ever taken to reduce domestic GHG emissions and improve automotive fuel economy, establishing standards that increase in stringency year-over-year from MY2012 through MY2025 and projected to reach a level that nearly doubles fuel economy and halves GHG emissions compared to MY2010.

Through the coordination of the National Program with the California Air Resources Board's GHG standards, automakers can build one single fleet of vehicles across the U.S. that satisfies all GHG/CAFE requirements, and consumers can continue to have a full range of vehicle choices that meet their needs.<sup>15</sup> In addition, the Canadian government has adopted standards aligned with the U.S. EPA GHG standards through MY2025, further facilitating manufacturers' ability to produce vehicles satisfying harmonized standards.<sup>16</sup> Most stakeholders strongly supported the National Program, including the auto industry, automotive suppliers, state and local governments, labor unions, NGOs, consumer groups, veterans groups, and others. In the agencies' 2012 final rules, the National Program was estimated to reduce carbon dioxide (CO<sub>2</sub>) emissions by 6 billion metric tons and reduce oil consumption by 12 billion barrels over the lifetime of MY2012-2025 vehicles. The standards are projected to provide significant savings for consumers due to reduced fuel use and consequent reduced fuel expenditures.

The 2012 final rule established standards through MY2025 to provide substantial lead time and regulatory certainty to the industry. Recognizing the rule's long time frame, EPA's rule establishing GHG standards for MY2017-2025 light-duty vehicles included a requirement for the agency to conduct a Midterm Evaluation (MTE) of the MYs 2022-2025 GHG standards. Through the MTE, EPA must determine whether the GHG standards for MY2022-2025,

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<sup>12</sup> Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014, EPA Publication number EPA 430-R-16-002, April 15, 2016. Overall transportation sources account for 26 percent of total U.S. GHG emissions.

<sup>13</sup> 75 FR 25324, May 7, 2010.

<sup>14</sup> 77 FR 62624, October 15, 2012.

<sup>15</sup> Subsequent to the adoption of California-specific GHG standards for MYs 2017-2025 and the adoption of the Federal standards for MY2017 and beyond, CARB adopted a "deemed to comply" provision in furtherance of a National Program whereby compliance with the federal GHG standards would be deemed to be compliance with California's GHG program.

<sup>16</sup> EPA has coordinated with Environment and Climate Change Canada (ECCC) and Transport Canada throughout the Midterm Evaluation, including collaborating on a number of technology research projects. See Draft Technical Assessment Report Chapter 2.2.3, p. 2-8.

established in 2012, are still appropriate, within the meaning of section 202(a)(1) of the Clean Air Act, in light of the record before the Administrator, given the latest available data and information. See 40 CFR 86.1818-12(h). The MTE regulations provide that if the Administrator were to make a determination that the standards are not appropriate, based upon consideration of the decision factors in the regulation and the factual record available to the Administrator at the time of the determination, then the EPA would initiate a rulemaking to amend the standards to make them either more or less stringent. See 40 CFR 86.1818-12(h) (final sentence). This regulatory provision to conduct a rulemaking is limited only to the situation where the Administrator makes a determination that the standards are not appropriate and should be changed, to be either more or less stringent, and not to the situation where the Administrator, as in the case of this Final Determination, determines that the standards are appropriate and should not be changed. See 77 FR 62784 (Oct. 15, 2012) (stating that if EPA concludes the standards are appropriate it will “announce that final decision and the basis for EPA’s decision” and if the EPA decides the standards are not appropriate, it will “initiate a rulemaking to adopt standards that are appropriate under section 202(a)”).

In the 2012 rulemaking, the EPA stated its intention that the MTE would entail "a holistic assessment of all of the factors considered in standards setting," and "the expected impact of those factors on manufacturers' ability to comply, without placing decisive weight on any particular factor or projection." See 77 FR 62784 (Oct. 15, 2012). Indeed, the analyses supporting this MTE have been as robust and comprehensive as that in the original setting of the MY2017-2025 standards, *Id.*, although the nature of the decision-making the EPA has undertaken based on those analyses is very different, as established by design of the MTE regulations. In the 2012 rule, the EPA was faced with establishing the MY2017-2025 standards, while in this Final Determination the EPA has evaluated those standards in light of developments to date in order to determine if the existing standards are appropriate. *Id.* In gathering data and information throughout the MTE process, the EPA has drawn from a wide range of sources, including vehicle certification data, research projects and vehicle testing programs initiated by the agencies, input from stakeholders, and information from technical conferences, published literature, studies published by various organizations, and the many public comments.

In July 2016, EPA, NHTSA, and CARB jointly issued for public comment a Draft Technical Assessment Report (TAR) examining a wide range of issues relevant to the MY2022-2025 standards.<sup>17</sup> For the EPA, the Draft TAR was the first formal step in the MTE process as required under EPA’s regulations.<sup>18</sup> The Draft TAR was a technical report, not a decision document. It was an opportunity for all three agencies to share with the public their technical analyses relating to the appropriateness of the MY2022-2025 standards.

The EPA received over 200,000 public comments on the Draft TAR, including about 90 comments from organizations and the rest from individuals. The organization commenters included auto manufacturers and suppliers, environmental and other non-governmental organizations (NGOs), consumer groups, state and local governments and their associations, labor unions, fuels and energy providers, auto dealers, academics, national security experts,

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<sup>17</sup> 81 FR 49217, July 27, 2016.

<sup>18</sup> See 40 CFR 86.1818-12(h)(2)(i).

veteran's groups, and others. These comments presented a range of views on whether the standards should be retained, or made more or less stringent, and, in some cases, provided additional factual information that EPA considered in updating its analyses in support of the Administrator's Proposed Determination. The EPA also considered the few additional comments received after the close of the comment period on the Draft TAR.<sup>19</sup>

On November 30, 2016, EPA Administrator issued a proposed adjudicatory determination<sup>20</sup> proposing to find that the MY2022-2025 standards remain appropriate under the Clean Air Act. Because the Administrator was proposing that there be no change to the MY2022-2025 standards currently in the regulations, in other words that there be no change in the standards' stringency, the Proposed Determination did not include a Notice of Proposed Rulemaking. See section 86.1818-12(h). In this Final Determination, the Administrator has once again considered public comments -- those received on the Proposed Determination. The EPA received more than 100,000 comments on the Proposed Determination, with about 60 comments from organizations and the rest from individuals. The EPA responds to the public comments in the accompanying Response to Comments (RTC) document.

The EPA regulations state that in making the required determination, the Administrator shall consider the information available on the factors relevant to setting greenhouse gas emission standards under section 202(a) of the Clean Air Act for model years 2022 through 2025, including but not limited to:

- The availability and effectiveness of technology, and the appropriate lead time for introduction of technology;
- The cost on the producers or purchasers of new motor vehicles or new motor vehicle engines;
- The feasibility and practicability of the standards;
- The impact of the standards on reduction of emissions, oil conservation, energy security, and fuel savings by consumers;
- The impact of the standards on the automobile industry;

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<sup>19</sup> After the close of the comment period on the Draft TAR, EPA received and docketed additional comments from Volkswagen, the Electric Drive Transportation Association, and the Alliance of Automobile Manufacturers (a non-technical comment), all of which the EPA considered in the Proposed Determination.

<sup>20</sup> As noted in the Proposed Determination, and discussed more fully in the Response to Comments, the determination is not a rulemaking. None of EPA's rules, the Administrative Procedures Act, or the Clean Air Act require that the determination be made by rulemaking. EPA is properly exercising its discretion to proceed by adjudication. The final determination evaluates the technical record and concludes that the current standards are appropriate. As with past mid-course evaluations of Title II rules, where the EPA evaluates standards and decides not to change them, it need not undertake, and is not undertaking, a rulemaking. For example, in the final rule for heavy-duty engine standards (66 FR 5063, January 18, 2001), EPA announced regular biennial reviews of the status of the key emission control technology. EPA subsequently issued those reviews in 2002 and 2004, without going through rulemaking. See EPA Report 420-R-02-016; EPA Report 420-R-04-004. Or for instance, in the final rule for the Nonroad Tier 3 standards (63 FR 56983, Oct 23, 1998), EPA committed to reviewing the feasibility of the standards by 2001 and to adjust them by rulemaking if necessary. In 2001, without engaging in rulemaking, the EPA published a report, see EPA Report 420-R-01-052, accepted comments, and concluded publicly that the standards remained technologically feasible. (Memorandum: "Comments On Nonroad Diesel Emissions Standards: Staff Technical Paper," from Chet France to Margo Oge, June 4, 2002).

- The impacts of the standards on automobile safety;
- The impact of the greenhouse gas emission standards on the Corporate Average Fuel Economy standards and a national harmonized program; and
- The impact of the standards on other relevant factors.<sup>21</sup>

The preamble to the 2012 final rule further listed ten relevant factors that the agencies will consider at a minimum during the MTE. The EPA in fact addressed all of these issues in the Draft TAR, and considered them further in the Proposed Determination and in this Final Determination.<sup>22</sup>

- Development of powertrain improvements to gasoline and diesel powered vehicles;
- Impacts on employment, including the auto sector;
- Availability and implementation of methods to reduce weight, including any impacts on safety;
- Actual and projected availability of public and private charging infrastructure for electric vehicles, and fueling infrastructure for alternative fueled vehicles;
- Costs, availability, and consumer acceptance of technologies to ensure compliance with the standards, such as vehicle batteries and power electronics, mass reduction, and anticipated trends in these costs;
- Payback periods for any incremental vehicle costs associated with meeting the standards;
- Costs for gasoline, diesel fuel, and alternative fuels;
- Total light-duty vehicle sales and projected fleet mix;
- Market penetration across the fleet of fuel efficient technologies;
- Any other factors that may be deemed relevant to the review.<sup>23</sup>

In the 2012 final rule, the agencies projected that the MY2025 standards would be met largely through advances in conventional vehicle technologies, including advances in gasoline engines (such as downsized/turbocharged engines) and transmissions, vehicle weight reduction, improvements in aerodynamics, more efficient accessories, and lower rolling resistance tires. The agencies also projected that vehicle air conditioning systems would continue to improve by becoming more efficient and by increasing the use of alternative refrigerants and lower leakage systems. The EPA estimated that some increased electrification of the fleet would occur through the expanded use of stop/start and mild hybrid technologies, but projected that the MY2025 standards could be met with only about five percent of the fleet being strong hybrid electric vehicles (HEVs) and only about two percent of the fleet to be electric vehicles (EV) or plug-in hybrid electric vehicles (PHEVs).<sup>24</sup> All of these technologies were available at the time of the

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<sup>21</sup> 40 CFR 86.1818-12(h).

<sup>22</sup> 76 FR 48673 (Aug. 9, 2011) and 77 FR 62784, October 15, 2012.

<sup>23</sup> Among the other factors deemed relevant and addressed in the Draft TAR and Proposed Determination, EPA's analysis examined the potential impact of the California Zero Emission Vehicle (ZEV) program, which California has revised since the 2012 final rule. EPA also examined the availability and use of credits, including credits for emission reductions from air conditioning improvements and from off-cycle technologies.

<sup>24</sup> For comparison to vehicles for sale today, an example of a mild HEV is GM's eAssist (Buick Lacrosse), a strong HEV is the Toyota Prius, an EV is the Nissan Leaf, and a PHEV is the Chevrolet Volt.

2012 final rule, some on a limited number of vehicles while others were more widespread, and the agencies projected that manufacturers would be able to meet the standards through significant efficiency improvements in the technologies, as well as through increased usage of these and other technologies across the fleet.

Since the 2012 final rule, vehicle sales have been strong, hitting an all-time high of 17.5 million vehicles in 2015, gas prices have dropped significantly, and truck share of the fleet has increased. At the same time, auto manufacturers have over-complied with the GHG program for each of the first four years of the program (MY2012-2015), and the industry as a whole has built a substantial bank of credits from the initial years of the program.<sup>25</sup> Technologies that reduce GHG emissions are entering the market at rapid rates, including more efficient engines and transmissions, aerodynamics, light-weighting, improved accessories, low rolling resistance tires, improved air conditioning systems, and others. Manufacturers are also using certain technologies that the agencies did not consider in their evaluation in the 2012 rule, including non-hybrid Atkinson cycle gasoline engines and 48-volt mild hybrid systems. Other technologies are being utilized at greater rates than the agencies projected, such as continuously variable transmissions (CVTs). These additional technologies have resulted in projected compliance pathways which differ slightly from those in the 2012 final rule with respect to some of the specific technologies expected to be applied to meet the future standards. However, the conclusions of the 2012 Final Rule, the July 2016 Draft TAR, the November 2016 Proposed Determination, and this Final Determination are very similar: that advanced gasoline vehicles will be the predominant technologies that manufacturers can use to meet the MY2025 standards. This assessment is similar to the conclusion of a 2015 study by the National Academy of Sciences which also found that the 2025 standards could be achieved primarily with advanced gasoline vehicle technologies.<sup>26</sup> As discussed below, the standards are also projected to be achievable through multiple feasible technology pathways at reasonable cost -- less than projected in the 2012 rulemaking -- and with significant direct benefit to consumers in the form of net savings due to purchasing less fuel.

The Administrator notes that, in response to EPA's solicitation of comment on the topic, several commenters spoke to the need for additional incentives or flexibilities in the out years of the program including incentives that could continue to help promote the market for very advanced technologies, such as electric vehicles. She notes that her determination, based on the record before her, is that the MY2022-2025 standards currently in effect are feasible (evaluated against the criteria established in the 2012 rule) and appropriate under section 202, and do not need to be revised. This conclusion, however, neither precludes nor prejudices the possibility of a future rulemaking to provide additional incentives for very clean technologies or flexibilities that could assist manufacturers with longer term planning without compromising the effectiveness of the current program. The EPA is always open to further dialog with the manufacturers, NHTSA, CARB and other stakeholders to explore and consider the suggestions made to date and any other ideas that could enhance firms' incentives to move forward with and

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<sup>25</sup> "Greenhouse Gas Emission Standards for Light-duty Vehicles, Manufacturer Performance Report for the 2015 Model Year, November 2016, EPA-420-R-16-014.

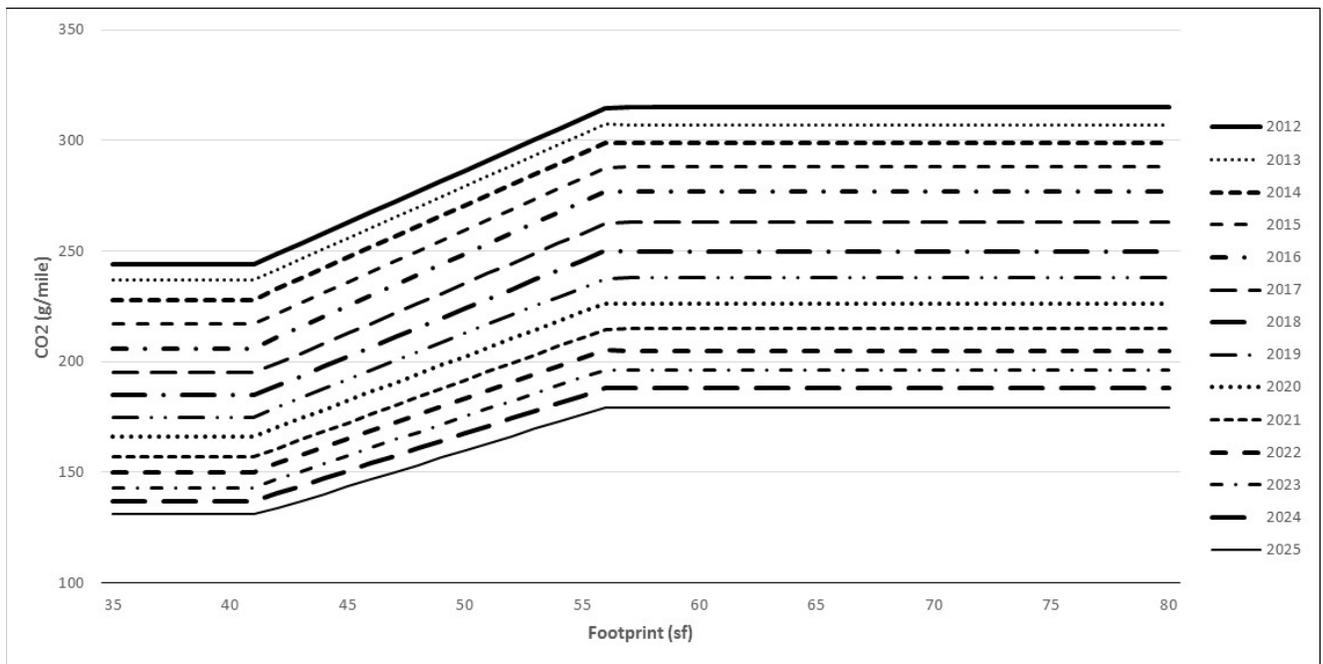
<sup>26</sup> "Cost, Effectiveness and Deployment of Fuel Economy Technologies for Light-Duty Vehicles," National Research Council of the National Academies, June 2015, Finding 2.1 (p. 2-83).

to help promote the market for very advanced technologies, such as electric vehicles (EVs), plug-in hybrid electric vehicles (PHEVs), and fuel cell vehicles (FCEVs).

**B. Background on the Light-duty Vehicle GHG Standards**

The GHG emissions standards are attribute-based standards, based on vehicle footprint.<sup>27</sup> In other words, the standards are based on a vehicle’s size: larger vehicles have numerically higher GHG emissions targets and smaller vehicles have numerically lower GHG emissions targets. Manufacturers are not compelled to build vehicles of any particular size or type, and each manufacturer has a unique fleetwide standard for each of its car and truck fleets that reflects the light-duty vehicles it chooses to produce in a given model year. Each automaker’s standard automatically adjusts each year based on the vehicles (sizes and volumes) it produces. With fleetwide averaging, a manufacturer can produce some models that exceed their target, and some that are below their target. This approach also helps preserve consumer choice, as the standards do not constrain consumers’ opportunity to purchase the size of vehicle with the performance, utility and safety features that meet their needs. In addition, manufacturers have available many other flexibility provisions, including banking and trading of credits across model years and trading credits across manufacturers.

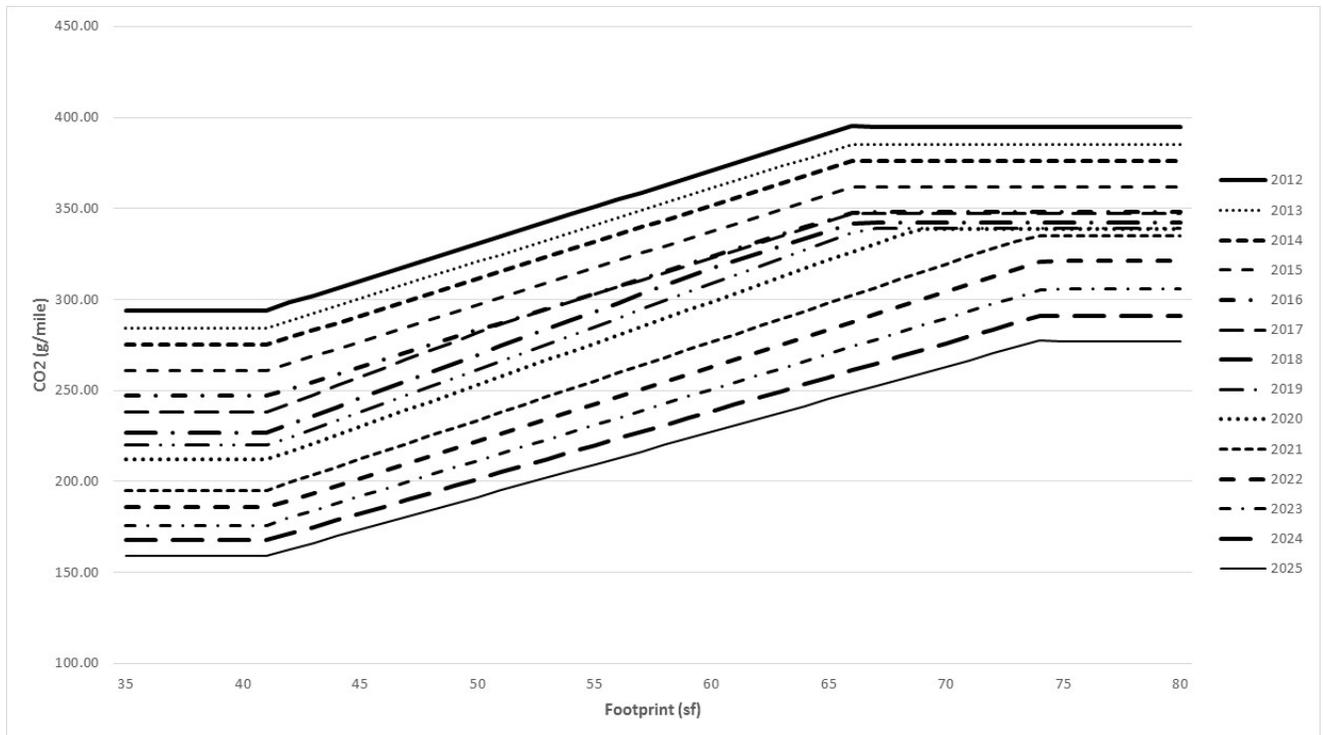
The footprint curves for the MY2012-2025 GHG standards, illustrating the year-over-year stringency increases, are shown below in Figure I.1 and Figure I.2.<sup>28</sup>



**Figure I.1 CO<sub>2</sub> (g/mile) Passenger Car Standards Curves**

<sup>27</sup> Footprint is defined as a vehicle’s wheelbase multiplied by its average track width—in other words, the area enclosed by the points at which the wheels meet the ground.

<sup>28</sup> See 40 CFR 86.1818-12(c).



**Figure I.2 CO<sub>2</sub> (g/mile) Light Truck Standards Curves**

### C. Climate Change Science

In the Proposed Determination, the EPA presented an overview of climate change science as laid out in the climate change assessments from the National Academies, the U.S. Global Change Research Program, and the Intergovernmental Panel on Climate Change. The EPA summarized the impacts to human health, to ecosystems, and to physical systems in the United States and around the world, from heat waves to sea level rise to disruptions of food security. Impacts to vulnerable populations such as children, older Americans, persons with disabilities, those with low incomes, indigenous peoples, and persons with preexisting or chronic conditions were also highlighted. The most recent assessments have confirmed and further expanded the science that supported the 2009 Endangerment and Cause or Contribute Findings for Greenhouse Gases Under section 202(a) of the Clean Air Act; Final Rule (74 FR 66496, December 15, 2009), as discussed in the more recent 2016 Finding That Greenhouse Gas Emissions from Aircraft Cause or Contribute to Air Pollution That May Reasonably Be Anticipated to Endanger Public Health and Welfare (81 FR 54422, August 15, 2016). Furthermore, the climate system continues to change: in 2015, CO<sub>2</sub> concentrations grew by more than 2 parts per million, reaching an annual average of 401 ppm, sea level continued to rise at 3.3 mm/year since the satellite record started in 1993, Arctic sea ice continues to decline, and glaciers continue to melt.<sup>29</sup> 2016 was the

<sup>29</sup> Blunden, J. and D. S. Arndt, Eds., 2016: State of the Climate in 2015. Bull. Amer. Meteor. Soc., 97 (8), S1–S275, DOI:10.1175/2016BAMSSStateoftheClimate.

warmest year in the global average surface temperature record going back to 1880, the third year in a row of record temperatures.

## II. The Administrator's Assessment of Factors Relevant to the Appropriateness of the MY2022-2025 Standards

Through the Midterm Evaluation, the Administrator must determine whether the GHG standards for model years 2022-2025, established in 2012, are still appropriate, within the meaning of section 202(a)(1) of the Clean Air Act, given the latest available data and information in the record before the Administrator.<sup>30</sup> In this final order, the Administrator is making a final determination that the GHG standards currently in place for MYs 2022-2025 remain appropriate under the Clean Air Act. The consequence of this determination is that the standards remain unchanged, there is no alteration in the rules, and the regulatory status quo continues. The Administrator has fully considered public comments submitted on the Proposed Determination, and the EPA has responded to comments in the accompanying Response to Comments (RTC) document. The Administrator believes that there has been no information presented in the public comments on the Proposed Determination that materially changes the Agency's analysis documented in the Proposed Determination.<sup>31</sup> Therefore, the Administrator considers the analyses presented in the Proposed Determination as the final the EPA analyses upon which this Final Determination is based.

The EPA regulations<sup>32</sup> state that in making the required determination, the Administrator shall consider the information available on the factors relevant to setting greenhouse gas emission standards under section 202(a) of the Clean Air Act for model years 2022 through 2025, including but not limited to:

- (i) The availability and effectiveness of technology, and the appropriate lead time for introduction of technology;
- (ii) The cost on the producers or purchasers of new motor vehicles or new motor vehicle engines;
- (iii) The feasibility and practicability of the standards;
- (iv) The impact of the standards on reduction of emissions, oil conservation, energy security, and fuel savings by consumers;
- (v) The impact of the standards on the automobile industry;
- (vi) The impacts of the standards on automobile safety;
- (vii) The impact of the greenhouse gas emission standards on the Corporate Average Fuel Economy standards and a national harmonized program; and
- (viii) The impact of the standards on other relevant factors.<sup>33</sup>

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<sup>30</sup> See 40 CFR 86.1818-12(h).

<sup>31</sup> Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation, EPA-420-R-16-020, and accompanying Technical Support Document, EPA-420-R-16-021, November 2016. In adopting the midterm evaluation provisions, EPA indicated that it "expect[ed] to place primary reliance on peer-reviewed studies" and on "NAS reports" in making midterm evaluation determinations. 77 FR 62787. EPA has in fact done so. See Draft TAR Section 2.2.1 and 2.2.3.

<sup>32</sup> See 40 CFR 86.1818-12(h)(1)(i) through (viii).

<sup>33</sup> 40 CFR 86.1818-12(h)(1).

Below we discuss each of these factors in light of the analyses upon which this Final Determination is based.

*(i) The availability and effectiveness of technology, and the appropriate lead time for introduction of technology; (ii) the cost on the producers or purchasers of new motor vehicles or new motor vehicle engines; (iii) the feasibility and practicability of the standards*

Several of the factors relate to the technology assessment -- technology availability and effectiveness, lead time for introducing technologies, and the costs, feasibility and practicability of the standards. On the basis of EPA's extensive technical analyses contained in the Proposed Determination, and after consideration of the additional comments received by the agency, the Administrator finds that there will be multiple technologies available at reasonable cost to allow the industry to meet the MY2022-2025 standards, with the majority in commercial production today, and others under active development with reliable evidence of feasibility and availability in the market by 2025. See Proposed Determination Sections II and IV.A, and TSD Chapter 2. As in the 2012 FRM, The Administrator further finds that the MY2025 standards can be achieved with very low levels of strong hybrid or plug-in electrified vehicles. The EPA's extensive review of the literature, including but not limited to the 2015 NAS study, makes it clear that advanced gasoline vehicle technologies will continue to improve between now and 2025. In addition, the significant technology advances that have already occurred in just the four years since the 2012 final rule are a strong indication that technology will continue to advance, with clear potential for additional innovation over the next eight years.

The EPA projects a range of potential compliance pathways for each manufacturer and the industry as a whole to meet the MY2022-2025 standards (see Proposed Determination Table IV.5 and Appendix C which show a "central case" and eight sensitivity cases). This analysis indicates that the standards can be met largely through utilization of a suite of advanced gasoline vehicle technologies, with modest penetration of stop-start and mild hybrids and relatively low penetrations of strong hybrids, PHEVs and EVs. The 2015 National Academy of Sciences study on fuel economy technologies similarly found that the 2025 standards would be achieved largely through improvements to a range of technologies that can be applied to a gasoline vehicle without the use of strong hybrids, PHEV, or EV technology. It is important to underscore that EPA's projected technology penetrations are meant to illustrate one of many possible technology pathways to achieve compliance with the MY2022-2025 GHG standards. The rules do not mandate the use of any particular form of technology; the standards are performance-based and thus manufacturers are free to select among the suite of technologies they best believe is right for their vehicles to achieve compliance. As we have seen in recent years with the rapid advances in a wide range of GHG-reduction technologies, we expect that ongoing innovation will result in further improvements to existing technologies and the emergence of others.

As we note throughout this document, the EPA carefully considered and responded in detail to all of the significant public comments as part of the record for the Proposed Determination. Some industry commenters have expressed the view that the EPA did not in fact consider their technical comments. As described in the Proposed Determination and Chapter 2 of the TSD, a number of changes the EPA made to its analysis between the Draft TAR and the Proposed Determination were in response to those technical comments highlighted by the Alliance of Automobile Manufacturers and Global Automakers. These included updating the baseline fleet to a MY2015 basis, better accounting for certain technologies in that baseline fleet, improving

the vehicle classification structure to improve the resolution of cost-effectiveness estimates applied in the OMEGA model, updating effectiveness estimates for certain advanced transmission technologies, conducting additional sensitivity analyses (including those where certain advanced technologies are artificially constrained), and adding quality assurance checks of technology effectiveness into the ALPHA and Lumped Parameter Model. See Proposed Determination Appendix A at A-1 and A-2. EPA consulted with NHTSA and CARB as part of the process of developing the Proposed Determination. The Final Determination is based on an administrative record at the very least as robust as that for the 2012 FRM, including extensive state-of-the-art research projects conducted by EPA and consultants to both agencies, data and input from stakeholders, multiple rounds of public comment, information from technical conferences, published literature, and studies published by various organizations. EPA put primary emphasis on the many peer-reviewed studies, as well as on the National Academy of Sciences 2015 report on fuel economy technologies.

Auto industry commenters believe that EPA's analysis generally overestimates the effect of advanced gasoline technologies, that these technologies will not be sufficient to meet the standards, and that higher levels of electrified vehicles will be needed to meet the MY2022-2025 standards. The EPA has carefully considered these comments and our assessment is that the commenters are not considering the possibility of applying the full range of road load reduction and non-electrified powertrain technologies broadly across high volume models, and in the combinations, that the EPA assessed in the Proposed Determination and Draft TAR. In some cases, the auto industry comments, including the Alliance of Automobile Manufacturers (Alliance), are based on the premise that the only possible technologies available in MY2025 will be represented by technology already contained in the fleet today (more specifically, that contained in the Draft TAR's MY2014 baseline fleet), and that those technologies will not improve in efficiency. The EPA disagrees with this assertion; several recently released engines have already demonstrated efficiencies that exceed those in the MY2014 fleet.<sup>34</sup> These actual engines illustrate that improvement has continued beyond the assumed basis of the comments, and it is highly unlikely that even these recent developments represent the limit of achievable efficiencies in the future. EPA's assessment is consistent with the MY2015 NAS report, in which the committee wrote that in the context of increasingly stringent fuel economy and GHG emissions standards, "gasoline-fueled spark ignition (SI) engine will continue to be the dominant powertrain configuration even through 2030 (pg S-1)."<sup>35</sup> Setting aside the assumption that the best available technologies today will undergo no improvement in future years (a premise the auto industry has disproved time and again), the commenters do not even allow for the recombination of existing technologies, and thus severely and unduly limit potential effectiveness increases obtainable by MY2025. The EPA notes that events have already disproven this assumption; as one specific example, Ford introduced a 10-speed automatic transmission on the MY2017 F150 paired with a turbocharged downsized engine, which represents a technology combination that was not previously available and was therefore not considered (and would be deemed impossible) by the Alliance comments. NGO commenters, on

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<sup>34</sup> These engines include the 1.5L Honda turbo, Volkswagen's EA888-3B Miller cycle, and Hyundai-Kia's 2.0L Atkinson cycle engine.

<sup>35</sup> The 2015 NAS report also included an example technology pathway which illustrated how the application of conventional, non-electrified technologies would enable the example midsize car to meet its MY2025 footprint target (pp 8-18, 8-19).

the other hand, believe that EPA's analysis is robust and that, if anything, EPA's assessment of technologies is overly conservative as we did not consider additional technologies expected to be in the market in the MY2022-2025 timeframe.

The EPA also has carefully considered comments and issues related to powertrain improvements, including advanced engine technologies and improvements to transmission technologies. See 76 FR 48763 and 77 FR 62784. A key technology the EPA assessed in the Draft TAR and Proposed Determination to be available at reasonable cost is the Atkinson Cycle engine in non-hybrid applications. The Atkinson Cycle architecture has already been demonstrated in production domestically (Mazda, Toyota, Hyundai-Kia), enhanced with cooled exhaust gas recirculation (Mazda), and in Europe further enhanced with cylinder deactivation (Volkswagen). These production examples are consistent with EPA engine modeling and initial hardware testing that shows synergies between the use of cooled exhaust gas recirculation and cylinder deactivation with Atkinson Cycle engines. See TSD Chapter 2.3.4.1.4. In addition, and as explained in TSD Chapter 2.3.4.1.8.3 and further below, the EPA conducted sensitivity analyses constraining penetration of Atkinson-cycle engines and found that there are other cost-effective compliance paths available which rely chiefly on engine technology alternatives, rather than on electrification. We did not receive information in the comments on the Proposed Determination that provided a basis for reaching a different conclusion. Among these alternative technology paths are increased penetration of gasoline direct injected, turbo-downsized engines (a chief technology in the agencies' 2012 FRM assessment). The EPA has carefully considered and addressed the comments questioning the effectiveness values the EPA estimated for this technology; the EPA continues to believe these estimates are well grounded. The EPA explained in detail why the engine configuration used in its effectiveness estimates is representative, why the friction reduction assumptions are sound based on the use of coatings and other materials and technologies throughout the engine's moving components, and why the production engines cited as alternatives in the comments are not representative of feasible effectiveness values in 2025 given that they lack various technologies that improve efficiency (including variable valve lift, external cooled exhaust gas recirculation, sequential turbocharging, and higher peak cylinder pressure capability). See TSD Chapter 2.3.4.1.9.1.

The EPA is projecting average per vehicle costs of \$875 across the fleet (see Table ES-1 and Proposed Determination Table IV.5).<sup>36</sup> These costs are lower than those projected in the 2012 rule, which the EPA estimated at about \$1,100 (see Table 12.44 of the Draft TAR). The EPA found in the 2012 rule that these (higher) costs were reasonable, even without considering the payback in the form of less fuel used, which more than offsets these costs. See 77 FR 62663-62665, 62880 and 62922. Consequently, the EPA regards these lower estimated per-vehicle costs to be reasonable. Furthermore, the projected reduced fuel expenditures more than offset the estimated increase in vehicle cost even with lower assumptions of fuel cost. EPA's analysis finds that consumers who finance their vehicle with a 5-year loan would see payback within the first year; consumers who pay cash for their vehicle would see payback in the fifth year of

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<sup>36</sup> Across eight sensitivity cases, average per-vehicle costs ranged from \$800-\$1,115. See Proposed Determination Table IV.5.

ownership. Consumers would realize net savings of \$1,650 over the lifetime of their new vehicle (i.e., net of increased lifetime costs and lifetime fuel savings).

This decrease in estimated per-vehicle cost is not surprising—technology to achieve environmental improvements has often proved to be less costly than EPA’s initial estimates.<sup>37</sup> Captured in these cost estimates, we project significant increases in the use of advanced engine technologies, comprising more than 60 percent of the fleet across a range of engines including turbo-downsized 18 bar and 24 bar, naturally-aspirated Atkinson cycle, and Miller cycle engines. We also see significant increases of advanced transmission technology projected to be implemented on more than 90 percent of the fleet, which includes continuously variable transmissions (CVTs) and eight-speed automatic transmissions. Stop-start technology and mild hybrid electrification are projected to be used on 15 percent and 18 percent, respectively, of the fleet. Similar to the analysis in the 2012 FRM, the EPA is projecting very low levels of strong hybrids (2 percent) and EV/PHEVs (5 percent) as absolute levels in the fleet (in the central case analysis, see Table ES-1).<sup>38</sup>

The EPA has considered the feasibility of the standards under several different scenarios of future fuel prices and fleet mix, as well as other sensitivity cases (e.g., different assumptions about technologies or credit trading) (see Proposed Determination Section IV.A and Appendix C), which showed only very small variations in average per-vehicle cost or technology penetration mix. Thus, our conclusion that there are multiple ways the MY2022-2025 standards can be met with a wide range of technologies at reasonable cost, and predominantly with advanced engine technologies, holds across all these scenarios.

These technology pathway findings are similar to the types of technologies that EPA projected in establishing the standards in the 2012 rule, although the specific technologies within the advanced engine, advanced transmission, and mild hybrid categories have been updated from the 2012 rule to reflect the current state of technological development (hence the lower estimated per vehicle cost than in the 2012 rule). For example, additional engine technologies, such as the naturally aspirated Atkinson cycle and Miller cycle noted above, were not even considered by the agencies in the 2012 rule yet are in production vehicles today. Similarly, transmission technology has developed such that CVTs are now emerging as a more popular choice for manufacturers than the dual-clutch transmissions we had mainly considered in 2012.<sup>39</sup> Mild hybrid technology also has developed, with more sophisticated 48-volt systems now offering a more cost-effective option than the 110-volt systems we had considered in the 2012 rule. The fact that these technologies have developed and improved so rapidly in the past four years since the MY2022-2025 standards were established provides a strong indication that the pace of innovation is likely to continue. The EPA expects that this trend will continue, likely affording

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<sup>37</sup> U.S. EPA, National Center for Environmental Economics (2014). “Retrospective Study of the Costs of EPA Regulations: A Report of Four Case Studies.” EPA 240-F-14-001, [https://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0575.pdf/\\$file/EE-0575.pdf](https://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0575.pdf/$file/EE-0575.pdf) including its literature review, Chapter 1.1.

<sup>38</sup> Note that a portion of the five percent EV/PHEV penetration is attributed to the California Zero Emission Vehicle (ZEV) program which is included in our reference case. See TSD Section 1.2.1.1. The incremental penetration of EV/PHEVs needed to meet the EPA GHG standards is projected to be less than one percent. See Proposed Determination Appendix C.1.1.3.2, Tables C.19-C.22, p. A-136-137.

<sup>39</sup> 77 FR 62852-62883; October 15, 2012.

manufacturers even more technology options, and at potentially lower cost, than the Administrator was able to consider at this time for the Final Determination.

EPA's analysis indicates that the effectiveness of the technologies evaluated provides manufacturers with a feasible, reasonable mix of technologies that are predominantly in production today, though not always in combination. For example, a manufacturer may have moved to an advanced turbo-downsized engine design and applied aerodynamic improvements, but not yet applied more advanced transmission or applied further mass reduction opportunities. In addition, there are some straightforward improvements to these technologies that are anticipated and well-documented in the record. See, e.g., Proposed Determination TSD Chapters 2.2.3.4 through 2.2.3.11, and 2.2.7.2 through 2.2.7.5. Most of the automaker comments to the Proposed Determination regarding feasibility did not account for the possibility of using a broad slate of technologies in combination. A few manufacturers have shared with the EPA confidential business information illustrating technology walks (or “techwalks”), which show the cumulative effects of the application of various technologies applied to a given vehicle model. However, while the techwalks provided include some of the same advanced technologies considered by EPA, none of the techwalks include a fuller range of conventional technologies in the combinations described in the Proposed (and Final) Determination. Some are missing very reasonable vehicle technologies, some are missing very reasonable engine technologies, and some are missing very reasonable transmission technologies. Because the manufacturer example techwalks don't include all technologies in the appropriate combinations and in some cases don't include the appropriate credit values, the examples show a shortfall (as would be expected) of about 20-40 g/mi depending on the vehicle. This resulting gap between the EPA and manufacturer-supplied projections would be eliminated if a broader set of the available technologies described in the Final Determination were included in their analysis and appropriate credit values were used.

Moreover, the EPA believes there is ample lead time between now and MY2022-2025 for manufacturers to continue implementing additional technologies into their vehicle production such that the MY2022-2025 standards can be achieved.

In considering whether lead time for the MY2022-2025 standards is adequate, the EPA recognizes that these standards were first established in 2012, providing the auto manufacturers with up to 13 years of lead time for product planning to meet these standards. In the 2012 rule, the EPA concluded that, “EPA agrees that the long lead time in this rulemaking should provide additional certainty to manufacturers in their product planning. The EPA believes that there are several factors that have quickened the pace with which new technologies are being brought to market, and this will also facilitate regulatory compliance.”<sup>40</sup> As noted, in setting the standards in 2012, the EPA was beginning to see that technologies were being brought to market at a quickened pace, and this trend has clearly continued over the past four years (see Proposed Determination Section II). The EPA's 2016 CO<sub>2</sub> and Fuel Economy Trends report provides even further evidence of the rapid pace at which manufacturers are bringing advanced technologies into the fleet. For example, GM, Honda and Hyundai have implemented advanced transmissions on 80-90 percent of their fleets within the past five years. Over that same period, GM and Ford have implemented turbocharged engines on 25 percent and 40 percent of their fleets,

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<sup>40</sup> 77 FR 62880; October 15, 2012.

respectively. Given that the EPA projects that the fleet as a whole could reach the 2025 standards with penetrations of 27 percent turbo-downsized 18 bar engines, and 7 percent turbo-downsized 24 bar engines, these penetration rates are clearly achievable given the pace with which some manufacturers have already implemented similar technologies.<sup>41</sup> With respect to the issue of lead time for the Atkinson engine technology, many of the building blocks necessary to operate an engine in Atkinson mode are already present in the MY2016 fleet (including gasoline direct injection (GDI), increased valve phasing authority, higher compression ratios, and (in some instances) cooled exhaust gas recirculation (cEGR)). Some of the potential packaging obstacles mentioned in comments, such as exhaust manifold design, should not be an impediment because more conventional manifold designs (not requiring a revamping of vehicle architecture) are both available and demonstrated in non-hybrid Atkinson cycle applications. There thus should be sufficient lead time before MY2022 to adopt the technology, since it could be incorporated without needing to be part of a major vehicle redesign.

Indeed, technology adoption rates and the pace of innovation have accelerated even beyond what EPA expected when initially setting these standards, which will further aid in addressing any potential for lead time concerns. By the time manufacturers must meet the MY2025 standards, since the standards were set in 2012, they will have had up to 13 years of lead time for product planning and at least 2-3 product redesign cycles, and at present manufacturers still have 5 to 8 years of lead time until the MY2022-2025 standards, with at least 1-2 redesign cycles.<sup>42</sup>

The EPA has also evaluated the progress of the existing fleet in meeting standards in future model years. See the Proposed Determination TSD Appendix C. This assessment shows that more than 100 individual MY2016 vehicle versions, or about 17 percent of the fleet, already meet future footprint-based CO<sub>2</sub> targets for MY2020 with current powertrains and air conditioning improvements. These figures do not include off-cycle credits in assessing compliance. In light of the fact that manufacturers are reporting an average of 3 g/mi of off-cycle credits across the fleet for 2015, with some manufacturers reporting more than 4 g/mi off-cycle credits, the share of the MY2016 fleet that can already meet the MY2020 footprint-based CO<sub>2</sub> targets -- four years ahead of schedule-- is actually even higher.

Notably, the majority of these vehicles are gasoline powertrains, and the vehicles include nearly every vehicle type, including midsize cars, SUVs, and pickup trucks, and span nearly every major manufacturer. It is important to note that because of the fleetwide averaging structure of the standards, not all vehicles are required to be below their individual targets, and in fact EPA expects that manufacturers will be able to comply with the standards with roughly 50 percent of their production meeting or falling below the footprint based targets. This analysis is another indication that the fleet is on track to meet future standards, especially given the 5 to 8 years of lead time remaining to MY2022-2025.

Consequently, evaluating the factors the EPA is required to consider under 40 CFR 86.1818(h)(1) (i), (ii), and (iii) of the mid-term evaluation rules, based on the current record before the Administrator, there is available and effective technology to meet the MY2022-2025 standards, it is available at reasonable cost to the producers and purchasers of new motor

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<sup>41</sup> EPA 2016 CO<sub>2</sub> and Fuel Economy Trends Report, Figures 6.2, 6.3 and 6.5.

<sup>42</sup> Redesign cycles are summarized in the Proposed Determination Appendix A and are discussed in greater detail in the 2012 FRM final Joint Technical Support Document, EPA-420-R-12-901, at Chapter 3.5.1.

vehicles or new motor vehicle engines, there is adequate lead time to meet those standards, and the standards are thus feasible and practicable. Moreover, this most recent analysis remains consistent with the key conclusions reached in the 2012 FRM: there are multiple compliance paths based chiefly on deployment of advanced gasoline engine technologies with minimal needed penetration of strong hybrid or full electric vehicles, projected per vehicle costs are lower than in the 2012 FRM, and the cost of the lower emitting technology is fully paid back by the associated fuel savings.

*(iv) The impact of the standards on reduction of emissions, oil conservation, energy security, and fuel savings by consumers*

The EPA also has considered the impact of the standards on reduction of emissions, oil conservation, energy security, and fuel savings by consumers, again as required by the Midterm Evaluation rules. Light-duty vehicles are significant contributors to the U.S. GHG emissions inventory—responsible for 61 percent of U.S. transportation GHG emissions and 16 percent of total U.S. GHG emissions in 2014—and thus must be a critical part of any program to reduce U.S. GHG emissions. EPA projects that the MY2022-2025 standards will reduce GHG emissions annually by more than 230 million metric tons (MMT) by 2050, and nearly 540 MMT over the lifetime of MY2022-2025 vehicles. See Proposed Determination Section IV.A.4, Table IV.6, and Appendix C.2. These projected GHG reductions associated with the MY2022-2025 standards are significant compared to total light-duty vehicle GHG emissions of 1,100 MMT in 2014.<sup>43</sup> See Proposed Determination Section IV and Table IV.6.

These standards are projected to reduce oil consumption by 50 billion gallons and to save U.S. consumers nearly \$92 billion in fuel cost over the lifetime of MY2022-2025 vehicles. See Proposed Determination Table IV.8 and IV.13, respectively. On average for a MY2025 vehicle (compared to a vehicle meeting the MY2021 standards), consumers will save more than \$2,800 in total fuel costs over that vehicle's lifetime, with a net savings of \$1,650 after taking into consideration the upfront increased vehicle costs. See Proposed Determination Table IV.12, 3 percent discount rate case. EPA considers a range of societal benefits of the standards, including the social costs of carbon and other GHGs, health benefits, energy security, the value of time saved for refueling, and others.

Benefits are projected to far outweigh the costs, with net benefits totaling nearly \$100 billion over the lifetime of MY2022-2025 vehicles (3 percent discount rate). See Proposed Determination Section IV.A.6 and Table IV.13. As was the case when the EPA first established the MY2022-2025 standards in the 2012 rule, this analysis also supports a conclusion that the standards remain appropriate – and indeed will provide enormous benefits -- from the standpoint of impacts of the standards on emissions, oil conservation, energy security, and fuel savings.

*(v) The impact of the standards on the automobile industry*

EPA has assessed the impacts of the standards on the automobile industry. We have estimated the costs required to meet the MY2022-2025 standards at about \$33 billion (see

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<sup>43</sup> Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2014, EPA 430-R-16-002, April 15, 2016.

Proposed Determination Section IV.A and Table IV.13), with an average per-vehicle cost of about \$875 (see Proposed Determination Section IV.A and Tables IV.4 and IV.5). These costs are less than those originally projected when the EPA first established these standards in the 2012 rule; at that time, we had projected an average per vehicle cost of approximately \$1,100 (see Table 12.44 of the Draft TAR). The Administrator found those (higher) projected costs to be reasonable in the 2012 rule, and finds the lower projected costs shown in our current analysis continues to support the appropriateness of the standards.

In addition to costs, the EPA has assessed impacts on the auto industry in terms of potential impacts on vehicle sales. See Proposed Determination Section III and Appendix B and TSD Chapter 4. As part of these assessments, the EPA has evaluated a range of issues affecting consumers' purchases of vehicles, which also addresses a portion of the factor, "the cost on the producers or purchasers of new motor vehicles or new motor vehicle engines" (emphasis added, 40 CFR 86.1818-12(h)(ii)). EPA's assessments indicate that, to date, there is little, if any, evidence that consumers have experienced adverse effects from the standards. Vehicle sales continue to be strong, with annual increases for seven straight years, through 2016, for the first time in 100 years, and record sales in 2016. These sales increases are likely due not to the standards, but rather to economic recovery from the 2008-2009 recession. Nevertheless, at the least, we find no evidence that the standards have impeded sales. We also have not found any evidence that the technologies used to meet the standards have imposed "hidden costs" in the form of adverse effects on other vehicle attributes. See Proposed Determination Appendix B.1.4 and B.1.5.2. Similarly, we have not identified significant effects on vehicle affordability to date. See Proposed Determination Appendix B.1.6. We recognize that the standards will have some impact on the price of new vehicles, but we do not believe that the standards have significantly reduced the availability of vehicle model choices for consumers at any particular price point, including the lowest price vehicle segment. *Id.* at Appendix B.1.6.1. Given the lead time provided since the 2012 rule for automakers to achieve the MY2022-25 standards, and the evidence to date of consumer acceptance of technologies being used to meet the standards, the EPA expects that any effects of the standards on the vehicle market will be small relative to market responses to broader macroeconomic conditions.

The main argument in the public comments on both the Draft TAR and the Proposed Determination that the standards will have an adverse impact on the industry is that the standards, although achievable, will require extensive electrification of the fleet to do so, and this will result in more expensive vehicles -- and an emerging technology -- which consumers will be reluctant to purchase. Our analysis, however, indicates that there are multiple compliance pathways which would need only minimal (less than 3 percent) of strong hybrids and electric vehicles, and that the great bulk of technologies used would be based on improvements to gasoline internal combustion engines. This is true not only in the agency's primary analysis, but also in a series of sensitivity analyses (assuming, among other things, significantly less use of the Atkinson engine technology, and a wide range of fuel prices). See Table ES-1 and the Proposed Determination Section IV.A.3 and Appendix C.1. This analysis is also consistent with findings of the 2015 NAS study (as well as each agency's findings in the 2012 FRM).<sup>44</sup> Consequently, the EPA does believe that the evidence supports the claim of the comments on this point.

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<sup>44</sup> "Cost, Effectiveness and Deployment of Fuel Economy Technologies for Light-Duty Vehicles," National Research Council of the National Academies, June 2015.

The EPA also carefully considered the issue of whether there has been consumer acceptance of the new fuel efficiency technologies. As noted, industry sales are at a record high, with sales increasing for seven consecutive years for the first time since the 1920's. These sales trends provide no evidence of consumer reluctance to purchase the new technologies. Moreover, professional auto reviews found generally positive associations with the existence of the technologies. See Section B.1.5.1.2 of the Appendix to the Proposed Determination. The evidence to date thus supports consumer acceptance of the new technologies.

Another potential impact on the automobile industry that the EPA has assessed is the potential for impacts on employment. EPA's assessment projects job growth in the automotive manufacturing sector and automotive parts manufacturing sector due specifically to the need to increase expenditures for the vehicle technologies needed to meet the standards. We do not attempt to quantitatively estimate the total effects of the standards on the automobile industry, due to the significant uncertainties underlying any estimate of the impacts of the standards on vehicle sales. Nor do we quantitatively estimate the total effects on employment at the national level, because such effects depend heavily on the state of overall employment in the economy. We further note that, under conditions of full employment, any changes in employment levels in the regulated sector due to the standards are mostly expected to be offset by changes in employment in other sectors. See the Proposed Determination Appendix B.2. The Administrator finds that, while the standards are likely to have some effect on employment, this effect (whether positive or negative) is likely to be small enough that it will be unable to be distinguished from other factors affecting employment, especially macroeconomic conditions and their effect on vehicle sales.

The Administrator thus finds, based on the current record, that the standards will impose reasonable per vehicle costs (and less than those projected in the 2012 FRM), that there is no evidence of the standards having an adverse impact on vehicle sales or on other vehicle attributes, or on employment in the automotive industry sector. Given these assessments of potential impacts on costs to the auto industry and average per-vehicle costs, consumers' purchases of vehicles, and employment, the Administrator finds that the potential impacts on the automobile industry support a conclusion that the MY2022-2205 standards remain appropriate and should not be changed.

*(vi) The impacts of the standards on automobile safety*

The EPA has assessed the potential impacts of the standards on automobile safety. In the Proposed Determination, consistent with the Draft TAR's safety assessment, the EPA assessed the potential of the MY2022-2025 standards to affect vehicle safety. In the Draft TAR (Chapter 8), the agencies reviewed the relationships between mass, size, and fatality risk based on the statistical analysis of historical crash data, which included a new analysis performed by using the most recent available crash data. The EPA used this updated analysis<sup>45</sup> in the Proposed Determination to calculate the estimated safety impacts of the modeled mass reductions over the lifetimes of new vehicles in response to MY2022-2025 standards. See the Proposed

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<sup>45</sup> Puckett, S.M. and Kindelberger, J.C. (2016, June). Relationships between Fatality Risk, Mass, and Footprint in Model Year 2003-2010 Passenger Cars and LTVs – Preliminary Report. Washington, DC: National Highway Traffic Safety Administration.

Determination Section III.C.1 and Appendix B.3.1. EPA's analysis finds that the fleet can achieve modest levels of mass reduction as one technology among many to meet the MY2022-2025 standards without any net increase in fatalities. The 2015 NAS study further found that the footprint-based standards are likely to have little effect on vehicle and overall highway safety.<sup>46</sup> Therefore, the Administrator finds that the existing MY2022-2025 standards will have no adverse impact on automobile safety. There is no evidence in the public comments that suggests a different conclusion.

*(vii) The impact of the greenhouse gas emission standards on the corporate average fuel economy standards and a national harmonized program*

The EPA has assessed the impacts of the standards on the CAFE standards and a national harmonized program. EPA notes that NHTSA has established augural standards for MY2022-2025 and must by statute undertake a *de novo* notice and comment rulemaking to establish final standards for these model years. Under the Energy Policy and Conservation Act (EPCA) statute, as amended by the Energy Independence and Security Act (EISA), NHTSA must establish final standards at least 18 months before the beginning of each model year.<sup>47</sup> That statute requires the Secretary of Transportation to consult with the EPA Administrator in establishing fuel economy standards.<sup>48</sup> The EPCA/EISA statute includes a number of factors that NHTSA must consider in deciding maximum feasible average fuel economy, including "the effect of other motor vehicle standards of the Government on fuel economy."<sup>49</sup> Thus, in determining the CAFE standards for MY2022-2025, NHTSA can take into consideration the light-duty GHG standards, and indeed did so in initially establishing the MY2017-2021 CAFE standards and the augural MY2022-2025 standards. See 77 FR 62669, 62720, 62803-804. The EPA believes that by providing information on our evaluation of the current record and our determination that the existing GHG standards for MY2022-2025 are appropriate, we are enabling, to the greatest degree possible, NHTSA to take this analysis and the GHG standards into account in considering the appropriate CAFE standards for MY2022-2025.

The EPA recognizes that in 2012, when we discussed the mid-term evaluation, we expressed an intent that if EPA's determination was that the standards should not change, the EPA would issue its final determination concurrently with NHTSA's final rule adopting fuel economy standards for MY2022-2025. See 77 FR at 62633. Our intent was to align the agencies' proceedings for MYs 2022-2025 and to maintain a joint national program. *Id.* The EPA remains committed to a joint national program that aligns, as much as possible, the requirements of EPA, NHTSA, and CARB. The Administrator concludes, however, that providing her determination that the GHG standards remain appropriate now, rather than waiting until after NHTSA has proposed standards, allows NHTSA to fully account for the GHG standards and is more likely to align the agencies' determinations. Thus, the Administrator finds that her determination takes

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<sup>46</sup> "Cost, Effectiveness and Deployment of Fuel Economy Technologies for Light-Duty Vehicles," National Research Council of the National Academies, June 2015, Finding 10.2.

<sup>47</sup> 42 U.S.C. 32902(a).

<sup>48</sup> 42 U.S.C. 32902(b)(1).

<sup>49</sup> 42 U.S.C. 32902(f).

account of the relationship between GHG standards and fuel economy standards and supports the goal of a national harmonized program.<sup>50</sup>

In an action separate from this Final Determination, the EPA will be responding to a petition received from the auto industry trade associations, the Alliance of Automobile Manufacturers and Global Automakers, regarding several provisions that they request be harmonized between the EPA GHG standards and the NHTSA CAFE standards.<sup>51</sup> On December 21, 2016, NHTSA signed a Federal Register notice signaling its plan to consider the NHTSA-specific requests from the auto industry petition. The EPA likewise intends, in the near future, to continue working together with NHTSA, the Petitioners and other stakeholders, as we carefully consider the requests made in the June 2016 petition, and possible ways to further harmonize the national program.

*(viii) The impact of the standards on other relevant factors*

In addition to the above factors, the Administrator has also considered the factor of regulatory certainty -- which relates closely to the issue of lead time discussed above. Regulatory certainty gives the automakers the time they need to conduct long-term planning and engineering to meet future standards. Indeed, the 2012 standards covered a long period of time – 13 years—in order to provide the industry with a lengthy period of stability and certainty. Thus, the Midterm Evaluation called for rule changes only if the Administrator found the existing standards to be no longer feasible and appropriate. Clearly, as discussed above, the automakers' response to technology development and deployment in the face of the regulatory certainty provided by the MY2012-2021 standards, which are not subject to the midterm evaluation, has exceeded EPA's projections set out in the original 2012 rule. Having the same certainty on the level of the MY2022-2025 standards can now enable manufacturers to continue unimpeded their existing long-term product planning and technology development efforts, which, in turn, could lead to even further, and perhaps sooner, breakthroughs in technology. These efforts could contribute to the continued success of the industry and the GHG standards program, which in turn would benefit consumers through fuel savings and the public through reduced emissions. Initiating a rulemaking now to change the standards would disrupt the industry's planning for future product lines and investments. Thus, the Administrator finds that regulatory certainty is an important consideration in assessing the appropriateness of the standards.

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<sup>50</sup> The MTE rules themselves do not require concurrent timing with any aspect of NHTSA's rulemaking. Moreover, there is uncertainty as to whether the NHTSA rulemaking would be complete by the date on which EPA is mandated to make a final determination, so that the expressed hope (in the 2012 preamble) of concurrent proceedings may be overtaken by events in any case.

<sup>51</sup> "Petition for Direct Final Rule with Regard to Various Aspects of the Corporate Average Fuel Economy Program and the Greenhouse Gas Program," submitted by the Alliance of Automobile Manufacturers and the Association of Global Automakers to EPA and NHTSA, June 20, 2016.

### III. Final Determination

Having considered available information on each of the above factors required by the regulations, under 40 CFR 86.1818-12(h)(1), the Administrator is determining that the GHG standards currently in place for MYs 2022-2025 are appropriate under section 202(a)(1) and (2) of the Clean Air Act. The Administrator has fully considered public comments submitted on the Proposed Determination, and there has been no information provided through the comments that compels or persuades the Administrator to alter her Proposed Determination. The consequence of this final determination is a continuation of the current regulatory status quo. The regulations themselves are unaltered as a result of this determination.

In the Administrator's view, the record clearly establishes that, in light of technologies available today and improvements we project will occur between now and MY2022-2025, it will be practical and feasible for automakers to meet the MY2022-2025 standards at reasonable cost that will achieve the significant GHG emissions reduction goals of the program, while delivering significant reductions in oil consumption and associated fuel savings for consumers, significant benefits to public health and welfare, and without having material adverse impact on the industry, safety, or consumers. The Administrator recognizes that not all of the technologies available today have been implemented in a widespread manner, but she also recognizes that the purpose of the Midterm Evaluation is to assess whether the standards remain appropriate in light of the pace of compliance and technological development in the industry. As discussed above, the technological development of advanced gasoline vehicle technologies has surpassed EPA's expectations when we initially adopted the standards. Although we anticipated in 2012 that the standards could be met primarily using advanced gasoline engine and transmission technologies, the range of technology development has been more extensive and effective than anticipated. The industry's vibrancy, initiative, and ingenuity is to be commended. The Administrator concludes that the MY2022-2025 standards could be largely met simply by implementation of these technologies, but we recognize that we are at the mid-point of these standards phasing-in and it would be unreasonable, in light of past developments, ongoing investment by the industry, and EPA's extensive review of the literature on future technologies and improvements to existing technologies, to expect that no further technology development would occur that could be implemented for MY2022-2025 vehicles. In the Draft TAR and Proposed Determination, the EPA was not even able to consider all of the technologies being developed because of the rapid pace of development. As discussed in the Proposed Determination (see Section II and Appendix B), the EPA did not consider several technologies that we know are under active development and may potentially provide additional cost-effective technology pathway options for meeting the MY2025 standards; examples of such technologies include electric boosting, dynamic cylinder deactivation, and variable compression ratio. A significant difference between the industry analysis and that of the EPA is over the extent to which electric vehicle production will be needed to meet the standards. Many of industry's comments regarding cost, consumer acceptance, and other factors primarily stem from their view that significant EV penetration will be required. As discussed earlier, the Administrator has considered the report of the National Academy of Sciences and information and data from the auto industry, and she has determined based on the technical record before her that the industry's conclusions do not take into account the possibility of applying the full range of road load reduction and non-electrified powertrain technologies broadly across high volume models, and in the combinations, that the EPA assessed in the Proposed Determination and Draft TAR. In addition, the automotive industry has been

characterized throughout its history by continued innovation and adoption of ever-improving technologies to improve fuel economy and lower emissions while simultaneously providing a range of vehicles to customers with the features they desire (safety, driveability, etc.). Thus, in light of the pace of progress in reducing GHG emissions since the MY2022-2025 standards were adopted, the success of automakers in achieving the standards to date while vehicle sales are strong, the projected costs of the standards, the impact of the standards on reducing emissions and fuel costs for consumers, and the other factors identified in 40 CFR 86.1818-12(h) and discussed above, the Administrator concludes that the record does not support a conclusion that the MY2022-2025 standards should be revised to make them less stringent.

The Administrator has also considered whether, in light of these factors and the record (including public comments urging more stringent standards), it would be appropriate to make the standards more stringent. She recognizes that the current record, including the current state of technology and the pace of technology development and implementation, could support a decision to adopt more stringent standards for MY2022-2025 (or, put more precisely, could support a decision to initiate rulemaking proposing to amend the standards to increase their stringency). The EPA found in 2012 that the projected standards were feasible at reasonable cost, and the current record shows that the standards are feasible at even less cost and that there are more available technologies (particularly advanced gasoline technologies) than projected in 2012, and that the benefits outweigh the costs by nearly \$100 billion. These factors could be the basis for a proposal to amend the standards to increase the standards' stringency. Moreover, one could point to the overall need to significantly reduce greenhouse gases in the transportation sector even further, especially given expected growth in vehicle travel. The Administrator also recognizes, however, that regulatory certainty is an important and critical consideration. Regulatory certainty gives the automakers the time they need to conduct long-term planning and engineering that could lead to major advancements in technology while contributing to the continued success of the industry and the GHG standards program, which in turn will benefit consumers and reduce emissions. She also believes a decision to maintain the current standards provides support to a timely NHTSA rulemaking to adopt MY2022-2025 standards and a harmonized national program. Thus, the Administrator has concluded that it is appropriate to provide the full measure of lead time for the MY2022-2025 standards, rather than initiating rulemaking to adopt new, more stringent standards with a shorter lead time and significant uncertainty in the interim which would impede on-going technological improvements and innovation.

Accordingly, the Administrator concludes that in light of all the prescribed factors, and considering the entire record, the current MY2022-2025 standards are appropriate.

**III.**

Excerpt of EPA Regulations:

40 C.F.R. § 86.1818-12(h), Mid-term evaluation of standards

40 C.F.R. 86.1818-12, Greenhouse gas emission standards for light-duty vehicles, light-duty trucks, and medium-duty passenger vehicles.

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**(h)** Mid-term evaluation of standards.

No later than April 1, 2018, the Administrator shall determine whether the standards established in paragraph (c) of this section for the 2022 through 2025 model years are appropriate under section 202(a) of the Clean Air Act, in light of the record then before the Administrator. An opportunity for public comment shall be provided before making such determination. If the Administrator determines they are not appropriate, the Administrator shall initiate a rulemaking to revise the standards, to be either more or less stringent as appropriate.

**(1)** In making the determination required by this paragraph (h), the Administrator shall consider the information available on the factors relevant to setting greenhouse gas emission standards under section 202(a) of the Clean Air Act for model years 2022 through 2025, including but not limited to:

- (i)** The availability and effectiveness of technology, and the appropriate lead time for introduction of technology;
- (ii)** The cost on the producers or purchasers of new motor vehicles or new motor vehicle engines;
- (iii)** The feasibility and practicability of the standards;
- (iv)** The impact of the standards on reduction of emissions, oil conservation, energy security, and fuel savings by consumers;
- (v)** The impact of the standards on the automobile industry;
- (vi)** The impacts of the standards on automobile safety;
- (vii)** The impact of the greenhouse gas emission standards on the Corporate Average Fuel Economy standards and a national harmonized program; and
- (viii)** The impact of the standards on other relevant factors.

**(2)** The Administrator shall make the determination required by this paragraph (h) based upon a record that includes the following:

**(i)** A draft Technical Assessment Report addressing issues relevant to the standard for the 2022 through 2025 model years;

**(ii)** Public comment on the draft Technical Assessment Report;

**(iii)** Public comment on whether the standards established for the 2022 through 2025 model years are appropriate under section 202(a) of the Clean Air Act; and

**(iv)** Such other materials the Administrator deems appropriate.

**(3)** No later than November 15, 2017, the Administrator shall issue a draft Technical Assessment Report addressing issues relevant to the standards for the 2022 through 2025 model years.

**(4)** The Administrator will set forth in detail the bases for the determination required by this paragraph (h), including the Administrator's assessment of each of the factors listed in paragraph (h)(1) of this section.

#### IV.

EPA, NHTSA, & CARB, Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025, Executive Summary (July 2016)

# Draft Technical Assessment Report:

## Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025

### Executive Summary

**Draft Technical Assessment Report:**

**Midterm Evaluation of Light-Duty  
Vehicle Greenhouse Gas Emission  
Standards and Corporate Average Fuel  
Economy Standards for Model Years  
2022-2025**

**Executive Summary**

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

National Highway Traffic Safety Administration  
U.S. Department of Transportation

And

California Air Resources Board

## Executive Summary

The Environmental Protection Agency (EPA) and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) have established a coordinated program for Federal standards for greenhouse gas (GHG) emissions and corporate average fuel economy (CAFE) for light-duty vehicles.<sup>1</sup> This program was developed in cooperation and alignment with the California Air Resources Board (CARB) to ensure a single National Program. The National Program established standards that increase in stringency year-over-year from model year (MY) 2012 through MY2025 for EPA and through MY2021 for NHTSA. California adopted the first in the nation GHG standards for light-duty vehicles in 2004 for MY2009-2016, and in 2012 for MY2017-2025, followed by amendments that allow compliance with the Federal GHG standards as compliance with the California GHG standards, in furtherance of a single National Program. Under the National Program, consumers continue to have a full range of vehicle choices that meet their needs, and, through coordination with the California standards, automakers can build a single fleet of vehicles across the U.S. that satisfies all GHG/CAFE requirements. In the agencies' 2012 final rules establishing the MY2017-2025 standards for EPA and 2017-2021 final and 2022-2025 augural standards for NHTSA, the National Program standards were projected by MY2025 to double fuel economy and cut GHG emissions in half, save 6 billion metric tons of carbon dioxide (CO<sub>2</sub>) pollution and 12 billion barrels of oil over the lifetime of MY2012-2025 vehicles, and deliver significant savings for consumers at the gas pump.

The rulemaking establishing the National Program for MY 2017-2025 light-duty vehicles included a regulatory requirement for EPA to conduct a Midterm Evaluation (MTE) of the GHG standards established for MYs 2022-2025.<sup>i</sup> The 2012 final rule preamble also states that “[t]he mid-term evaluation reflects the rules’ long time frame, and, for NHTSA, the agency’s statutory obligation to conduct a *de novo* rulemaking in order to establish final standards for MYs 2022-2025.” NHTSA will consider information gathered as part of the MTE record, including information submitted through public comments, in the comprehensive *de novo* rulemaking it must undertake to set CAFE standards for MYs 2022-2025.<sup>ii</sup> Through the MTE, EPA must determine no later than April 1, 2018 whether the MY2022-2025 GHG standards, established in 2012, are still appropriate under section 202 (a) of the Clean Air Act, in light of the record then before the Administrator, given the latest available data and information.<sup>iii</sup> EPA’s decision could go one of three ways: the standards remain appropriate, the standards should be less stringent, or the standards should be more stringent. EPA and NHTSA also are closely coordinating with CARB in conducting the MTE to better ensure the continuation of the National Program. The MTE will be a collaborative, data-driven, and transparent process and must entail a holistic assessment of all the factors considered in the initial standards setting.<sup>iv</sup>

This Draft Technical Assessment Report (TAR), issued jointly by EPA, NHTSA, and CARB for public comment, is the first formal step in the MTE process.<sup>v</sup> In this Draft TAR, the agencies examine a wide range of technical issues relevant to GHG emissions and augural CAFE standards for MY2022-2025, and share with the public the initial technical analyses of those issues. This is a technical report, not a policy or decision document. The information in this

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<sup>1</sup> The agencies finalized the first set of National Program standards covering model years (MYs) 2012-2016 in May 2010<sup>1</sup> and the second set of standards, covering MYs 2017-2025, in October 2012.

report, and in the comments we receive on it, will inform the agencies' subsequent determination and rulemaking actions. The agencies will fully consider public comments on this Draft TAR as they continue to update and refine the analyses for further steps in the MTE process.

In this Draft TAR, EPA provides its initial technical assessment of the technologies available to meet the MY2022-2025 GHG standards and one reasonable compliance pathway, and NHTSA provides its initial assessment of technologies available to meet the avarage MY2022-2025 CAFE standards and a different reasonable compliance pathway. Given that there are multiple possible ways that new technologies can be added to the fleet, examining two compliance pathways provides valuable additional information about how compliance may occur. NHTSA and EPA also performed multiple sensitivity analyses which show additional possible compliance pathways. The agencies' independent analyses complement one another and reach similar conclusions:

- A wider range of technologies exist for manufacturers to use to meet the MY2022-2025 standards, and at costs that are similar or lower, than those projected in the 2012 rule;
- Advanced gasoline vehicle technologies will continue to be the predominant technologies, with modest levels of strong hybridization and very low levels of full electrification (plug-in vehicles) needed to meet the standards;
- The car/truck mix reflects updated consumer trends that are informed by a range of factors including economic growth, gasoline prices, and other macro-economic trends. However, as the standards were designed to yield improvements across the light duty vehicle fleet, irrespective of consumer choice, updated trends are fully accommodated by the footprint-based standards.

Additionally, while the Draft TAR analysis focuses on the MY2022-2025 standards, the agencies note that the auto industry, on average, is over-complying with the first several years of the National Program. This has occurred concurrently with a period during which the automotive industry successfully rebounded after a period of economic distress. The industry has now seen six consecutive years of increases and a new all-time sales record in 2015, reflecting positive consumer response to vehicles complying with the standards.

A summary of each chapter of the Draft TAR follows.

**Chapter 1: Introduction.** This chapter provides a broad discussion of the National Program, explains further the MTE process and timeline, and provides additional background on NHTSA's CAFE program, EPA's GHG program, and California's GHG program. This chapter also includes an update on what the latest science tells us about climate change impacts, and the U.S.'s and California's commitments on actions to address climate change. Chapter 1 also provides a discussion of petroleum consumption and energy security.

**Chapter 2: Overview of Agencies' Approach to Draft TAR Analysis.** The agencies are committed to conducting the MTE through a collaborative, data-driven, and transparent process. In gathering data and information for this Draft TAR, the agencies drew from a wide range of sources to evaluate how the automotive industry has responded into the early years of the National Program, how technology has developed, and how other factors affecting the light-duty vehicle fleet have changed since the final rule in 2012. The agencies found that there is a wealth of information since the 2012 final rule upon which to inform this Draft TAR, and this

information is detailed throughout the document. Chapter 2 describes these sources, including extensive state-of-the-art research projects by experts at the EPA National Vehicle and Fuel Emissions Laboratory, as well as consultants to the agencies, data and input from stakeholders, and information from technical conferences, published literature, and studies published by various organizations. A significant study informing the agencies' analyses is the National Academy of Sciences 2015 report<sup>vi</sup> on fuel economy technologies, which the agencies highlight in Chapter 2, and discuss throughout this document.

The analyses presented in this Draft TAR reflect the new data and information gathered by the agencies thus far, and the agencies will continue to gather and evaluate more up-to-date information, including public comments on this Draft TAR, to inform our future analyses. The agencies have conducted extensive outreach with a wide range of stakeholders – including auto manufacturers, automotive suppliers, non-governmental organizations (NGOs), consumer groups, labor unions, automobile dealers, state and local governments, and others.

**Chapter 3: Recent Trends in the Light-Duty Vehicle Fleet since the 2012 Final Rule.**

This chapter summarizes trends in the light-duty vehicle market in the four years since the 2012 final rule, including changes in fuel economy/GHG emissions, vehicle sales, gasoline prices, car/truck mix, technology penetrations, and vehicle power, weight and footprint. Since the 2012 final rule, vehicle sales have been strong, hitting an all-time high of 17.5 million vehicles in 2015, gas prices have dropped significantly, and truck share has grown. At the same time, fuel economy technologies are entering the market at rapid rates. The agencies provide the latest available projections for vehicle sales, gasoline prices, and fleet mix out to 2025, and compare those to projections made in the 2012 final rule. This chapter also highlights compliance to date with the GHG and CAFE standards, where, for the first three years of the program (MY2012-2014), auto manufacturers have over-complied with the program.

**Chapter 4: Baseline and Reference Vehicle Fleets.** This chapter describes the agencies' methodologies for developing a baseline fleet of vehicles and future fleet projections out to MY2025. The GHG analysis uses a baseline fleet based on the MY2014 fleet, the latest year available for which there are final GHG compliance data. The CAFE analysis uses a MY2015 baseline fleet based on MY2015 data and sales projections provided by manufacturers in the latter half of MY2015, when production was well underway. These data sets complement one another and each yield important perspective, with the MY2014 data having the benefit of validation through compliance data, and the MY2015 data providing more recent perspective. The GHG and CAFE analysis fleets utilized similar, but separate, purchased projections from IHS-Polk for the future vehicle fleet mix out to 2025, thereby representing some of the uncertainty inherent in all reference case projections. Both analyses used data from the Energy Information Administration's Annual Energy Outlook 2015 (AEO 2015) as the basis for total vehicle sales projections to 2025, as well as for the car and truck volume mix. Although the agencies have relied on different data sources in development of the baseline fleets, we believe this combination of approaches strengthens our results by showing robust results across a range of reference case projections.

**Chapter 5: Technology Costs, Effectiveness, and Lead-Time Assessment.** This chapter is an in-depth assessment of the state of vehicle technologies to improve fuel economy and reduce GHG emissions, as well as the agencies' assessment of expected future technology developments through MY2025. The technologies evaluated include all those considered for the 2012 final

rule, as well as new technologies that have emerged since then. Every technology has been reconsidered with respect to its cost, effectiveness, application, and lead-time considerations, with emphasis on assessing the latest introductions of technologies to determine if and how they have changed since the agencies' assessment in the 2012 final rule. These efforts reflect the significant rate of progress made in automotive technologies over the past four years since the MY2017-2025 standards were established. Technologies considered in this Draft TAR include more efficient engines and transmissions, aerodynamics, light-weighting, improved accessories, low rolling resistance tires, improved air conditioning systems, and others. Beyond the technologies the agencies considered in the 2012 final rule, manufacturers are now employing several technologies, such as higher compression ratio, naturally aspirated gasoline engines, and greater penetration of continuously variable transmissions (CVTs); other new technologies are under active development and are expected to be in the fleet well before MY2025, such as 48-volt mild hybrid systems.

In Chapter 5, the agencies also provide details on the specific technology assumptions used respectively by EPA for the GHG assessment and by NHTSA for the CAFE assessment in this Draft TAR, including the specific assumptions that EPA and NHTSA each made for each technology's cost and effectiveness, and lead-time considerations. The agencies' estimates of technology effectiveness were informed by vehicle simulation modeling approaches; NHTSA utilized the Autonomie model developed by Argonne National Laboratories for the Department of Energy (DOE), and EPA used its Advanced Light-duty Powertrain and Hybrid Analysis (ALPHA) model. The agencies look forward to public comment in this and other areas to help advance collective forecasting of technology effectiveness in the out years of the program.

It is clear that the automotive industry is innovating and bringing new technology to market at a rapid pace and neither of the respective agency analyses reflects all of the latest and emerging technologies that may be available in the 2022-2025 time frame. For example, the agencies were not able for this Draft TAR to evaluate the potential for technologies such as electric turbo-charging, variable compression ratio, skip-fire cylinder deactivation, and P2-configuration mild-hybridization. These technologies may provide further cost-effective reductions in GHG emissions and fuel consumption. The agencies will continue to update their analyses throughout the MTE process as new information becomes available.

**Chapter 6: Assessment of Consumer Acceptance of Technologies that Reduce Fuel Consumption and GHG Emissions.** This chapter reviews issues surrounding consumer acceptance of the vehicle technologies expected to be used to meet the MY2022-2025 standards. Since the program has been in effect since MY2012, the agencies focus on the evidence to date related to consumer acceptance of vehicles subject to the National Program standards. This evidence includes an analysis of how professional auto reviewers assess fuel-saving technologies. For each technology, positive evaluations exceed negative evaluations, suggesting that it is possible to implement these technologies without significant hidden costs. To date, consumer response to vehicles subject to the standards is positive. Chapter 6 also discusses potential impacts of the standards on vehicle sales and affordability, which are closely interconnected with the effects of macroeconomic and other market forces. Based on the agencies' draft assessments, the reduced operating costs from fuel savings over time are expected to far exceed the increase in up-front vehicle costs, which should mitigate any potential adverse effects on vehicle sales and affordability.

**Chapter 7: Employment Impacts.** This chapter discusses the effects of employment in the automotive sector to date, and the projected effects of the MY 2022-2025 standards on employment. Employment in the automotive industry dropped sharply during the Great Recession, but has increased steadily since 2009. The primary employment effects of these standards are expected to be found in several key sectors: auto manufacturers, auto parts manufacturing, auto dealers, fuel production and supply, and consumers. The MY2025 standards are likely to have some effect on employment, due to both the effects of the standards on vehicle sales, and the need to produce new technologies to meet the standards. Nevertheless, the net effect of the standards on employment is likely to be small compared to macroeconomic and other factors affecting employment.

**Chapter 8: Assessment of Vehicle Safety Effects.** This chapter assesses the estimated overall crash safety impacts of the MY 2022-2025 standards. In this chapter, the agencies first review the relationships between mass, size, and fatality risk based on the statistical analysis of historical crash data, which includes the new analysis performed by using the most recent crash data. The updated NHTSA analysis develops five parameters for use in both the NHTSA and EPA assessments to calculate the estimated safety impacts of the modeled mass reductions over the lifetimes of new vehicles in response to MY 2022-2025 GHG standards and augural CAFE standards. Second, to examine the impact of future lightweight vehicle designs on safety, the agencies also reviewed a fleet crash simulation study that examined frontal crashes using existing and future lightweight passenger car and cross-over utility vehicle designs. The study found a relationship between vehicle mass reduction and safety that is directionally consistent with the overall risk for passenger cars from the NHTSA 2016 statistical analysis of historical crash data. Next, the agencies investigate the amount of mass reduction that is affordable and feasible while maintaining overall fleet safety and as well as functionality such as durability, drivability, noise, vibration and handling (NVH), and acceleration performance. Based on those approaches, the agencies further discuss why the real world safety effects might be less than or greater than calculated safety impacts, and what new challenges these lighter vehicles might bring to vehicle safety and potential countermeasures available to manage those challenges effectively.

**Chapter 9: Assessment of Alternative Fuel Infrastructure.** This chapter assesses the status of infrastructure for alternative fueled vehicles, with emphasis on two technologies the agencies believe will be important for achieving longer-term climate and energy goals – plug-in electric vehicles (PEVs) and fuel cell electric vehicles (FCEVs). The agencies also discuss infrastructure for ethanol (E85) flex-fueled vehicles and natural gas vehicles. The agencies' assessment is that, as we concluded in the 2012 rule, high penetration levels of alternative fueled vehicles will not be needed to meet the MY2025 standards, with the exception of a very small percentage of PEVs, and that infrastructure is progressing sufficiently to support vehicles from those manufacturers choosing to produce alternative fueled vehicles to meet the MY2022-2025 standards. The majority of PEV charging occurs at home, and national PEV infrastructure in public and work locations is progressing appropriately. Hydrogen infrastructure developments are addressing many of the initial challenges of simultaneously launching new vehicle and fueling infrastructure markets, and current efforts in California and the northeast states will facilitate further vehicle and infrastructure rollout at the national level.

**Chapter 10: Economic and Other Key Inputs Used in the Agencies' Analyses.** This chapter describes many of the economic and other inputs used in the agencies' analyses. This

chapter discusses the methodologies used to assess inputs such as the real-world fuel economy/GHG emissions gap, vehicle miles traveled (VMT), vehicle survival rates, the VMT rebound effect, energy security, the social cost of carbon and other GHGs, health benefits, consumer cost of vehicle ownership, and others.

**Chapter 11: Credits, Incentives and Flexibilities.** The National Program was designed with a wide range of optional compliance flexibilities to allow manufacturers to maintain consumer choice, spur technology development, and reduce compliance costs, while achieving significant GHG and oil reductions. Chapter 11 provides an informational overview of all of these compliance flexibilities, with particular emphasis on those flexibility options likely to be most important in the MY2022-2025 timeframe.

**Chapter 12: Analysis of the MY2022-2025 GHG Standards;** and **Chapter 13: Analysis of Augural CAFE Standards.** Chapters 12 and 13 provide results, respectively, of EPA's initial technical assessment of the technologies available to meet the MY2022-2025 GHG standards (i.e., the footprint-based standard curves) and their costs, and NHTSA's initial technical assessment of technologies capable of meeting CAFE standards corresponding to the augural standards for MY2022-2025, and these technologies' costs. CARB has not conducted an independent analysis, but has participated in both EPA's and NHTSA's analyses. Although all three agencies have been working collaboratively in an array of areas throughout the development of this Draft TAR, the EPA GHG and NHTSA CAFE assessments were done largely independently. These independent analyses were done in part to recognize differences in the agencies' statutory authorities and to reflect independent choices regarding some of the modeling inputs used at this initial stage of our evaluation. The agencies believe that independent and parallel analyses can provide complementary results. The agencies further believe that, for this Draft TAR which is the first step of the Midterm Evaluation process, it is both reasonable and advantageous to make use of different data sources and modeling tools, and to show multiple pathways for potential compliance with the MY 2022-2025 GHG standards and augural CAFE standards.

As noted above, although CARB did not perform its own modeling assessment of the costs and technologies to meet the 2022-2025 GHG and CAFE requirements, it was integrally involved in analyzing the underlying technology cost and effectiveness inputs to the EPA and NHTSA modeling. CARB believes that the analyses presented in this Draft TAR appropriately present a range of technologies that could be used to meet the requirements. However, as discussed above, there are, and will continue to be, emerging technologies that may well be available in the 2022-2025 timeframe and could perform appreciably better or be lower cost than the technologies modeled in this Draft TAR. Such technologies are exemplified by recent advancements already seen in the marketplace yet not anticipated by the agencies' rule four years ago (e.g., expanded use of higher compression ratio, naturally aspirated gasoline engines). Vehicle manufacturers have historically outpaced agency expectations and CARB believes it is likely that industry will continue to do so.

In this Draft TAR, NHTSA does not present alternatives to the augural standards because, as the first stage of the Midterm Evaluation process, the TAR is principally an exploration of technical issues -- including assumptions about the effectiveness and cost of specific technologies, as well as other inputs, methodologies and approaches for accounting for these issues. The agencies seek comment from stakeholders to further inform the analyses, in advance

of the NHTSA rulemaking and the EPA Proposed Determination. For the purposes of clearly reflecting the impacts of updated technology assumptions relative to a familiar point of comparison, both agencies have run their respective models using the stringency levels included in NHTSA's augural standards, and EPA's existing GHG standards through MY2025. However, the technology assumptions and other analyses presented in this Draft TAR, which will be informed by public comment, will support the development of a full range of stringency alternatives in the subsequent CAFE Notice of Proposed Rulemaking.

In this Draft TAR, the EPA GHG and NHTSA CAFE assessments both show that the MY2022-2025 standards can be achieved largely through the use of advanced gasoline vehicle technologies with modest penetrations of lower cost electrification (like 48 volt mild hybrids which include stop/start) and low penetrations of higher cost electrification (like strong hybrids, plug-in hybrid electric vehicles, and all electric vehicles). Given the rapid pace of automotive industry innovation, the agencies may consider effectiveness and cost of additional technologies as new information, including comments on this Draft TAR, becomes available for further steps of the Midterm Evaluation.

Based on various assumptions including the Annual Energy Outlook 2015 (AEO 2015) reference case projections of the car/truck mix out to 2025, the footprint-based GHG standards curves for MY2022-2025 are projected to achieve an industry-wide fleet average CO<sub>2</sub> target of 175 grams/mile (g/mi) in MY2025, and the augural CAFE standards are projected to result in average CAFE requirements increasing from 38.3 mpg in MY2021 to 46.3 mpg in MY2025. The projected fleet average CO<sub>2</sub> target represents a GHG emissions level equivalent to 50.8 mpg (if all reductions were achieved exclusively through fuel economy improvements).<sup>2</sup>

Table ES-1 below compares two additional AEO 2015 scenarios in addition to the AEO 2015 reference case: a low fuel price case and a high fuel price case. As shown, these fuel price cases translate into different projections for the car/truck fleet mix (e.g., with a higher truck share shown in the low fuel price case, and a lower truck share shown in the high fuel price case), which in turn leads to varying projections for the estimated fleet wide CAFE requirements and GHG CO<sub>2</sub> targets and MPG-e levels projected for MY2025, from 169 g/mi (52.6 mpg-e) under the high fuel price case to 178 g/mi (49.9 mpg-e) under the low fuel price case. These estimated GHG target levels and CAFE requirements reflect changes in the latest projections about the MY2025 fleet mix compared to the projections in 2012 when the agencies first established the standards. Under the footprint-based standards, the program is designed to ensure significant GHG reductions/fuel economy improvements across the fleet, and each automaker's standard automatically adjusts based on the mix (size and volume) of vehicles it produces each model year. In the agencies' current analyses for this Draft TAR, we are applying the same footprint-based standards established in the 2012 final rule to the updated fleet projections for MY2025. It is important to keep in mind that the updated MY2025 fleet wide projections reflected in this Draft TAR are still just projections (as were the fleet projections in the 2012 rule) -- based on the latest available information, which may continue to change with future projections -- and that the actual GHG emissions/fuel economy level achieved in MY2025 won't be determined until the

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<sup>2</sup> The projected MY 2025 target of 175 g/mi represents an approximate 50% decrease in GHG emissions relative to the fuel economy standards that were in place in 2010. It is clear from current GHG manufacturer performance data that many automakers are earning air conditioner refrigerant GHG credits that reduce GHG emissions, but do not increase fuel economy. Accordingly, the projected MY 2025 target of 175 g/mi represents slightly less than a doubling of fuel economy relative to the standards that were in place in 2010.

manufacturers have completed their MY2025 production. The agencies will continue to assess the latest available projections as we continue the Midterm Evaluation process.

**Table ES- 1 Projections for MY2025: Car/Truck Mix, CO<sub>2</sub> Target Levels, and MPG-equivalent<sup>1</sup>**

	2012 Final Rule	AEO 2015 Fuel Price Case		
		AEO Low	AEO Reference	AEO High
Car/truck mix	67/33%	48/52%	52/48%	62/38%
CAFE (mpg) <sup>2</sup>	48.7	45.7	46.3	47.7
CO <sub>2</sub> (g/mi)	163	178	175	169
MPG-e	54.5	50.0	50.8	52.6

Notes:

<sup>1</sup> The CAFE, CO<sub>2</sub> and MPG-e values shown here are 2-cycle compliance values. Projected real-world values are detailed in Chapter 10.1; for example, for the AEO reference fuel price case, real-world EPA CO<sub>2</sub> emissions performance would be 220 g/mi and real-world fuel economy would be 36 mpg.

<sup>2</sup> Average of estimated CAFE requirements.

<sup>3</sup> Mile per gallon equivalent (MPG-e) is the corresponding fleet average fuel economy value if the entire fleet were to meet the CO<sub>2</sub> standard compliance level through tailpipe CO<sub>2</sub> improvements that also improve fuel economy. This is provided for illustrative purposes only, as we do not expect the GHG standards to be met only with fuel efficiency technology.

The agencies' updated assessments provide projections for the MY2022-2025 standards for several key metrics, including modeled "low-cost pathway" technology penetrations, per-vehicle average costs (cars, trucks, and fleet, by manufacturer and total industry-wide), industry-wide average costs, GHG and oil reductions, consumer payback, consumer fuel savings, and benefits analysis.

Based on the extensive updated assessments provided in this Draft TAR, the projections for the average per-vehicle costs of meeting the MY2025 standards (incremental to the costs already incurred to meet the MY2021 standard) are, for EPA's analysis of the GHG program, \$894 - \$1,017, and, for NHTSA's analysis of the CAFE program, \$1,245 in the primary analysis using Retail Price Equivalent (RPE), and \$1,128 in a sensitivity case analysis using Indirect Cost Multipliers (ICM). In the 2012 final rule, the estimated costs for meeting the MY2022-2025 GHG standards (incremental to the costs for meeting the MY2021 standard in MY2021) was \$1,070.<sup>3,vii</sup>

<sup>3</sup> This cost estimate from the 2012 final rule was based on the use of Indirect Cost Multipliers (ICMs) in 2010\$.

**Table ES- 2 Per-Vehicle Average Costs to Meet MY2025 Standards: Draft TAR Analysis**  
**Costs Shown are Incremental to the Costs to Meet the MY2021 Standards**

	GHG <sup>1</sup> in MY2025		CAFE in MY 2028	
	Primary Analysis	RPE Sensitivity Case <sup>3</sup>	Primary Analysis <sup>2</sup>	ICM Sensitivity Case <sup>3</sup>
Car	\$707	\$789	\$1,207	\$1,156
Truck	\$1,099	\$1,267	\$1,289	\$1,096
Combined	\$894	\$1,017	\$1,245	\$1,128

Notes:

<sup>1</sup>The values reported for the GHG analysis to account for indirect costs reflect the use of Indirect Cost Multipliers for the primary analysis, and Retail Price Equivalent for the sensitivity case.

<sup>2</sup> The values reported for CAFE primary analysis reflect the use of RPE and include civil penalties estimated to be incurred by some OEMs as provided by EPCA/EISA. Estimated technology costs (without civil penalties) average \$1,111, \$1,246, and \$1,174, respectively for MY2028 passenger cars, light trucks, and the overall light-duty fleet.

<sup>3</sup> Note that Chapter 12 (GHG) and Chapter 13 (CAFE) include a wide range of additional sensitivity cases.

In Table ES-2, NHTSA’s estimates are provided for MY2028 because NHTSA’s analysis, which is conducted on a year-by-year basis, indicates that manufacturers could make use of EPCA/EISA’s provisions allowing credits to be earned and carried forward to be applied toward ensuing model years. Therefore, NHTSA’s analysis indicates that a “stabilized” response to the aural standards might not be achieved until approximately 2028 (see Chapter 13 for additional detail). EPA estimates are provided for MY2025 because EPA’s analysis projects that each manufacturer would comply in MY2025 with that year’s standards (see Chapter 12 for additional details).

Table ES-3 shows fleet-wide penetration rates for a subset of the technologies the agencies’ project could be utilized to comply with the MY2025 standards. While all three agencies have been working collaboratively on an array of issues throughout this initial phase of the Midterm Evaluation, much of the EPA GHG and NHTSA CAFE assessments were done largely independently, as reflected in the different technology pathways shown in Table ES-3 (see Chapter 2.3 for additional detail). The agencies’ analyses each project that the MY2022-2025 standards can be met largely through improvements in gasoline vehicle technologies, such as improvements in engines, transmissions, light-weighting, aerodynamics, and accessories. The analyses further indicate that only modest amounts of hybridization, and very little full electrification (plug-in hybrid electric vehicles (PHEV) or electric vehicles (EV)) technology will be needed to meet the standards. This initial assessment of potential technology paths is similar to the agencies’ projections made in the 2012 final rule, and is consistent with the findings of the National Academy of Sciences report from June 2015 (discussed in Chapter 2).

**Executive Summary****Table ES- 3 Selected Technology Penetrations to Meet MY2025 Standards<sup>1</sup>**

	<b>GHG</b>	<b>CAFE</b>
Turbocharged and downsized gasoline engines	33%	54%
Higher compression ratio, naturally aspirated gasoline engines	44%	<1%
8 speed and other advanced transmissions <sup>2</sup>	90%	70%
Mass reduction	7%	6%
Stop-start	20%	38%
Mild Hybrid	18%	14%
Full Hybrid	<3%	14%
Plug-in hybrid electric vehicle <sup>3</sup>	<2%	<1%
Electric vehicle <sup>3</sup>	<3%	<2%

Notes:

<sup>1</sup> Percentages shown are absolute rather than incremental. These values reflect both EPA and NHTSA's primary analyses; both agencies present additional sensitivity analyses in Chapter 12 (GHG) and Chapter 13 (CAFE). For EPA this includes a pathway where higher compression ratio naturally aspirated gasoline engines are held at a 10% penetration, and the major changes are turbocharged and downsized gasoline engines increase to 47% and mild hybrids increase to 38% (See Chapter 12.1.2)

<sup>2</sup> Including continuously variable transmissions (CVT)

<sup>3</sup> In EPA's modeling, the California Zero Emission Vehicles (ZEV) program is considered in the reference case fleet; therefore, 3.5% of the fleet is projected to be full EV or PHEV in the 2022-2025 timeframe due to the ZEV program and the adoption of that program by nine additional states.

Although some of the differences in costs are expected as EPA and NHTSA conducted two independent analyses, the consideration of CARB's program also led to one important difference. As noted in the footnote for Table ES-3, EPA's analysis included consideration for compliance with other related state regulations including CARB's ZEV regulation that has also been adopted by nine other states under Section 177 of the Federal Clean Air Act. CARB's ZEV program requires a portion of new light-duty vehicle sales to be ZEVs and collectively, CA and these states represent nearly 30 percent of nationwide sales of light-duty vehicles. CARB worked with EPA to include ZEVs reflecting compliance with California's ZEV program within the reference fleet used by EPA. NHTSA's analysis did not. This accounts for at least part of the cost differences in the two agencies' analyses as well as for some of the difference in technology penetration rates for full hybrids.

EPA's analysis indicates that, compared to the MY2021 standards, the MY2025 standards will result in a net lifetime consumer savings of \$1,460 - \$1,620 and a payback of about 5 to 5 ½ years.<sup>4</sup> NHTSA's primary analysis indicates that net lifetime consumer savings could average \$680 per vehicle, such that increased vehicle purchase costs are paid back within about 6 ½ years, and \$800 with payback within about 6 years in a sensitivity case analysis using ICMs.

<sup>4</sup> Based on the AEO 2015 reference case gasoline price projections, 3 percent discount rate, and ICMs.

**Executive Summary****Table ES- 4 Payback Period and Lifetime Net Consumer Savings for an Average Vehicle Compared to the MY2021 Standards**

	GHG MY2025 Vehicle		CAFE MY2028 Vehicle	
	Primary Analysis	RPE Sensitivity Case	Primary Analysis	ICM Sensitivity Case
Payback period (years)	5	5 ½	6 ½	6
Net Lifetime Consumer Savings (\$, discounted at 3%)	\$1,620	\$1,460	\$680	\$800

\* Note that Chapter 12 (GHG) and Chapter 13 (CAFE) include a wide range of additional sensitivity cases.

Over the lifetimes of MY2021-2025 vehicles, EPA estimates that under the GHG standards, GHG emissions would be reduced by about 540 million metric tons (MMT) and oil consumption would be reduced by 1.2 billion barrels. Over the lifetimes of MY2016-2028 vehicles, NHTSA estimates that under the augural MY2022-2025 CAFE standards, GHG emissions would be reduced by about 748 MMT and oil consumption would be reduced by about 1.6 billion barrels. NHTSA's estimates span a wider range of model years for two reasons, as discussed in Chapter 13: first, the NHTSA analysis projects that manufacturers may take some "early action" prior to MY2022; second, as discussed above, the response to the augural standards might not be "stabilized" until after MY2025. Differences in these values also result from differences in the agencies' estimates of annual mileage accumulation by light-duty vehicles.<sup>5</sup>

**Table ES- 5 Cumulative GHG and Oil Reductions for Meeting the MY2022-2025 Standards**

Lifetime Reductions	GHG ( MYs 2021-2025 vehicles)	CAFE (MYs 2016-2028 vehicles)
CO <sub>2</sub> e reduction (million metric tons, MMT)	540	748
Oil reduction (billion barrels)	1.2	1.6

For the EPA GHG analysis, total industry-wide costs of meeting the MY2022-2025 GHG standards are estimated at \$34 to \$38 billion. Societal monetized benefits of the MY2022-2025 standards (exclusive of fuel savings to consumers) range from \$40 to \$41 billion. Consumer pre-tax fuel savings are estimated to be \$89 billion over the lifetime of vehicles meeting the MY2022-2025 standards. Net benefits (inclusive of fuel savings) are estimated at \$90 to \$94 billion. These values are all at a 3 percent discount rate; values at a 7 percent discount rate are shown in Table ES-6 below.

<sup>5</sup> The agencies' methods for assessing vehicle mileage accumulation are discussed in Chapter 10.3 for EPA, and Chapter 13 for NHTSA.

**Executive Summary****Table ES- 6 GHG Analysis of Lifetime Costs & Benefits to Meet the MY2022-2025 Standards (for Vehicles Produced in MY2021-2025)\* (Billions of 2013\$)**

	3 Percent Discount Rate		7 Percent Discount Rate	
	Primary Analysis	RPE Sensitivity Case	Primary Analysis	RPE Sensitivity Case
Vehicle Program	-\$34	-\$38	-\$24	-\$27
Maintenance	-\$2	-\$2	-\$1	-\$1
Fuel	\$89	\$89	\$49	\$49
Benefits*	\$41	\$40	\$30	\$30
Net Benefits	\$94	\$90	\$54	\$51

Note:

\*These values reflect AEO 2015 reference fuel price case. The Primary Analysis reflects ICMs and the Sensitivity Case reflects RPEs. All values are discounted back to 2015; see Chapter 12.3 for details on discounting social cost of GHG and non-GHG benefits. Note that Chapter 12 also includes a number of additional sensitivity cases.

NHTSA's primary analysis shows that compared to the No Action alternative, the augural CAFE standards could entail additional costs totaling \$87 billion during MYs 2016-2028 (reasons for this span of MYs are discussed above), and a sensitivity case using ICM shows total costs of \$79 billion. The primary analysis shows benefits totaling \$175 billion, and the ICM sensitivity case shows \$178 billion. Consumer fuel savings are estimated to be \$67 billion to \$122 billion over the lifetime of vehicles meeting the MY2022-2025 standards. Thus, net benefits (inclusive of fuel savings) could total \$88 billion based on the primary analysis and \$99 billion for the ICM sensitivity case. These are estimates of the present value (in 2015) of costs and benefits, based on a 3 percent discount rate. NHTSA has also conducted analysis using a 7 percent discount rate, and a broader sensitivity analysis to examine the impact of other key analysis inputs, as discussed in Chapter 13. Below, Table ES-7 provides an overall summary of costs and benefits observed in NHTSA's analysis.

**Table ES- 7 CAFE Analysis of Lifetime Costs & Benefits to Meet the MY2022-2025 Standards (for Vehicles Produced in MY2016-2028) (Billions of 2013\$)**

	3 Percent Discount Rate		7 Percent Discount Rate
	Primary Analysis <sup>2</sup>	ICM Sensitivity Case <sup>3</sup>	Primary Analysis
Vehicle Program <sup>1*</sup>	-\$87	-\$79	-\$60
Benefits (Fuel)	\$120	\$122	\$67
Benefits (Other)	\$55	\$56	\$43
Net Benefits	\$88	\$99	\$50

Notes:

<sup>1</sup> Includes changes in maintenance costs (small relative to cost of additional technology).

<sup>2</sup> The Primary Analysis reflects RPE.

<sup>3</sup> Note that Chapter 13 includes a wide range of additional sensitivity cases.

As noted above, because EPA and NHTSA developed independent assessments of technology cost, effectiveness, and reference case projections, the compliance pathways and associated costs that result are also different. Consideration of these two results provides greater confidence that compliance can be achieved through a number of different technology pathways.

**References**

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<sup>i</sup> See 40 CFR 86.1818-12(h).

<sup>ii</sup> See 40 CFR 86.1818-12(h).

<sup>iii</sup> See 40 CFR section 86.181-12(h).

<sup>iv</sup> See 77 FR 62784 (Oct. 12, 2012).

<sup>v</sup> See 40 CFR 86.1818-12(h)(2)(i).

<sup>vi</sup> National Academy of Sciences, National Research Council to the National Academies, “Cost, Effectiveness and Deployment of Fuel Economy Technologies for Light-Duty Vehicles,” June 2015.

<sup>vii</sup> Regulatory Impact Analysis: Final Rulemaking for 2017-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards, EPA-420-R-12-016, Table 5.1-8, page 5-8.

## V.

EPA, Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation: Technical Support Document, Executive Summary (Nov. 2016)

**Proposed Determination on the  
Appropriateness of the Model Year  
2022-2025 Light-Duty Vehicle  
Greenhouse Gas Emissions Standards  
under the Midterm Evaluation:**

Technical Support Document

**Proposed Determination on the  
Appropriateness of the Model Year  
2022-2025 Light-Duty Vehicle  
Greenhouse Gas Emissions Standards  
under the Midterm Evaluation:**

**Technical Support Document**

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

## **Executive Summary**

The rulemaking establishing the National Program for Federal greenhouse gas (GHG) emissions and corporate average fuel economy (CAFE) standards for model year (MY) 2017-2025 light-duty vehicles included a regulatory requirement for the Environmental Protection Agency (EPA) to conduct a Midterm Evaluation (MTE) of the greenhouse gas (GHG) standards established for MYs 2022-2025. Through the MTE, EPA must determine no later than April 1, 2018 whether the MY2022-2025 GHG standards, established in 2012, are still appropriate under section 202 (a) (1) of the Clean Air Act ("Act"), in light of the record then before the Administrator, given the latest available data and information. The Administrator is making a Proposed Determination that the MY2022-2025 standards adopted in the 2012 final rule establishing the MY2017-2025 standards remain appropriate under section 201 (a) (1) of the Act. This Technical Support Document (TSD) provides additional detailed analyses supporting this Proposed Determination.

The Proposed Determination follows the July 2016 release of a Draft Technical Assessment Report (TAR), issued jointly by EPA, National Highway Traffic Safety Administration (NHTSA), and the California Air Resources Board (CARB). EPA requested comment on the analysis supporting the Draft TAR and has fully considered those public comments as well as other new information, and has updated its analyses where appropriate as part of this Proposed Determination. This TSD describes in more detail our assessment of public comment on the Draft TAR and updates to our technology costs, technology effectiveness, consumer impacts, and other elements of our analysis.

A summary of each chapter of the TSD follows:

**Chapter 1: Baseline and Reference Vehicle Fleets.** This chapter describes EPA's methodologies for developing a baseline fleet of vehicles and future fleet projections out to MY2025. The Proposed Determination analysis uses a baseline fleet based on the MY2015 fleet, the latest year available for which there are final GHG compliance data. EPA used data from Energy Information Administration's Annual Energy Outlook 2016 (AEO 2016) as the basis for total vehicle sales projections to 2025, as well as for the car and truck volume mix.

**Chapter 2: Technology Costs, Effectiveness, and Lead Time Assessment.** This chapter is an in-depth assessment of the state of vehicle technologies to reduce GHG emissions and improve fuel economy, as well as EPA's assessment of expected future technology developments through MY2025. The technologies evaluated include all those considered for the 2012 final rule and the Draft TAR, as well as new technologies that have emerged. Every technology has been reconsidered with respect to its cost, effectiveness, application, and lead time considerations, with emphasis on assessing the latest introductions of technologies to determine if and how they have changed.

**Chapter 3: Economic and Other Key Inputs Used in EPA's Analyses.** This chapter describes many of the economic and other inputs used in the Proposed Determination analyses. This chapter discusses the methodologies used to assess inputs such as the real-world fuel economy/GHG emissions gap, vehicle miles traveled (VMT), vehicle survival rates, the VMT rebound effect, energy security, the social cost of carbon and other GHGs, health benefits, consumer cost of vehicle ownership, and others.

**Chapter 4: Consumer Issues.** This chapter reviews issues surrounding consumer acceptance of the vehicle technologies expected to be used to meet the MY2022-2025 standards. Since the GHG standards have been in effect since MY2012, EPA focuses on the evidence to date related to consumer acceptance of vehicles subject to these standards. This chapter also discusses potential impacts of the standards on vehicle sales and affordability, which are closely interconnected with the effects of macroeconomic and other market forces.

**Chapter 5: EPA's OMEGA Model.** This chapter describes EPA's computerized program called the Optimization Model for reducing Emissions of Greenhouse gases from Automobiles (OMEGA), the model used to efficiently apply technologies to the wide range of vehicles produced by various manufacturers.

## VI.

## Excerpts of 2012 Preamble:

EPA & NHTSA, 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 77 Fed. Reg. 62,623 (Oct. 15, 2012), pages 62,631-34, 62,652, 62,770-73, 62,784-88, 62,963-65

62,631-34	I(B)(1) Continuation of the National Program
62,652	I(C)(5) Mid-Term Evaluation
62,770-73	III(A)(3)(a) Light-Duty Vehicle, Light-Duty Truck, and Medium-Duty Passenger Vehicle Greenhouse Gas Emission Standards and Projected Emissions Levels
62,784-88	III(B)(3) Mid-Term Evaluation
62,963-65	IV(A)(3)(b) Benefits of Continuing the National Program

Section IV for more information. The agencies will conduct a comprehensive mid-term evaluation and agency decision-making process for the MYs 2022–2025 standards as described in the proposal. The mid-term evaluation reflects the rules' long time frame and, for NHTSA, the agency's statutory obligation to conduct *de novo* rulemaking in order to establish final standards for vehicles for those model years. In order to align the agencies' proceedings for MYs 2022–2025 and to maintain a joint national program, EPA and NHTSA will finalize their actions related to MYs 2022–2025 standards concurrently.

The agencies project that manufacturers will comply with the final rules by using a range of technologies, including improvements in air conditioning efficiency, which reduce both GHG emissions and fuel consumption. Compliance with EPA's GHG standards is also likely to be achieved through improvements in air conditioning system leakage and through the use of alternative air conditioning refrigerants with a lower global warming potential (GWP), which reduce GHGs (i.e., hydrofluorocarbons) but which do not generally improve fuel economy. The agencies believe there is a wide range of technologies already available to reduce GHG emissions and improve fuel economy from both passenger cars and trucks. The final rules facilitate long-term planning by manufacturers and suppliers for the continued development and deployment across their fleets of fuel saving and GHG emissions-reducing technologies. The agencies believe that advances in gasoline engines and transmissions will continue for the foreseeable future, and that there will be continual improvement in other technologies, including vehicle weight reduction, lower tire rolling resistance, improvements in vehicle aerodynamics, diesel engines, and more efficient vehicle accessories. The agencies also expect to see increased electrification of the fleet through the expanded production of stop/start, hybrid, plug-in hybrid and electric vehicles. Finally, the agencies expect that vehicle air conditioners will continue to improve by becoming more efficient and by increasing the use of alternative refrigerants and lower leakage air conditioning systems. Many of these technologies are already available today, some on a limited number of vehicles while others are more widespread in the fleet, and manufacturers will be able to meet the standards through significant efficiency improvements in these

technologies, as well as through a significant penetration of these and other technologies across the fleet. Auto manufacturers may also introduce new technologies that we have not considered for this rulemaking analysis, which could result in possible alternative, more cost-effective paths to compliance.

From a societal standpoint, this second phase of the National Program is estimated to save approximately 4 billion barrels of oil and to reduce GHG emissions by the equivalent of approximately 2 billion metric tons over the lifetimes of those light duty vehicles produced in MYs 2017–2025. These savings and reductions come on top of those that are being achieved through the MYs 2012–2016 standards.<sup>15</sup> The agencies project that fuel savings will far outweigh higher vehicle costs, and that the net benefits to society of the MYs 2017–2025 National Program will be in the range of \$326 billion to \$451 billion (7 and 3 percent discount rates, respectively) over the lifetimes of those light duty vehicles sold in MY 2017–2025.

These final standards are projected to provide significant savings for consumers due to reduced fuel use. Although the agencies estimate that technologies used to meet the standards will add, on average, about \$1,800 to the cost of a new light duty vehicle in MY 2025, 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, for a net lifetime savings of \$3,400 to \$5,000. This estimate assumes gasoline prices of \$3.87 per gallon in 2025 with small increases most years throughout the vehicle's lifetime.<sup>16</sup> For those consumers who purchase their new MY 2025 vehicle with cash, the discounted fuel savings will offset the higher vehicle cost in roughly 3.3 years, and fuel savings will continue for as long as the consumer owns the vehicle. Those consumers that buy a new vehicle with a typical 5-year loan will immediately benefit from an average monthly cash flow savings of about \$12 during the loan period, or about \$140 per year, on average. So this type of consumer would benefit immediately from the time of purchase: the increased monthly fuel savings would more than offset the

<sup>15</sup> The cost and benefit estimates provided in this final rule are only for the MYs 2017–2025 rulemaking. EPA and DOT's rulemaking establishing standards for MYs 2012–2016 are already part of the baseline for this analysis.

<sup>16</sup> See Chapter 4.2.2 of the Joint TSD for full discussion of fuel price projections over the vehicle's lifetime.

higher monthly payment. Section I.D provides a detailed discussion of the projected costs and benefits of the MYs 2017–2025 for CAFE and GHG emissions standards for light-duty vehicles.

In addition to saving consumers money at the pump, the agencies have designed their final standards to 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 meets their needs. The standards are based on a vehicle's size (technically they are based on vehicle footprint, which is the area defined by the points where the tires contact the ground), and larger vehicles have numerically less stringent fuel economy/GHG emissions targets and smaller vehicles have numerically more stringent fuel economy/GHG emissions targets. Footprint based standards promote fuel economy and GHG emissions improvements in vehicles of all sizes, and are not expected to create incentives for manufacturers to change the size of their vehicles in order to comply with the standards. Moreover, since the standards are fleet average standards for each manufacturer, no specific vehicle *must* meet a target.<sup>17</sup> Thus, nothing in these rules prevents consumers in the 2017 to 2025 timeframe from choosing from the same mix of vehicles that are currently in the marketplace.

#### 1. Continuation of the National Program

EPA is adopting final greenhouse gas emissions standards for model years 2017–2025 and NHTSA is adopting final Corporate Average Fuel Economy standards for model years 2017–2021 and presenting augural standards for model years 2022–2025. These rules will implement strong and coordinated Federal greenhouse gas and fuel economy standards for passenger cars, light-duty trucks, and medium-duty passenger vehicles. Together, these vehicle categories, which include passenger cars, sport utility vehicles, crossover utility vehicles, minivans, and pickup trucks, are presently responsible for approximately 60 percent of all U.S. transportation-related greenhouse gas emissions and fuel consumption. The final rules continue the National Program by setting more stringent standards for MY 2017 and beyond light duty vehicles. This coordinated program will achieve important reductions of

<sup>17</sup> A specific vehicle would only have to meet a fuel economy or GHG target value on the target curve standards being finalized today in the rare event that a manufacturer produces a single vehicle model.

greenhouse gas (GHG) emissions and fuel consumption from the light-duty vehicle part of the transportation sector, based on technologies that either are commercially available or that the agencies project will be commercially available in the rulemaking timeframe and that can be incorporated at a reasonable cost.

In working together to finalize these standards, NHTSA and EPA are building on the success of the first phase of the National Program to regulate fuel economy and GHG emissions from U.S. light-duty vehicles, which established the strong and coordinated light duty vehicle standards for model years (MY) 2012–2016. As with the MY 2012–2016 final rules, a key element in developing the final rules was the agencies' collaboration with the California Air Resources Board (CARB) and discussions with automobile manufacturers and many other stakeholders. Continuing the National Program will help to ensure that all manufacturers can build a single fleet of U.S. light duty vehicles that satisfy all requirements under both federal programs as well as under California's program, helping to reduce costs and regulatory complexity while providing significant energy security, consumer savings and environmental benefits.

The agencies have been developing the basis for these final standards almost since the conclusion of the rulemaking establishing the first phase of the National Program. Consistent with Executive Order 13563, this rule was developed with early consultation with stakeholders, employs flexible regulatory approaches to reduce burdens, maintains freedom of choice for the public, and helps to harmonize federal and state regulations. After much research and deliberation by the agencies, along with CARB and other stakeholders, on July 29, 2011 President Obama announced plans for extending the National Program to MY 2017–2025 light duty vehicles and NHTSA and EPA issued a Supplemental Notice of Intent (NOI) outlining the agencies' plans for proposing the MY 2017–2025 standards and program.<sup>18</sup> This July NOI built upon the extensive analysis conducted by the agencies during 2010 and 2011, including an initial technical assessment report and NOI issued in September 2010, and a supplemental NOI issued in December 2010. 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 Supplemental NOI.<sup>19</sup> The United Auto Workers (UAW) also supported the announcement,<sup>20</sup> as did many consumer and environmental groups. As envisioned in the Presidential announcement, Supplemental NOI, and the December 2011 Notice of Proposed Rulemaking (NPRM), these final rules establish standards for MYs 2017– and beyond light duty vehicles. These standards take into consideration significant public input that was received in response to the NPRM from the regulated industry, consumer groups, labor unions, states, environmental organizations, national security experts and veterans, industry suppliers and dealers, as well as other organizations and by thousands of U.S. citizens. The agencies anticipate that these final standards will spur the development of a new generation of clean and more fuel efficient cars and trucks through innovative technologies and manufacturing that will, in turn, spur economic growth and create high-quality domestic jobs, enhance our energy security, and improve our environment.

As described below, NHTSA and EPA are finalizing a continuation of the National Program for light-duty vehicles that the agencies believe represents the appropriate levels of fuel economy and GHG emissions standards for model years 2017 and beyond, given the technologies that the agencies project will be available for use on these vehicles and the agencies' understanding of the cost and manufacturers' ability to apply these technologies during that time frame, and consideration of other relevant factors. Under this joint rulemaking, EPA is establishing GHG emissions standards under the Clean Air Act (CAA), and NHTSA is establishing CAFE standards under EPCA, as amended by the Energy Independence and Security Act of 2007 (EISA). This joint final rulemaking reflects a carefully coordinated and harmonized approach to implementing these two statutes, in accordance with all substantive and procedural requirements imposed by law.<sup>21</sup>

These final rules allow for long-term planning by manufacturers and

suppliers for the continued development and deployment across their fleets of fuel saving and emissions-reducing technologies. NHTSA's and EPA's technology assessment indicates there is a wide range of technologies available for manufacturers to consider utilizing to reduce GHG emissions and improve fuel economy. The agencies believe that advances in gasoline engines and transmissions will continue during these model years and that these technologies are likely to play a key role in compliance strategies for the MYs 2017–2025 standards, which is a view that is supported in the literature, among the vehicle manufacturers, suppliers, and by public comments.<sup>22</sup> The agencies also believe that there will be continued improvement in diesel engines, vehicle aerodynamics, and tires as well as the use of lighter weight materials and optimized designs that will reduce vehicle mass. The agencies also expect to see increased electrification of the fleet through the expanded production of stop/start, hybrid, plug-in hybrid and electric vehicles.<sup>23</sup> Finally, the agencies expect that vehicle air conditioners will continue to become more efficient, thereby improving fuel efficiency. The agencies also expect that air conditioning leakage will be reduced and that manufacturers will use reduced global warming refrigerants. Both of these improvements will reduce GHG emissions.

Although a number of these technologies are available today, the agencies' assessments support that there will be continuing improvements in the efficiency of some of the technologies and that the cost of many of the technologies will be lower in the future.

<sup>22</sup> There are a number of competing gasoline engine technologies, with one in particular that the agencies project will increase beyond MY 2016. This is the downsized gasoline direct injection engine equipped with a turbocharger and cooled exhaust gas recirculation, which has better fuel efficiency than a larger engine and similar steady-state power performance. Paired with these engines, the agencies project that advanced transmissions (such as automatic and dual clutch transmissions with eight forward speeds) and higher efficiency gearboxes will contribute to providing fuel efficiency improvements. Transmissions with eight or more speeds can be found in the fleet today in very limited production, and while they are expected to penetrate further by MY 2016, we anticipate that by MY 2025 these will be common in new light duty vehicles.

<sup>23</sup> For example, while today less than three percent of annual vehicle sales are strong hybrids, plug-in hybrids and all electric vehicles, by MY 2025 we estimate in our analyses for this final rule that these technologies could represent 3–7%, while "mild" hybrids may be as high as 17–27% of new sales and vehicles with stop/start systems only may be as high as 6–15% of new sales. Thus by MY 2025, 26–49% of the fleet may have some level of electrification.

<sup>19</sup> Letters of support are available at <http://www.epa.gov/otaq/climate/regulations.htm> and at <http://www.nhtsa.gov/fuel-economy> (last accessed June 12, 2012).

<sup>20</sup> The UAW's support was expressed in a statement on July 29, 2011, which can be found at <http://www.uaw.org/articles/uaw-supports-administration-proposal-light-duty-vehicle-cafe-and-greenhouse-gas-emissions-r> (last accessed June 12, 2012).

<sup>21</sup> For NHTSA, this includes the requirements of the National Environmental Policy Act (NEPA).

<sup>18</sup> 76 FR 48758 (August 9, 2011).

We anticipate that the standards will require most manufacturers to considerably increase the application of these technologies across their light duty vehicle fleets in order to comply with the standards. Manufacturers may also develop and introduce other technologies that we have not considered for this rulemaking analysis, which could play important roles in compliance with the standards and potentially offer more cost effective alternatives. Due to the relatively long lead time for the later model years in this rule, it is quite possible that innovations may arise that the agencies (and the automobile manufacturers) are not considering today, which may even become commonplace by MY 2025.

As discussed further below, and as with the standards for MYs 2012–2016, the agencies believe that the final standards help to preserve consumer choice, that is, the standards should not affect consumers' opportunity to purchase the size and type of vehicle that meets their needs, and should not otherwise affect vehicles' performance attributes. NHTSA and EPA are finalizing standards based on vehicle footprint, which is the area defined by the points where the tires contact the ground, where smaller vehicles have relatively more stringent targets, and larger vehicles have less stringent targets. Footprint based standards promote fuel economy and GHG emissions improvements in vehicles of all sizes, and are not expected to create incentives for manufacturers to change the size of their vehicles in order to comply with the standards. Consequently, these rules should not have a significant effect on the relative availability of different size vehicles in the fleet. The agencies' analyses used a constraint of preserving all other aspects of vehicles' functionality and performance, and the technology cost and effectiveness estimates developed in the analyses reflect this constraint.<sup>24</sup> In addition, as with the standards for MYs 2012–2016, the agencies believe that the standards should not have a negative effect on vehicle safety, as it

<sup>24</sup> One commenter asserted that the standards "value purported consumer choice and the continued production of every vehicle in its current form over the need to conserve energy: as soon as increased fuel efficiency begins to affect any attribute of any existing vehicle, stringency increases cease." CBD Comments p. 4. This assertion is incorrect. As explained in the text above, the agencies' cost estimates include costs of preserving existing attributes, such as vehicle performance. These costs are reflected in the agencies' analyses of reasonableness of the costs of the rule, but do not by themselves dictate any particular level of standard stringency much less cause stringency to "cease" as the commenter would have it.

relates to vehicle size and mass as described in Section II.C and II.G below, respectively. Because the standards are fleet average standards for each manufacturer, no specific vehicle *must* meet a target.<sup>25</sup> Thus, nothing in these rules prevents consumers in the 2017 to 2025 timeframe from choosing from the same mix of vehicles that are currently in the marketplace.

Given the long time frame at issue in setting standards for MYs 2022–2025 light-duty vehicles, and given NHTSA's statutory obligation to conduct a *de novo* rulemaking in order to establish final standards for vehicles for the 2022–2025 model years, the agencies will conduct a comprehensive mid-term evaluation and agency decision-making process for the MYs 2022–2025 standards, as described in the proposal. As stated in the proposal, both NHTSA and EPA will develop and compile up-to-date information for the mid-term evaluation, through a collaborative, robust and transparent process, including public notice and comment. The mid-term evaluation will assess the appropriateness of the MYs 2022–2025 standards, based on information available at the time of the mid-term evaluation and an updated assessment of all the factors considered in setting the standards and the impacts of those factors on the manufacturers' ability to comply. NHTSA and EPA fully expect to conduct this mid-term evaluation in coordination with the California Air Resources Board, given our interest in maintaining a National Program to address GHG emissions and fuel economy. NHTSA's rulemaking, which will incorporate findings from the mid-term evaluation, will be a totally fresh consideration of all relevant information and fresh balancing of statutory and other relevant factors in order to determine the maximum feasible CAFE standards for MYs 2022–2025. In order to align the agencies proceedings for MYs 2022–2025 and to maintain a joint national program, if the EPA determination is that its standards will not change, NHTSA will issue its final rule concurrently with the EPA determination. If the EPA determination is that standards may change, the agencies will issue a joint NPRM and joint final rule. Further discussion of the mid-term evaluation is found later in this section, as well as in Sections III.B.3 and IV.A.3.b.

The 2017–2025 National Program is estimated to reduce GHGs by

<sup>25</sup> A specific vehicle would only have to meet a fuel economy or GHG target value on the target curve standards being finalized today in the rare event that a manufacturer produces a single vehicle model.

approximately 2 billion metric tons and to save 4 billion barrels of oil over the lifetime of MYs 2017–2025 vehicles relative to the MY 2016 standard curves already in place.<sup>26</sup> The average cost for a MY 2025 vehicle to meet the standards is estimated to be about \$1800 compared to a vehicle that meets the level of the MY 2016 standards in MY 2025. Fuel savings for consumers are expected to more than offset the higher vehicle costs. The typical driver will save a total of \$5,700 to \$7,400 (7 percent and 3 percent discount rate, respectively) in fuel costs over the lifetime of a MY 2025 vehicle and, even after accounting for the higher vehicle cost, consumers will save a net \$3,400 to \$5,000 (7 percent and 3 percent discount rate, respectively) over the vehicle's lifetime. This estimate assumes a gasoline price of \$3.87 per gallon in 2025 with small increases most years over the vehicle's lifetime.<sup>27</sup> Further, the payback period for a consumer purchasing a 2025 light-duty vehicle with cash would be, on average, 3.4 years at a 7 percent discount rate or 3.2 years at a 3 percent discount rate, while consumers who buy with a 5-year loan would save more each month on fuel than the increased amount they will spend on the higher monthly loan payment, beginning in the first month of ownership.

Continuing the National Program has both energy security and climate change benefits. Climate change is a significant long-term threat to the global environment. EPA has found that elevated atmospheric concentrations of six greenhouse gases—carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride—taken in combination endanger both the public health and the public welfare of current and future generations. EPA further found 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. 74 FR 66496 (Dec. 15, 2009). As summarized in EPA's Endangerment and Cause or Contribute Findings under Section 202(a) of the Clean Air Act, anthropogenic emissions of GHGs are very likely (90 to 99 percent probability) the cause of most of the observed global warming over the last

<sup>26</sup> The cost and benefit estimates provided here are only for the MY 2017–2025 rulemaking. The CAFE and GHG emissions standards for MYs 2012–2016 and CAFE standards for MY 2011 are already part of the baseline for this analysis.

<sup>27</sup> See Chapter 4.2.2 of the Joint TSD for full discussion of fuel price projections of the vehicle lifetimes.

50 years.<sup>28</sup> Mobile sources emitted 30 percent of all U.S. GHGs in 2010 (transportation sources, which do not include certain off-highway sources, account for 27 percent) and have been the source of the largest absolute increases in U.S. GHGs since 1990.<sup>29</sup> Mobile sources addressed in the 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 2010.<sup>30</sup> Light-duty vehicles emit CO<sub>2</sub>, methane, nitrous oxide, and hydrofluorocarbons and were responsible for nearly 60 percent of all mobile source GHGs and over 70 percent of Section 202(a) mobile source GHGs in 2010.<sup>31</sup> For light-duty vehicles in 2010, CO<sub>2</sub> emissions represented about 94 percent of all greenhouse emissions (including HFCs), and similarly, the CO<sub>2</sub> emissions measured over the EPA tests used for fuel economy compliance represent about 90 percent of total light-duty vehicle GHG emissions.<sup>32,33</sup>

<sup>28</sup> 74 FR 66,496, 66,518, December 18, 2009; “Technical Support Document for Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act” Docket: EPA-HQ-OAR-2009-0472-11292, <http://epa.gov/climatechange/endangerment/index.html> (last accessed August 9, 2012)

<sup>29</sup> Memorandum: Mobile Source Contribution to U.S. GHGs in 2010 (Docket EPA-HQ-OAR-2010-0799). See generally, U.S. Environmental Protection Agency. 2012. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2010. EPA 430-R-12-001. Available at <http://epa.gov/climatechange/emissions/downloads12/US-GHG-Inventory-2012-Main-Text.pdf> (last accessed June 12, 2012).

<sup>30</sup> Section 202(a) sources include passenger cars, light-duty trucks, motorcycles, buses, and medium- and heavy-duty trucks. EPA’s GHG Inventory groups these modes into on-road totals. However, the on-road totals in the Inventory include refrigerated transport for medium- and heavy-duty trucks, which is not considered a source for Section 202(a). In order to determine the Section 202(a) total, we took the on-road GHG total of 1556.8 Tg and subtracted the 11.6 Tg of refrigerated transport to yield a value of 1545.2 Tg.

<sup>31</sup> Memorandum: Mobile Source Contribution to U.S. GHGs in 2010 (Docket EPA-HQ-OAR-2010-0799). See generally, U.S. Environmental Protection Agency. 2012. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2010. EPA 430-R-12-001. Available at <http://epa.gov/climatechange/emissions/downloads12/US-GHG-Inventory-2012-Main-Text.pdf> (last accessed June 12, 2012)

<sup>32</sup> Memorandum: Mobile Source Contribution to U.S. GHGs in 2010 (Docket EPA-HQ-OAR-2010-0799). See generally, 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](http://epa.gov/climatechange/emissions/downloads09/GHG2007entire_report-508.pdf).

<sup>33</sup> Memorandum: Mobile Source Contribution to U.S. GHGs in 2010 (Docket EPA-HQ-OAR-2010-0799). See generally, U.S. Environmental Protection Agency. 2012. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2010. EPA 430-R-12-001. Available at <http://epa.gov/climatechange/emissions/downloads12/US-GHG-Inventory-2012-Main-Text.pdf>

Improving our energy and national security by reducing our dependence on foreign oil has been a national objective since the first oil price shocks in the 1970s. Although our dependence on foreign petroleum has declined since peaking in 2005, net petroleum imports accounted for approximately 45 percent of U.S. petroleum consumption in 2011.<sup>34</sup> World crude oil production is highly concentrated, exacerbating the risks of supply disruptions and price shocks as the recent unrest in North Africa and the Persian Gulf highlights. Recent tight global oil markets led to prices over \$100 per barrel, with gasoline reaching over \$4 per gallon in many parts of the U.S., causing financial hardship for many families and businesses. The export of U.S. assets for oil imports continues to be an important component of the historically unprecedented U.S. trade deficits. Transportation accounted for about 72 percent of U.S. petroleum consumption in 2010.<sup>35</sup> Light-duty vehicles account for about 60 percent of transportation oil use, which means that they alone account for about 40 percent of all U.S. oil consumption.<sup>36</sup>

## 2. Additional Background on the National Program and Stakeholder Engagement Prior to the NPRM

Following the successful adoption of a National Program for model years (MY) 2012–2016 light duty vehicles, President Obama issued a Memorandum on May 21, 2010 requesting that the NHTSA, on behalf of the Department of Transportation, and the U.S. EPA 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 for model years 2017–2025.”<sup>37</sup> Among other things, the

<sup>34</sup> Energy Information Administration, “How dependent are we on foreign oil?” Available at [http://www.eia.gov/energy\\_in\\_brief/foreign\\_oil\\_dependence.cfm](http://www.eia.gov/energy_in_brief/foreign_oil_dependence.cfm) (last accessed June 12, 2012).

<sup>35</sup> Energy Information Administration, Annual Energy Outlook 2011, “Oil/Liquids.” Available at [http://www.eia.gov/forecasts/aeo/MT\\_liquidfuels.cfm](http://www.eia.gov/forecasts/aeo/MT_liquidfuels.cfm) (last accessed June 12, 2012).

<sup>36</sup> Energy Information Administration, Annual Energy Outlook 2012 Early Release Overview. Available at [http://www.eia.gov/forecasts/aeo/er/early\\_fuel.cfm](http://www.eia.gov/forecasts/aeo/er/early_fuel.cfm) (last accessed June 14, 2012).

<sup>37</sup> The Presidential Memorandum is found at: <http://www.whitehouse.gov/the-press-office/presidential-memorandum-regarding-fuel-efficiency-standards>. For the reader’s reference, the President also requested the Administrators of EPA and NHTSA to issue joint rules under the CAA and EISA to establish fuel efficiency and greenhouse gas emissions standards for commercial medium- and heavy-duty on-highway vehicles and work trucks beginning with the 2014 model year. The agencies recently promulgated final GHG and fuel efficiency

agencies were tasked with researching and then developing standards for MYs 2017 through 2025 that would be appropriate and consistent with EPA’s and NHTSA’s respective statutory authorities. Several major automobile manufacturers and CARB sent letters to EPA and NHTSA in support of a MYs 2017 to 2025 rulemaking initiative as outlined in the President’s announcement.<sup>38</sup>

The President’s memorandum requested that the agencies, “work with the State of California to develop by September 1, 2010, a technical assessment to inform the rulemaking process \* \* \*”. Together, NHTSA, EPA, and CARB issued the joint Technical Assessment Report (TAR) consistent with Section 2(a) of the Presidential Memorandum.<sup>39</sup> In developing this assessment, the agencies and CARB held numerous meetings with a wide variety of stakeholders including the automobile original equipment manufacturers (OEMs), automotive suppliers, non-governmental organizations, states and local governments, infrastructure providers, and labor unions. Concurrent with issuing the TAR, NHTSA and EPA also issued a joint Notice of Intent to Issue a Proposed Rulemaking (NOI)<sup>40</sup> which highlighted the results of the TAR analyses, provided an overview of key program design elements, and announced plans for initiating the joint rulemaking to improve the fuel efficiency and reduce the GHG emissions of passenger cars and light-duty trucks built in MYs 2017–2025.

The TAR evaluated a range of potential stringency scenarios through model year 2025, representing a 3, 4, 5, and 6 percent per year estimated decrease in GHG levels from a model

standards for heavy duty vehicles and engines for MYs 2014–2018. 76 FR 57106 (September 15, 2011).

<sup>38</sup> These letters of support in response to the May 21, 2010 Presidential Memorandum are available at <http://www.epa.gov/otaq/climate/letters.htm> (last accessed August 9, 2012).

<sup>39</sup> This Interim Joint Technical Assessment Report (TAR) is available at <http://www.epa.gov/otaq/climate/regulations/ldv-ghg-tar.pdf> (last accessed August 9, 2012) and [http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/2017+CAFE-GHG\\_Interim\\_TAR2.pdf](http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/2017+CAFE-GHG_Interim_TAR2.pdf). Section 2(a) of the Presidential Memorandum requested that EPA and NHTSA “Work with the State of California to develop by September 1, 2010, a technical assessment to inform the rulemaking process, reflecting input from an array of stakeholders on relevant factors, including viable technologies, costs, benefits, lead time to develop and deploy new and emerging technologies, incentives and other flexibilities to encourage development and deployment of new and emerging technologies, impacts on jobs and the automotive manufacturing base in the United States, and infrastructure for advanced vehicle technologies.”

<sup>40</sup> 75 FR 62739, October 13, 2010.

CO<sub>2</sub> emissions level does not increase. Minimum sales penetration thresholds apply for the performance-based credits, similar to those adopted for HEV credits.

To avoid double-counting, no truck will receive credit under both the HEV and the performance-based approaches. Further details on the full-size truck technology credit program are provided in sections II.F.3 and III.C.3, as well as in Chapter 5.3 of the joint TSD.

The agencies received a variety of comments on the proposal for this technology incentive program for full size pickup trucks. Some environmental groups and manufacturers questioned the need for it, arguing that this vehicle segment is not especially challenged by the standards, that hybrid systems would readily transfer to it from other vehicle classes, and that the credit essentially amounts to an economic advantage for manufacturers of these trucks. Other industry commenters requested that it be made available to a broader class of vehicles, or that the minimum penetration thresholds be removed or relaxed. There were also a number of comments on the technical requirements defining eligibility and mild/strong HEV performance. In response to the comments, the agencies made some changes to the proposed program, including adjustments to the penetration thresholds for mild HEVs, clarification that non-gasoline HEVs can qualify, and improvements to the technical criteria for mild and strong hybrids. The comments and changes are discussed in detail in sections II.F.3, and III.C.3, and in Chapter 5 of the TSD.

#### 5. 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 *de novo* rulemaking in order to establish final standards for vehicles for those model years, the agencies will conduct a comprehensive mid-term evaluation and agency decision-making process for the MYs 2022–2025 standards, as described in the proposal.

The agencies received many comments about the importance of the proposed mid-term evaluation due to the long time-frame of the rule and the uncertainty in assumptions due to this long timeframe. Nearly all auto manufacturers and associations predicated their support of the MY 2017–2025 National Program on the agencies conducting this evaluation and decision-making process. In addition, a number of auto manufacturers suggested additional factors that the agencies should consider during the evaluation process and also stressed the

importance of completing the evaluation no later than April 1, 2018, the timeframe proposed by the agencies. Several associations also asked for more detail to be codified regarding the timeline, content and procedures of the review process. Several automakers and organizations suggested that the agencies also conduct a series of smaller, focused evaluations or “check-ins” on key issues and technological and market trends. Several organizations and associations stressed the importance of involving CARB and broad public participation in the review process.

The agencies also received a number of comments from environmental and consumer organizations expressing concerns about the mid-term evaluation—that it could occur too early, before reliable data on the new standards is available, be disruptive to auto manufacturers’ product planning and add uncertainty, and that it should not be used as an opportunity to delay benefits or weaken the overall National Program for MY 2022–2025. Those organizations commented that if the agencies determined that a mid-term evaluation was necessary, it should be used as an opportunity to increase the stringency of the 2022–2025 standards. Some environmental groups opposed the concept of the agencies performing additional interim reviews. Finally, several environmental organizations urged transparency and recommended that the agencies provide periodic updates on technology progress and compliance trends. One commenter, NADA, stated that the rule should not be organized in a way that would require a mid-term evaluation and that the agencies should wait to set standards for MYs 2017–2021 until more information is available. The mid-term evaluation comments are discussed in detail in sections III.B.3 and IV.A.3.b.

The agencies are finalizing the mid-term evaluation and agency decision-making process as proposed. As stated in the proposal, both NHTSA and EPA will develop and compile up-to-date information for the mid-term evaluation, through a collaborative, robust and transparent process, including public notice and comment. The evaluation will be based on (1) a holistic assessment of all of the factors considered by the agencies in setting standards, including those set forth in this final rule and other relevant factors, and (2) the expected impact of those factors on the manufacturers’ ability to comply, without placing decisive weight on any particular factor or projection. In order to align the agencies’ rulemaking for MYs 2022–

2025 and to maintain a joint national program, if the EPA determination is that standards will not change, NHTSA will issue its final rule concurrently with the EPA determination. If the EPA determination is that standards may change, the agencies will issue a joint NPRM and joint final rule. The comprehensive evaluation process will lead to final agency action by both agencies, as described in sections III.B.3 and IV.A.3 of this Notice.

NHTSA’s final action will be a *de novo* rulemaking conducted, as explained, with fresh inputs and a fresh consideration and balancing of all relevant factors, based on the best and most current information before the agency at that time. EPA will conduct a mid-term evaluation of the later model year light-duty GHG standards (MY2022–2025). The evaluation will determine what standards are appropriate for those model years.

Consistent with the agencies’ commitment to maintaining a single national framework for regulation of vehicle GHG emissions and fuel economy, the agencies fully expect to conduct the mid-term evaluation in close coordination with the California Air Resources Board (CARB). In adopting their GHG standards on March 22, 2012, the California Air Resources Board directed the Executive Officer to continue collaborating with EPA and NHTSA as the Federal GHG standards were finalized and also “to participate in U.S. EPA’s mid-term review of the 2022 through 2025 model year passenger vehicle greenhouse gas standards being proposed under the 2017 through 2025 MY National Program”.<sup>89</sup> In addition, in order to align the agencies’ proceedings for MYs 2022–2025 and to maintain a joint national program, if the EPA determination is that standards will not change, NHTSA will issue its final rule concurrently with the EPA determination. If the EPA determination is that standards may change, the agencies will issue a joint NPRM and joint final rule.

Further discussion of the mid-term evaluation can be found in Sections III.B.3 and IV.A.3.b of this final rule preamble.

#### 6. Coordinated Compliance

The MYs 2012–2016 final rules established detailed and comprehensive regulatory provisions for compliance and enforcement under the GHG and

<sup>89</sup> See California Low-Emission Vehicles (LEV) & GHG 2012 regulations approved by State of California Air Resources Board, Resolution 12–11. Available at: <http://www.arb.ca.gov/regact/2012/cfo2012/res12-11.pdf> (last accessed August 9, 2012).

1990. Transportation sources, which do not include certain off highway sources such as farm and construction equipment, account for 27% of U.S. GHG emissions, and motor vehicles (CAA section 202(a)), which include light-duty vehicles, light-duty trucks, medium-duty passenger vehicles, heavy-duty trucks, buses, and motorcycles, account for 23% of total U.S. GHGs.

Light-duty vehicles emit carbon dioxide, methane, nitrous oxide and hydrofluorocarbons. Carbon dioxide (CO<sub>2</sub>) is the end product of fossil fuel combustion. During combustion, the carbon stored in the fuels is oxidized and emitted as CO<sub>2</sub> and smaller amounts of other carbon compounds. Methane (CH<sub>4</sub>) emissions are a function of the methane content of the motor fuel, the amount of hydrocarbons passing uncombusted through the engine, and any post-combustion control of hydrocarbon emissions (such as catalytic converters). Nitrous oxide or N<sub>2</sub>O (and nitrogen oxide or NO<sub>x</sub>) emissions from vehicles and their engines are closely related to air-fuel ratios, combustion temperatures, and the use of pollution control equipment. For example, some types of catalytic converters installed to reduce motor vehicle NO<sub>x</sub>, carbon monoxide (CO) and hydrocarbon (HC) emissions can promote the formation of N<sub>2</sub>O. Hydrofluorocarbons (HFC) are progressively replacing chlorofluorocarbons (CFC) and hydrochlorofluorocarbons (HCFC) in vehicle air conditioning systems as CFCs and HCFCs are being phased out under the Montreal Protocol and Title VI of the CAA. There are multiple emissions pathways for HFCs with emissions occurring during charging of cooling and refrigeration systems, during operations, and during decommissioning and disposal.

b. Basis for Action Under the Clean Air Act

Section 202(a)(1) of the Clean Air Act (CAA) states that “the Administrator shall by regulation 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 \* \* \*, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.” The Administrator has found that the elevated concentrations of a group of six GHGs in the atmosphere may reasonably be anticipated to endanger public health and welfare, and that emissions of GHGs from new motor

vehicles and new motor vehicle engines contribute to this air pollution.

As a result of these findings, section 202(a) requires EPA to issue standards applicable to GHG emissions, and authorizes EPA to revise them from time to time. See *Coalition for Responsible Regulation v. EPA* (No. 09–1322, June 26, 2012 (D.C. Circuit)) holding that under section 202(a), EPA has a mandatory duty to issue standards controlling emissions of greenhouse gases from new motor vehicles once it made a positive endangerment determination, and rejecting all arguments to the contrary as inconsistent with “[b]oth the plain text of Section 202(a) and precedent” (slip op. p. 40). This preamble describes the revisions to the current standards to control emissions of CO<sub>2</sub> and HFCs from new light-duty motor vehicles.<sup>396</sup> For further discussion of EPA’s authority under section 202(a), see Section I.D.

c. EPA’s Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act

On December 15, 2009, EPA published its findings that elevated atmospheric concentrations of GHGs are reasonably anticipated to endanger the public health and welfare of current and future generations, and that emissions of GHGs from new motor vehicles contribute to this air pollution. Further information on these findings may be found at 74 FR 66496 (December 15, 2009) and 75 FR 49566 (Aug. 13, 2010). As noted, the D.C. Circuit rejected all industry and State challenges to the endangerment finding, holding that EPA’s endangerment determination was supported by “substantial scientific evidence”. *Coalition for Responsible Regulation v. EPA* (No. 09–1322, June 26, 2012 (D.C. Circuit)) slip op. p. 30.

3. What is EPA finalizing?

a. Light-Duty Vehicle, Light-Duty Truck, and Medium-Duty Passenger Vehicle Greenhouse Gas Emission Standards and Projected Emissions Levels

This section provides an overview of EPA’s final rule. The key public comments are discussed in the sections that follow, which provide the details of the program. A fuller discussion of comments is in EPA’s separate Response to Comments document.

<sup>396</sup> EPA is not amending the substantive standards adopted in the 2012–2016 light-duty vehicle rule for N<sub>2</sub>O and CH<sub>4</sub>, but is revising the options that manufacturers have in meeting the N<sub>2</sub>O and CH<sub>4</sub> standards, and to the timeframe for manufacturers to begin measuring N<sub>2</sub>O emissions. See Section III.B below.

The major elements of EPA’s final rule are being finalized as proposed, including overall stringency and timing, and the CO<sub>2</sub>-footprint target curves. With respect to the key program design elements, a few changes have been made subsequent to the proposal, in response to public comment, including the addition of multiplier incentives for dedicated and dual fuel CNG vehicles for MYs 2017–2021, temporary lead time provisions for intermediate volume manufacturers, and some relatively minor changes in the off-cycle credit and hybrid pick-up truck incentive programs.

EPA is finalizing new tailpipe carbon dioxide (CO<sub>2</sub>) emissions standards for cars and light trucks based on the CO<sub>2</sub> emissions-footprint curves for cars and light trucks that are shown above in Section I.B.3 and below in Section III.B.<sup>397</sup> These curves establish different CO<sub>2</sub> emissions targets for each unique car and truck footprint value. Generally, the larger the vehicle footprint, the higher the corresponding vehicle CO<sub>2</sub> emissions target. Vehicle CO<sub>2</sub> emissions will be measured over the EPA city and highway tests. Under this rule, various incentives and credits are available for manufacturers to demonstrate compliance with the standards. See Section I.B for a comprehensive overview of both the CO<sub>2</sub> emissions-footprint standard curves and the various compliance flexibilities that are available to the manufacturers in meeting the tailpipe CO<sub>2</sub> standards.

EPA projects that the tailpipe CO<sub>2</sub> standards will yield a fleetwide average light vehicle CO<sub>2</sub> emissions compliance target level in MY 2025 of 163 grams per mile,<sup>398</sup> which represents an average fleetwide reduction of 35 percent relative to the projected average light vehicle CO<sub>2</sub> level in MY 2016. On average, car CO<sub>2</sub> emissions would be reduced by about 5 percent per year, while light truck CO<sub>2</sub> emissions would be reduced by about 3.5 percent per year from MYs 2017 through 2021, and by about 5 percent per year from MYs 2022 through 2025.

The following three tables, Table III–1 through Table III–3, summarize EPA’s projections of what the standards mean in terms of CO<sub>2</sub> emissions reductions for passenger cars, light trucks, and the overall fleet combining passenger cars and light trucks for MYs 2017–2025. It is important to emphasize that these

<sup>397</sup> EPA is not changing the 0.010 gram per mile N<sub>2</sub>O or 0.030 gram per mile CH<sub>4</sub> standards which were established in the MYs 2012–2016 rulemaking. See Section III.B for a discussion of the N<sub>2</sub>O and CH<sub>4</sub> standards.

<sup>398</sup> This translates to 54.5 mpg if met exclusively with fuel economy technologies.

projections are based on technical assumptions by EPA about various matters, including the mix of cars and trucks, as well as the mix of vehicle footprint values, in the fleet in varying years. It is possible that the actual CO<sub>2</sub> emissions values, as well as the actual utilization of incentives and credits, will be either higher or lower than the EPA projections.<sup>399</sup>

In each of these tables, the column “Projected CO<sub>2</sub> Compliance Target” represents our projected fleetwide average CO<sub>2</sub> compliance target value based on the CO<sub>2</sub>-footprint curve standards as well as the projected mixes of cars and trucks and vehicle footprint distributions.

The columns under “Incentives” represent the projected emissions impact of the advanced technology multiplier incentives,<sup>400</sup> as well as the pickup truck incentives. Also shown under incentives is the projected impact of the flexibilities provided to intermediate volume manufacturers. These incentives allow manufacturers to meet their compliance targets with CO<sub>2</sub> emissions levels slightly higher than they would otherwise have to be, but do not reflect actual real-world CO<sub>2</sub> emissions reductions. As such they reduce the emissions reductions that the

CO<sub>2</sub> standards would be expected to achieve.

The column “Projected Achieved CO<sub>2</sub>” is the sum of the CO<sub>2</sub> Compliance Target and the values in the “Incentive” columns. This Achieved CO<sub>2</sub> value is a better reflection of the CO<sub>2</sub> emissions benefits of the standards, since it accounts for the incentive programs.

One incentive that is not reflected in these tables is the 0 gram per mile compliance value for EV/PHEV/FCVs. The 0 gram per mile value accurately reflects the tailpipe CO<sub>2</sub> gram per mile achieved by these vehicles; however, fuel use from these vehicles will impact the overall GHG reductions associated with the standards due to fuel production and distribution-related upstream GHG emissions which are projected to be greater than the upstream GHG emissions associated with gasoline from oil. The combined impact of the 0 gram per mile compliance value for EV/PHEV/FCVs and the advanced technology multiplier on overall program GHG emissions is discussed in more detail below in Section III.C.2.d.

The columns under “Credits” quantify the projected CO<sub>2</sub> emissions credits that we project manufacturers will achieve through improvements in

air conditioner refrigerants and efficiency, as well as certain off-cycle technologies. These credits reflect real world emissions reductions, so they do not raise the levels of the Achieved CO<sub>2</sub> values, but they do allow manufacturers to meet their compliance targets with 2-cycle test CO<sub>2</sub> emissions values higher than otherwise. For the off-cycle credit program, values are projected for two technologies—active aerodynamics and stop-start systems—EPA is not quantifying the use of additional off-cycle technologies at this time because of a lack of information with respect to the likely use of additional off-cycle technologies.

In the MYs 2012–2016 rule, we estimated the impact of the Temporary Leadtime Allowance Alternative Standards credit in MY 2016 to be 0.1 gram/mile. Due to the small magnitude, we have not included this in the following tables for the MY 2016 base year.

The column “Projected 2-cycle CO<sub>2</sub>” is the projected fleetwide 2-cycle CO<sub>2</sub> emissions values that manufacturers would have to achieve in order to be able to comply with the standards. This value is the sum of the projected fleetwide credit, incentive, and Compliance Target values.

TABLE III–1—EPA PROJECTIONS FOR FLEETWIDE TAILPIPE EMISSIONS COMPLIANCE WITH CO<sub>2</sub> STANDARDS—PASSENGER CARS<sup>401</sup>  
 [Grams per mile]

Model year	Projected CO <sub>2</sub> compliance target	Incentives <sup>402</sup>		Projected achieved CO <sub>2</sub>	Credits			Projected 2-cycle CO <sub>2</sub>
		Advanced technology multiplier	Intermediate volume provisions		Off cycle credit	A/C refrigerant	A/C efficiency	
2016 (base) .....	225 <sup>403</sup>	0	0	225	0.4	5.4	4.8	235
2017 .....	212	0.6	0.1	213	0.5	7.8	5.0	226
2018 .....	202	1.1	0.3	203	0.6	9.3	5.0	218
2019 .....	191	1.6	0.1	193	0.7	10.8	5.0	210
2020 .....	182	1.5	0.1	183	0.8	12.3	5.0	201
2021 .....	172	1.2	0.0	173	0.8	13.8	5.0	193
2022 .....	164	0.0	0.0	164	0.9	13.8	5.0	184
2023 .....	157	0.0	0.0	157	1.0	13.8	5.0	177
2024 .....	150	0.0	0.0	150	1.1	13.8	5.0	170
2025 .....	143	0.0	0.0	143	1.4	13.8	5.0	163

<sup>399</sup> All EPA projections in the preamble are relative to a 2008-based reference fleet; see the EPA Regulatory Impact Analysis for projections relative to a 2010-based reference fleet.

<sup>400</sup> The advanced technology multiplier incentive applies to EVs, PHEVs, FCVs, and CNG vehicles. The projections reflect EPA projections of the use of EVs and PHEVs for MYs 2017–2021. It is, of course, possible that there will be FCVs and CNG vehicles during this timeframe as well.

<sup>401</sup> Projected results using 2008-based fleet projection analysis. These values differ slightly from those shown in the proposal because of revisions to the MY 2008-based fleet and updates to the analysis.

<sup>402</sup> An incentive not reflected in this table is the 0 gram per mile compliance value for EV/PHEV/FCVs. See text for explanation.

<sup>403</sup> The projected compliance levels for 2016 are different than those which were projected in the

MYs 2012–2016 rule. Our assessment for this rule is based on a predicted 2016 compliance target of 224 for cars, 297 for trucks, and 252 for the fleet. This is because the standards are footprint based and the fleet projections, hence the footprint distributions, change slightly with each update of our projections, as described below. In addition, the actual fleet compliance levels for any model year will not be known until the end of that model year based on actual vehicle sales.

TABLE III-2—EPA PROJECTIONS FOR FLEETWIDE TAILPIPE EMISSIONS COMPLIANCE WITH CO<sub>2</sub> STANDARDS—LIGHT TRUCKS<sup>404</sup>

[Grams per mile]

Model year	Projected CO <sub>2</sub> compliance target	Incentives <sup>405</sup>		Projected achieved CO <sub>2</sub>	Credits			Projected 2-cycle CO <sub>2</sub>
		Pickup mild HEV + strong HEV	Intermediate volume provisions		Off cycle credit	A/C refrigerant	A/C efficiency	
2016 (base) .....	<sup>406</sup> 298	0	0.0	298	0.7	6.6	4.8	310
2017 .....	295	0.1	0.2	295	0.9	7	5	308
2018 .....	286	0.2	0.3	287	1.0	11	5	304
2019 .....	277	0.3	0.2	278	1.2	13.4	7.2	299
2020 .....	269	0.4	0.2	270	1.4	15.3	7.2	294
2021 .....	249	0.5	0.0	250	1.5	17.2	7.2	276
2022 .....	237	0.6	0.0	238	2.2	17.2	7.2	264
2023 .....	225	0.6	0.0	226	2.9	17.2	7.2	253
2024 .....	214	0.7	0.0	214	3.6	17.2	7.2	242
2025 .....	203	0.8	0.0	204	4.3	17.2	7.2	233

<sup>404</sup> Projected results using 2008-based fleet projection analysis. These values differ slightly from those shown in the proposal because of revisions to the MY 2008-based fleet and updates to the analysis.

<sup>405</sup> An incentive not reflected in this table is the 0 gram per mile compliance value for EV/PHEV/FCVs. See text for explanation.

<sup>406</sup> The projected compliance levels for 2016 are different than those which were projected in the MYs 2012–2016 rule. Our assessment for this rule is based on a predicted 2016 compliance target of 224 for cars, 297 for trucks, and 252 for the fleet. This is because the standards are footprint based and the fleet projections, hence the footprint distributions, change slightly with each update of our projections, as described below. In addition, the actual fleet compliance levels for any model year will not be known until the end of that model year based on actual vehicle sales.

TABLE III-3—EPA PROJECTIONS FOR FLEETWIDE TAILPIPE EMISSIONS COMPLIANCE WITH CO<sub>2</sub> STANDARDS—COMBINED PASSENGER CARS AND LIGHT TRUCKS<sup>407</sup>

[Grams per mile]

Model year	Projected CO <sub>2</sub> compliance target	Incentives <sup>408</sup>			Projected achieved CO <sub>2</sub>	Credits			Projected 2-cycle CO <sub>2</sub>
		Advanced technology multiplier	Pickup mild HEV + strong HEV	Intermediate volume provision		Off cycle credit	A/C refrigerant	A/C efficiency	
2016 (base) .....	<sup>409</sup> 250	0	0	.....	250	0.5	5.8	4.8	261
2017 .....	243	0.4	0.0	0.1	243	0.6	7.5	5.0	256
2018 .....	232	0.7	0.1	0.3	234	0.8	9.9	5.0	249
2019 .....	222	1.0	0.1	0.1	223	0.9	11.7	5.8	242
2020 .....	213	1.0	0.1	0.1	214	1.0	13.4	5.8	234
2021 .....	199	0.8	0.2	.....	200	1.1	15.0	5.8	222
2022 .....	190	0.0	0.2	.....	190	1.4	15.0	5.8	212
2023 .....	180	0.0	0.2	.....	181	1.7	15.0	5.8	203
2024 .....	171	0.0	0.2	.....	172	1.9	14.9	5.7	194
2025 .....	163	0.0	0.3	.....	163	2.3	14.9	5.7	186

<sup>407</sup> Projected results using 2008-based fleet projection analysis. These values differ slightly from those shown in the proposal because of revisions to the MY 2008-based fleet and updates to the analysis.

<sup>408</sup> The one incentive not reflected in this table is the 0 gram per mile compliance value for EV/PHEV/FCVs. See text for explanation.

<sup>409</sup> The projected compliance levels for 2016 are different than those which were projected in the MYs 2012–2016 rule. Our assessment for this rule is based on a predicted 2016 compliance target of 224 for cars, 297 for trucks, and 252 for the fleet. This is because the standards are footprint based and the fleet projections, hence the footprint distributions, change slightly with each update of our projections, as described below. In addition, the actual fleet compliance levels for any model year will not be known until the end of that model year based on actual vehicle sales.

Table III-4 shows the projected real world CO<sub>2</sub> emissions and fuel economy values associated with the CO<sub>2</sub> standards. These real world estimates, similar to values shown on new vehicle labels, reflect the fact that the way cars and trucks are operated in the real world generally results in higher CO<sub>2</sub> emissions and lower fuel economy than laboratory test results used to determine compliance with the standards, which are performed under tightly controlled conditions. There are many assumptions that must be made for these projections

and real world CO<sub>2</sub> emissions and fuel economy performance can vary based on many factors.

The real world tailpipe CO<sub>2</sub> emissions projections in Table III-4 are calculated starting with the projected 2-cycle CO<sub>2</sub> emissions values in Table III-1 through Table III-3, subtracting the air conditioner efficiency and off-cycle credits,<sup>410</sup> and then multiplying by a

<sup>410</sup> Air conditioner efficiency and off-cycle credits are subtracted from the Projected 2-cycle CO<sub>2</sub> values (which include the air conditioner efficiency

factor of 1.25. The 1.25 factor is an approximation of the ratio of real world CO<sub>2</sub> emissions to 2-cycle test CO<sub>2</sub> emissions for the fleet in the recent past. It is not possible to know the appropriate factor for future vehicle fleets, as this factor will depend on many factors such as technology

and off-cycle credits) because they will decrease real world CO<sub>2</sub> emissions and increase real world fuel economy. The same results can be obtained from starting with the Projected Achieved CO<sub>2</sub> values in Tables III-1 through Table III-3 and adding the A/C Refrigerant values.

performance, driver behavior, climate conditions, fuel composition, congestion, etc. Issues associated with future projections of this factor are discussed in TSD 4. The real world fuel economy value is calculated by dividing 8887 grams of CO<sub>2</sub> per gallon of gasoline by the real world tailpipe CO<sub>2</sub> emissions value.<sup>411</sup>

TABLE III-4—EPA PROJECTIONS FOR THE AVERAGE, REAL WORLD FLEETWIDE TAILPIPE CO<sub>2</sub> EMISSIONS AND FUEL ECONOMY ASSOCIATED WITH THE CO<sub>2</sub> STANDARDS

Model year	Real world tailpipe CO <sub>2</sub> (grams per mile)			Real World Fuel Economy (miles per gallon)		
	Cars	Trucks	Cars + trucks	Cars	Trucks	Cars + trucks
2016 (base) .....	287	381	320	30.9	23.3	27.8
2017 .....	276	378	313	32.2	23.5	28.4
2018 .....	266	373	304	33.5	23.9	29.2
2019 .....	255	363	294	34.8	24.5	30.2
2020 .....	244	357	284	36.4	24.9	31.3
2021 .....	234	334	269	38.0	26.6	33.1
2022 .....	223	318	256	39.9	27.9	34.7
2023 .....	215	304	244	41.3	29.3	36.4
2024 .....	205	289	233	43.4	30.8	38.1
2025 .....	196	277	223	45.4	32.1	40.0

As discussed both in Section I and later in Section III, EPA is finalizing provisions for averaging, banking, and trading of credits, that allow annual credits for a manufacturer's over-compliance with its unique fleet-wide average standard, carry-forward and carry-backward of credits, the ability to transfer credits between a manufacturer's car and truck fleets, and credit trading between manufacturers. EPA is also finalizing a one-time provision allowing credits generated in MYs 2012–2016 to be carried forward through MY 2021. These provisions are not expected to change the emissions reductions achieved by the standards, but should reduce the cost of achieving those reductions. The tables above do not reflect the year to year impact of these provisions. For example, car-to-truck or truck-to-car credit transfers could affect the projected values in Table III-1 and Table III-2, but such credit transfers between cars and trucks would not be expected to change the results for the combined fleet, reflected in Table III-3.

The rule also exempts from the standards a limited set of vehicles: emergency and police vehicles, and (as in the MYs 2012–2016 GHG standards) vehicles manufactured by small

businesses. As discussed in Section III.B below, these exclusions have a very limited impact on the total GHG emissions reductions from the light-duty vehicle fleet. We also do not anticipate significant impacts on total GHG emissions reductions from the provisions allowing small volume manufacturers to petition EPA for alternative standards. See Section III.B.5 below.

b. Environmental and Economic Benefits and Costs of EPA's Greenhouse Gas Emissions Standards

i. Model Year Lifetime Analysis

Section I.C provides a comprehensive discussion of the projected benefits and costs associated with MYs 2017–2025 GHG and CAFE standards based on a "model year lifetime" analysis, i.e., the benefits and costs associated with the lifetime operation of the new vehicles sold in these nine model years. It is important to note that while the incremental vehicle technology costs associated with MY 2017 vehicles will in fact occur in calendar year 2017, the benefits associated with MY 2017 vehicles will be split among all the calendar years from 2017 through the calendar year during which the last MY 2017 vehicle is retired.

Table III-5 provides a summary of the GHG emissions and oil savings associated with the lifetime operation of all the vehicles sold in each model year. Cumulatively, for the nine model years from 2017 through 2025, the standards are projected to save approximately 2 billion metric tons of GHG emissions and nearly 4 billion barrels of oil. These savings come on top of savings that would already be achieved through the continuation of EPA's MYs 2012–2016 standards.<sup>412</sup>

Table III-6 provides a summary of the most important projected economic impacts of the GHG emissions standards based on this model year lifetime analytical approach. These monetized dollar values are all discounted to the first year of each model year, and then are summed up across all model years. With a 3% discount rate, cumulative incremental vehicle program costs for MYs 2017–2025 vehicles are \$150 billion (with \$136 billion of that being new technology and \$14 billion being increased maintenance), fuel savings are \$475 billion, other monetized benefits are \$126 billion, and program net benefits are projected to be \$451 billion. Using a 7% discount rate, the projected program net benefits are \$326 billion.

TABLE III-5—SUMMARY OF GHG EMISSIONS AND OIL SAVINGS FOR MODEL YEAR LIFETIME ANALYSIS OF CO<sub>2</sub> STANDARDS

	MY 2017	MY 2018	MY 2019	MY 2020	MY 2021	MY 2022	MY 2023	MY 2024	MY 2025	Cumulative MY 2017–2025
GHG Savings (MMT) .....	30.5	69.6	108	149	216	270	320	371	423	1,956

<sup>411</sup> So this value will be different if there is significant use of diesel fuel.

<sup>412</sup> The cost and benefit estimates provided here are only for the MYs 2017–2025 rulemaking. EPA and DOT's rulemakings establishing standards for

MYs 2012–2016, and DOT's MY 2011 rulemaking, are already part of the baseline for this analysis.

downsizing (Insurance Institute for Highway Safety, Institute for Policy Integrity), or to make the curves flatter, to discourage upsizing (Whitefoot and Skerlos). The agencies' consideration of these and other comments and of the updated technical analyses did not lead to changes to the level of the standards nor in the shapes of the curves discussed above. These comments and the agencies' response are discussed in greater detail in section II.B and III.D of the Preamble, as well as Chapter 2 of the joint TSD.

3. Mid-Term Evaluation

Given the long time frame at issue in implementing standards for MY2022–2025, 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 described below. No changes are being made to the mid-term evaluation that was discussed and proposed.

Up to date information will be developed and compiled for the evaluation, through a collaborative, robust and transparent process, including public notice and comment. The evaluation will be based on (1) A holistic assessment of all of the factors considered by the agencies in setting standards, including those set forth in the rule and other relevant factors, and (2) the expected impact of those factors on the manufacturers' ability to comply, without placing decisive weight on any particular factor or projection. The comprehensive evaluation process will lead to final agency action by both agencies.

Consistent with the agencies' commitment to maintaining a single national framework for regulation of vehicle emissions and fuel economy, the agencies fully expect to conduct the mid-term evaluation in close coordination with the California Air Resources Board (CARB). Moreover, the agencies fully expect that any adjustments to the standards will be made with the participation of CARB and in a manner that ensures continued harmonization of state and Federal vehicle standards. In order to align the agencies proceedings for MYs 2022–2025 and to maintain a joint national program, EPA and NHTSA will finalize their actions related to MYs 2022–2025 standards concurrently.

EPA will conduct a mid-term evaluation of the later model year light-duty GHG standards (MY2022–2025). The evaluation will determine whether those standards are appropriate under

section 202(a) of the Act. Under the regulations adopted today, EPA would be legally bound to make a final decision, by April 1, 2018, on whether the MY2022–2025 GHG standards are appropriate under section 202(a), in light of the record then before the agency.

EPA, NHTSA and CARB will jointly prepare a draft Technical Assessment Report (TAR) to inform EPA's determination on the appropriateness of the GHG standards and to inform NHTSA's rulemaking for the CAFE standards for MY 2022–2025. The TAR will examine the same issues and underlying analyses and projections considered in the original rulemaking, including technical and other analyses and projections relevant to each agency's authority to set standards as well as any relevant new issues that may present themselves. There will be an opportunity for public comment on the draft TAR, and appropriate peer review will be performed of underlying analyses in the TAR. The assumptions and modeling underlying the TAR will be available to the public, to the extent consistent with law.

EPA will also seek public comment on whether the standards are appropriate under section 202(a), e.g. comments to affirm or change the GHG standards (either more or less stringent). The agencies will carefully consider comments and information received and respond to comments in their respective subsequent final actions.

EPA and NHTSA will consult and coordinate in developing EPA's determination on whether the MY2022–2025 GHG standards are appropriate under section 202(a) and NHTSA's NPRM. In making its determination, EPA will evaluate and determine whether the MY2022–2025 GHG standards are appropriate under section 202(a) of the CAA based on a comprehensive, integrated assessment of all of the results of the review, as well as any public comments received during the evaluation, taken as a whole. The decision making required of the Administrator in making that determination is intended to be as robust and comprehensive as that in the original setting of the MY2017–2025 standards.

In making this determination, EPA will consider information on a range of relevant factors, including but not limited to those listed in the rule<sup>439</sup> and below:

1. Development of powertrain improvements to gasoline and diesel powered vehicles.

2. Impacts on employment, including the auto sector.

3. Availability and implementation of methods to reduce weight, including any impacts on safety.

4. Actual and projected availability of public and private charging infrastructure for electric vehicles, and fueling infrastructure for alternative fueled vehicles.

5. Costs, availability, and consumer acceptance of technologies to ensure compliance with the standards, such as vehicle batteries and power electronics, mass reduction, and anticipated trends in these costs.

6. Payback periods for any incremental vehicle costs associated with meeting the standards.

7. Costs for gasoline, diesel fuel, and alternative fuels.

8. Total light-duty vehicle sales and projected fleet mix.

9. Market penetration across the fleet of fuel efficient technologies.

10. Any other factors that may be deemed relevant to the review.

If, based on the evaluation, EPA decides that the GHG standards are appropriate under section 202(a), then EPA will announce that final decision and the basis for EPA's decision. The decision will be final agency action which also will be subject to judicial review on its merits. EPA will develop an administrative record for that review that will be no less robust than that developed for the initial determination to establish the standards. In the midterm evaluation, EPA will develop a robust record for judicial review that is the same kind of record that would be developed and before a court for judicial review of the adoption of standards.

Where EPA decides that the standards are not appropriate, EPA will initiate a rulemaking to adopt standards that are appropriate under section 202(a), which could result in standards that are either less or more stringent. In this rulemaking EPA will evaluate a range of alternative standards that are potentially effective and reasonably feasible, and the Administrator will propose the alternative that in her judgment is the best choice for a standard that is appropriate under section 202(a).<sup>440</sup>

<sup>440</sup> The provisions of CAA section 202(b)(1)(C) are not applicable to any revisions of the greenhouse standards adopted in a later rulemaking based on the mid-term evaluation. Section 202(b)(1)(C) refers to EPA's authority to revise "any standard prescribed or previously revised under this subsection," and indicates that "[a]ny revised standard" shall require a reduction of emissions from the standard that was previously applicable. These provisions apply to standards that are adopted under subsection 202(b) of the Act and are later revised. These provisions are limited by their terms to such standards, and do not otherwise limit

<sup>439</sup> See 40 CFR 86.1818–12(h).

If EPA initiates a rulemaking, it will be a joint rulemaking with NHTSA. Any final action taken by EPA at the end of that rulemaking is also judicially reviewable. The MY2022–2025 GHG standards will remain in effect unless and until EPA changes them by rulemaking. NHTSA intends to issue conditional standards for MY2022–2025 in the LDV rulemaking being initiated this fall for MY2017 and later model years. The CAFE standards for MY2022–2025 will be determined with finality in a subsequent, de novo notice and comment rulemaking conducted in full compliance with section 32902 of title 49 U.S.C. and other applicable law.

Accordingly, NHTSA's development of its proposal in that later rulemaking will include the making of economic and technology analyses and estimates that are appropriate for those model years and based on then-current information. Any rulemaking conducted jointly by the agencies or by NHTSA alone will be timed to provide sufficient lead time for industry to make whatever changes to their products that the rulemaking analysis deems feasible based on the new information available. At the very latest, the three agencies will complete the mid-term evaluation process and subsequent rulemaking on the standards that may occur in sufficient time to promulgate final standards for MY2022–2025 with at least 18 months lead time, but additional lead time may be provided.

EPA understands that California intends to conduct a mid-term evaluation of its program that is coordinated with EPA and NHTSA and is based on a similar set of factors as outlined above. California submitted a waiver request under the Clean Air Act to EPA on June 27, 2012 for its MYs 2017–2025 standards.<sup>441</sup> The regulatory package submitted to EPA for a waiver includes such a mid-term evaluation. EPA understands that California intends to continue promoting harmonized state

and federal vehicle standards. The waiver request notes California's commitment to accept compliance with EPA greenhouse gas emission standards, as compliant with California's greenhouse gas program.<sup>442</sup> Therefore, if EPA revises its standards in response to the mid-term evaluation, California may need to amend one or more of its 2022–2025 MY standards and would submit such amendments to EPA with a request for a waiver, or for confirmation that said amendments fall within the scope of an existing waiver, as appropriate.

#### Overall Support for Finalizing the Mid-term Evaluation

Every automaker and associations representing either auto makers or suppliers who commented on the proposed mid-term evaluation indicated that this evaluation was essential to their support of the proposal and urged the agencies to finalize a comprehensive mid-term evaluation. These commenters included General Motors, Chrysler, Ford, Nissan, Toyota, Hyundai America Technical Center, Mercedes-Benz, Mitsubishi Motors, Volvo Car Corporation, Porsche, Ferrari, KIA, the Alliance of Auto Manufacturers, the Global Automakers, the Motor & Equipment Manufacturers Association (MEMA), National Association of Manufacturers (NAM), EcoMotors International, Inc., and Johnson Controls, Inc. Two automakers, Chrysler and Nissan, specifically predicated their support of the MY2017–2025 National Program on the agencies finalizing the proposed mid-term evaluation. In addition, a number of other organizations including the United Auto Workers (UAW), the International Council on Clean Transportation (ICCT), U.S. Chamber of Commerce, Securing America's Future Energy (SAFE), as well as 112 members of the U.S. House of Representatives (in a letter to both agency heads) expressed strong support for finalizing the proposed mid-term evaluation.

Many environmental and consumer organizations, as well as many private citizens, both at the three public hearings and in written comments, expressed concern that the mid-term evaluation might be used as an opportunity to weaken the standards or to delay the environmental benefits of the National Program. Many stressed the expectation that the mid-term should be used as an opportunity to strengthen the

MY2017–2025 standards. These commenters included the Pew Charitable Trust, Sierra Club, Union of Concerned Scientists (UCS), American Medical Association of California, the National Association of Clean Air Agencies (NAACA), the Ecology Center and more than 30,000 individual citizens who submitted letters to the docket. The ICCT expressed their strong support for the mid-term evaluation and NESCAUM in discussing the need to evaluate technology incentives on the overall GHG goals of the program indicated their support of the mid-term review for this purpose.

As discussed above, the mid-term evaluation will be a comprehensive and robust evaluation of all of the relevant factors. EPA is clear that any evaluation of the appropriateness of the standards and any decision to go forward with revising the standards will consider making the standards more or less stringent, whatever is most appropriate under the circumstances at that time. It would be inappropriate to limit EPA's consideration to either just increasing or just reducing the stringency of the standards. Instead, EPA will determine the appropriate course to follow based on all of the information, evidence, and views in front of it, including those provided during public notice and comment.

Two commenters opposed finalizing the mid-term evaluation. Natural Resources Defense Council (NRDC) stated that it was both unnecessary and potentially disruptive to automakers' product planning and would add uncertainty to a nine year period. The National Automobile Dealers Association (NADA) did not support the mid-term evaluation since it did not support the need for the underlying rulemaking "so soon after having set standards for MY2012–2016, and before having had the benefit of learning from how those standards work in the real world." EPA believes that the evaluation process will not be disruptive to the automakers product planning. Instead it provides a framework that allows manufacturers the certainty to go forward and prepare for these standards, as it both adopts them now as final standards and establishes a mechanism to evaluate and change them in the future, if appropriate. The common support from the manufacturers indicates that this is the case. The opposition by NADA is premised on their opposition to adopting standards in this rulemaking, which is addressed elsewhere.

EPA's general authority under section 202(a) to adopt standards and revise them "from time to time." Since the greenhouse gas standards are not adopted under subsection 202(b), section 202(b)(1)(C) does not apply to these standards or any subsequent revision of these standards.

<sup>441</sup> Letter from Mary D. Nicols, Chairman, California Air Resources Board to Lisa P. Jackson, Administrator, U.E. EPA requesting the Administrator treat the amended ZEV requirements as within the scope of the previously granted waivers for the ZEV program or alternatively to grant a new waiver of preemption under CAA section 209(b). The waiver request also asks for an expedited review prior to the start of its Clean Cars Program. Until the waiver is granted, California will not be able to enforce the program. The waiver process requires an opportunity for a public hearing and a 30 day comment period after the hearing before making a determination on the waiver.

<sup>442</sup> State of California Air Resources Board. Resolution 12–11, January 26, 2012, at 20 incorporated by referenced in Board's March 22, 2012 final approval action. Available at <http://www.arb.ca.gov/regact/2012/cfo2012/res12-11.pdf> (last accessed July 9, 2012).

Ensuring Coordination of Mid-term Evaluation

Ford, Toyota, NRDC and the UCS stressed the importance of a coordinated mid-term evaluation by EPA and NHTSA that should also include the California Air Resources Board (CARB). EPA agrees with this comment, as indicated by the discussion above. In adopting their GHG standards the California Air Resources Board (CARB), directed CARB's Executive Officer to, "participate in U.S. EPA's mid-term review of the 2022 through 2025 model year passenger vehicle greenhouse gas standards \* \* \*" and to also, "continue collaborating with EPA and NHTSA as their standards are finalized and in the mid-term review."<sup>443</sup> In addition, the Board directed CARB's Executive Officer that "It is appropriate to accept compliance with the 2017 through 2025 model year National Program as compliance with California's greenhouse gas emission standards in the 2017 through 2025 model years, once United States Environmental Protection Agency (U.S. EPA) issues their final rule on or after its current July 2012 planned release, provided that the greenhouse gas reductions set forth in U.S. EPA's December 1, 2011 Notice of Proposed Rulemaking for 2017 through 2025 model year passenger vehicles are maintained, except that California shall maintain its own reporting requirements."<sup>444</sup>

Clean Air Act Authority To Conduct a Mid-term Evaluation

A number of auto manufacturers submitted comments agreeing that section 202(a) of the Clean Air Act (CAA) authorizes the proposed mid-term evaluation. Chrysler noted that the EPA had a "firm legal basis to conduct the mid-term evaluation under section 307(d) of the Clean Air Act (CAA) and the Administrative Procedures Act to reconsider regulations based on new information as well as under section 202(a) of the CAA under which EPA proposed the mid-term evaluation." The Global Automakers stated that a mid-term evaluation was, "not only permissible under the Clean Air Act, but also required because of the uncertainties inherent in projecting regulatory requirements nine to twelve years into the future," continuing that it "would have been arbitrary and capricious for EPA to promulgate GHG

emissions standards for model years as far into the future as MY2022–2025 without providing for a mid-term evaluation." Nissan indicated support for the views expressed by the Global Automakers and stated further that "a robust and comprehensive mid-term review is legally necessary to ensure that the standards for the later model years are supported by substantial evidence and are not arbitrary and capricious. (Citing Motor Vehicle Mfr's Ass'n v. State Farm, 463 U.S. 29,42 (1983) listing examples of arbitrary and capricious agency activity)."

EPA agrees that section 202(a) provides the agency with ample authority to undertake the mid-term evaluation. EPA does not agree that the mid-term evaluation is authorized under CAA section 307(d), as the mid-term evaluation is not a reconsideration of the standards under that provision. Instead the mid-term evaluation will be undertaken under EPA's general authority to establish emissions standards under section 202(a). EPA does not agree that the mid-term evaluation is legally required, or that the standards adopted today would be arbitrary and capricious or without substantial evidence to support them absent such a mid-term evaluation. The final rule and supporting information and analysis amply justify the reasonableness and appropriateness of the final GHG standards adopted by EPA, irrespective of the provisions for a mid-term evaluation. In any case, that issue is not before EPA as EPA is exercising its discretion to adopt provisions for a mid-term evaluation, for the reasons discussed above.

The Center for Biological Diversity (CBD) challenged the basis for the mid-term evaluation and specifically argued that any interim rulemaking should be based on a presumption that the stringencies of the standards will not decrease. As discussed above, the mid-term evaluation will be a robust and comprehensive evaluation, and it would be inappropriate to limit EPA's consideration to either just increasing or just reducing the stringency of the standards. Instead, EPA will determine the appropriate course to follow based on all of the information, evidence, and views in front of it, including those provided during public notice and comment. CBD also raised a concern that EPA would be applying a faulty weighting of the statutory factors under the CAA. CBD stated that highlighting the manufacturers' ability to comply was improper, and instead decisive weighting should be placed on energy conservation. EPA disagrees that it is improper to carefully consider the

impact on manufacturers' ability to comply. When EPA conducts the mid-term evaluation, EPA will be evaluating standards that have already been adopted and for which manufacturers are required to comply. The ability to comply is an important part of determining the appropriateness of these standards. For example, ability to comply is directly tied to lead time, a factor EPA is required to consider under section 202(a). EPA does not agree that it is appropriate to assign decisive weighting to any one factor, such as energy conservation. That is contrary to conducting a holistic assessment, where EPA carefully considers all of the relevant factors under section 202(a) and gives them the weight that is appropriate in light of all of the circumstances.

Recommendations for Additional "Check-ins" or Periodic Status Reports

Several automakers, auto suppliers and industry associations (General Motors, Chrysler, Daimler Automotive Group, Hyundai, Alliance of Automobile Manufacturers, Global Automakers, Inc and Johnson Controls) suggested that, in addition to the proposed formal mid-term evaluation, the agencies should also undertake a series of smaller, focused technical evaluations or "check-ins" leading up to and potentially following the mid-term evaluation. Such check-ins, these commenters asserted, would allow the agencies to consider the latest relevant technical information, as well as other key issues. Several environmental organizations (Sierra Club, UCS, NRDC, and CBD) submitted comments opposing these focused technical evaluations or "check-ins," arguing that these would be time consuming and too premature to judge technology readiness for the MY2022–2025 standards, and would undermine the intent and effectiveness of the mid-term evaluation. A number of environmental organizations also supported periodic updates on technology progress and compliance trends. The Sierra Club, while not supportive of the "check-in" concept, did urge agency transparency and access to data that would allow the public to "effectively and timely monitor compliance trends and technology applications." The ICCT recommended that EPA and NHTSA conduct periodic updates on technology progress and consider periodic status reports in advance of the mid-term evaluation so that all interested parties could have access to key data that would be important in documenting progress in technology improvements and implementation.

<sup>443</sup> See California Low-Emission Vehicles (LEV) & GHG 2012 regulations approved by State of California Air Resources Board, Resolution 12–11 (March 22, 2012). Available at <http://www.arb.ca.gov/regact/2012/leviighg2012/leviighg2012.htm> (last accessed June 5, 2012).

<sup>444</sup> Id., CARB Resolution 12–11 at 20.

As discussed above, the agencies will conduct a comprehensive mid-term evaluation and agency decision-making process for the MYs 2022–2025 standards as described in the proposal. The agencies expect to continue ongoing stakeholder dialogue, including in depth technical dialogue with automakers on their confidential technology development efforts and product plans for MYs 2022–2025. EPA does not believe that additional or more frequent reports, as suggested by some commenters would be an efficient way to prepare for the mid-term evaluation.

#### Timeline and Process for Mid-term Evaluation

Several auto companies including Ford, Toyota and Porsche noted the importance of the agencies meeting the proposed November 15, 2017, deadline for issuing the draft Technical Assessment Report (TAR) so that there is adequate time for a reasonable public comment period while still insuring that EPA meet its proposed April 1, 2018 deadline for determining whether the standards established for MY2022–2025 are appropriate under CAA section 202(a). The Alliance of Automobile Manufacturers, Global Automakers, and the National Association of Manufacturers also expressed concern with the agencies' proposed schedule for undertaking the mid-term evaluation. These commenters recommended that additional details be written into the final regulatory text to provide more procedural certainty including: a start date for the evaluation, a schedule of major milestones, specific studies the agencies plan to conduct, and details of the peer review process. Toyota, Hyundai and Mercedes-Benz in their comments noted their support for these recommendations as well. Mitsubishi urged the agency to work with stakeholders well in advance of the mid-term to develop a sound review process and framework. Both the Union of Concerned Scientists and NRDC stated that the timing of the mid-term evaluation should be conducted as close as possible to the beginning of MY2022 so that the mid-term evaluation could most accurately capture the status of technology and the vehicle market for those model years under review.

EPA acknowledges the timing and other concerns raised by all commenters and continues to believe that the approach laid out in the proposal provides an appropriate balance between certainty and needed flexibility by providing end dates by which it must issue the draft TAR (November 15, 2017) and determine whether the MY2022–2025 standards are appropriate

under section 202(a) of the Clean Air Act (April 1, 2018). Additional regulatory details on the timing or content of the mid-term evaluation are not needed and would not be an efficient way to prepare for and conduct the mid-term evaluation.

#### Additional Evaluation Factors Should Be Considered

In its proposal, EPA indicated that it would consider a range of relevant factors in conducting the mid-term evaluation, including but not limited to those listed in the preamble and proposed regulatory text. Quite a few commenters suggested that EPA expand the list of these high level factors. The Alliance of Automobile Manufacturers recommended numerous additions to the list of factors including, “current and expected availability of state and Federal incentives/subsidies for advanced technology vehicles,” “the end-of-life costs associated with advanced technology vehicles,” and “consumer demand for and acceptance of fuel-efficient technologies, and consumer valuation of fuel savings.” Honeywell encouraged the agencies to, “commit \* \* \* to a detailed review of emerging boosting technologies that may considerably advance vehicle emissions and fuel economy performance during the later years of the rulemaking.” The Institute for Policy Integrity commented that the agencies “should amend their list of factors to specifically reflect any potential changes to benefits estimates, in addition to changes to costs or the state of technology.” Mitsubishi Motors commented that the mid-term factors must include an evaluation of the sufficiency of the EV infrastructure, including whether there have been any significant industry-wide economic setbacks making EVs and other overall fuel economy targets impracticable, consumer acceptance of EVs and a thorough evaluation of an EV multiplier in MYs 2022 through 2025 in order to continue EV market penetration. Also, Mitsubishi noted that the mid-term should include consideration of compliance options for OEMs with limited product lines. The National Association of Clean Air Agencies (NACAA) suggested that EPA evaluate the use of credits by automobile manufacturers and the impact of credit use on average fleet performance. The Clean Air Association of the Northeast States for Coordinated Air Use Management (NESCAUM) noted that it expected EPA to monitor upstream emissions from the power grid to determine whether the improvements assumed to occur were realized. Finally,

the Sierra Club recommended that the agencies provide the public with data on credit use by manufacturers, technology penetration both overall and by manufacturers, and sales by vehicle footprints. The Alliance for Automakers also indicated that the agencies should seek expert peer-reviewed information including the National Academy of Sciences to answer a number of questions associated with the Mid-term reviews.

A number of other commenters, including Ford, the UCS and ICCT supported the mid-term evaluation provisions as proposed by EPA. Ford commented that they believed the agencies had struck an appropriate balance between an exhaustive list and a high-level approach and pointed to proposed regulatory language “including but not limited to \* \* \*” as critical language that should be maintained in final rule. Ford further noted that factors that turn out to be most important six years from now are not necessarily foreseeable today and not necessarily the ones listed in the proposed rule. The ICCT noted that “it is impossible to define all the criteria for review at this time \* \* \*” And UCS agreed that “a holistic assessment of all of the factors \* \* \* without placing decisive weight on any particular factor or projects” is the correct approach in conducting the mid-term evaluation.”

EPA is finalizing the list of factors as proposed.<sup>445</sup> We believe these factors are broad enough to encompass all appropriate factors that should be considered during the mid-term evaluation, and provide the agency with an appropriate balance in that the list identifies major factors to consider and includes a clear provision for inclusion of other appropriate factors. This avoids trying to identify in detail at this time the myriad issues and factors that will be of concern in the mid-term evaluation. As in this rulemaking, in the mid-term evaluation EPA expects to place primary reliance on peer-reviewed studies. Additionally, as NAS reports are published, EPA will give careful consideration to reports and their findings as well as any reports and findings from other scientific and technical organizations.

As discussed above, the MY2022–2025 GHG standards will remain in effect unless and until EPA changes them by rulemaking. The National Association of Manufacturers (NAM) commented that EPA should not take the default position that the existing 2022–2025 model year standards will remain in place unless changed by

<sup>445</sup> See § 86.1818–12 (h).

rulemaking. Rather, they argued the existing standards should be rescinded immediately upon a determination that they are inappropriate, leaving the 2021 standards in effect until the revised standards are finalized. Another commenter, Toyota requested that, “in the event EPA does not take final agency action concerning the 2022–2025 model year standards by April 1, 2020, the 2021 model year GHG standards remain as the ‘default’ standards until such time as EPA does take final agency action providing at least 18-months of lead time prior to the applicable model year. EPA believes the appropriate approach is what was proposed; EPA is adopting the MY2022–2025 GHG standards at this time, and they will go into effect unless EPA revises them. The mid-term evaluation process is an effective and timely way to address any concerns that may arise in the future concerning the appropriateness of these standards. EPA believes this provides the right degree of certainty to the standards that are adopted today, along with a clear and effective mechanism for the timely evaluation of the standards and their revision if EPA determines in the future that they are no longer appropriate based on the circumstances at that time.

#### 4. Averaging, Banking, and Trading Provisions for CO<sub>2</sub> Standards

In the MY 2012–2016 rule, EPA adopted credit provisions for credit carry-back, credit carry-forward, credit transfers, and credit trading. These kinds of provisions are collectively termed Averaging, Banking, and Trading (ABT), and have been an important part of many mobile source programs under CAA Title II, both for fuels programs as well as for engine and vehicle programs.<sup>446</sup> As proposed, EPA is continuing essentially the same comprehensive program for averaging, banking, and trading of credits as provided in the MY2012–2016 program, which together will help manufacturers in planning and implementing the orderly phase-in of emissions control technology in their production, consistent with their typical redesign schedules. ABT is important because it can help to address many issues of technological feasibility and lead-time, as well as considerations of cost. ABT is an integral part of the standard setting itself, and is not just an add-on to help reduce costs. In many cases, ABT resolves issues of cost or technical feasibility which might otherwise arise, allowing EPA to set a standard that is numerically more stringent. The ABT

provisions are integral to the fleet averaging approach established in the MY 2012–2016 rule and we view them as equally integral to the MY 2017–2025 standards.<sup>447</sup> As proposed, EPA is finalizing a change to the credit carry-forward provisions as described below, but the program otherwise would remain in place unchanged for model years 2017 and later.

As noted above, the ABT provisions consist primarily of credit carry-back, credit carry-forward, credit transfers, and credit trading. Credit carry-back refers to using credits to offset any deficit in meeting the fleet average standards that had accrued in a prior model year. A manufacturer may have a deficit at the end of a model year (after averaging across its fleet using credit transfers between cars and trucks)—that is, a manufacturer’s fleet average level may fail to meet the required fleet average standard. The credit carry-back provisions allow a manufacturer to carry a deficit in its fleet average standards for up to three model years. After satisfying any needs to offset pre-existing debits within a vehicle category, remaining credits may be banked, or saved, for use in future years. This is referred to as credit carry-forward. The EPCA/EISA statutory framework for the CAFE program includes a 5-year credit carry-forward provision and a 3-year credit carry-back provision. In the MYs 2012–2016 program, EPA chose to adopt 5-year credit carry-forward and 3-year credit carry-back provisions as a reasonable approach that maintained consistency between the agencies’ provisions. EPA is continuing with this approach for the MY 2017–2025 standards. (A further discussion of the ABT provisions can be found at 75 FR 25412–14 (May 7, 2010)).

Although the credit carry-forward and carry-back provisions generally remain in place for MY 2017 and later, EPA is finalizing its proposal to allow all unused credits generated in MY 2010–2016 (but not MY 2009 early credits) to be carried forward through MY 2021. See § 86.1865–12(k)(6)(ii). This amounts to the normal 5 year carry-forward for MY 2016 and later credits, but provides additional carry-forward years for credits earned in MYs 2010–2015. Extending the life for MY 2010–2015 credits provides greater flexibility for manufacturers in using the credits they have generated. These credits would help manufacturers resolve lead-time issues they might face in the early

<sup>447</sup> These reasons likewise underly EPA’s decision to adopt similar types of ABT provisions in the GHG standards for heavy duty vehicles and engines. See 76 FR 57127–29.

model years of today’s program as they transition from the 2016 standards to the progressively more stringent standards for MY 2017 and later. It also provides an additional incentive for manufacturers to generate credits earlier, for example in MYs 2014 and 2015, because those credits may be used through MY 2021, thereby encouraging the earlier use of additional CO<sub>2</sub> reducing technology.

While this provision provides greater flexibility in how manufacturers use credits they have generated, it would not change the overall CO<sub>2</sub> benefits of the National Program, as EPA does not expect that any of the credits at issue would otherwise have been allowed to expire. Rather, the credits would be used or traded to other manufacturers.

EPA did not propose to allow MY 2009 early credits to be carried forward beyond the normal 5 years due to concerns expressed during the 2012–2016 rulemaking that there may be the potential for large numbers of credits that could be generated in MY 2009 for companies that are over-achieving on CAFE and that some of these credits could represent windfall GHG credits.<sup>448</sup> In response to these concerns, EPA placed restrictions on the use of MY 2009 credits (for example, MY 2009 credits may not be traded) and did not propose to expand opportunities for their utilization.

Transferring credits refers to exchanging credits between the two averaging sets, passenger cars and trucks, within a manufacturer. For example, credits accrued by over-compliance with a manufacturer’s car fleet average standard could be used to offset debits accrued due to that manufacturer not meeting the truck fleet average standard in a given year. Finally, accumulated credits may be traded to another manufacturer. EPA is finalizing provisions consistent with MYs 2012–2016 to allow no limits on the amount of credits that may be transferred or traded.

The averaging, banking, and trading provisions are generally consistent with those included in the CAFE program, with a few notable exceptions. As with EPA’s approach (except for the provision just discussed above for a one-time extended carry-forward of MY2010–2016 credits), under EISA, credits generated in the CAFE program can be carried forward for 5 model years

<sup>448</sup> 75 FR 25442. Moreover, as pointed out in the earlier rulemaking, there can be no legitimate expectation that these 2009 MY credits could be used as part of a compliance strategy in model years after 2014, and thus no reason to carry forward the credits past 5 years due to action in reliance by manufacturers.

<sup>446</sup> See 75 FR 25412–413.

## b. Reducing Petroleum Consumption To Reduce Climate Change Impacts

CO<sub>2</sub> is the natural by-product of the combustion of fossil fuel to power motor vehicles. The more fuel-efficient a vehicle is, the less fuel it needs to burn to travel a given distance. The less fuel it burns, the less CO<sub>2</sub> it emits in traveling that distance.<sup>928</sup> Since the amount of CO<sub>2</sub> emissions is essentially constant per gallon combusted of a given type of fuel, the amount of fuel consumption per mile is closely related to the amount of CO<sub>2</sub> emissions per mile. Transportation is the second largest GHG-emitting sector in the U.S. after electricity generation, and accounted for 27 percent of total U.S. GHG emissions in 2010; passenger cars and light trucks make up 62 percent of transportation sector GHG emissions.<sup>929</sup> Concentrations of greenhouse gases are at unprecedented levels compared to the recent and distant past, which means that fuel economy improvements to reduce those emissions are a crucial step toward addressing the risks of global climate change. These risks are well documented in Section III of this notice, and in NHTSA's Final Environmental Impact Statement (EIS) accompanying this final rule.

Fuel economy gains since 1975, due both to the standards and to market factors, have resulted in saving billions of barrels of oil and avoiding billions of metric tons of CO<sub>2</sub> emissions. In December 2007, Congress enacted the Energy Independence and Security Act (EISA), amending EPCA to require substantial, continuing increases in fuel economy. NHTSA thus sets CAFE standards today under EPCA, as amended by EISA, in order to help the U.S. passenger car and light truck fleet save fuel to promote energy independence, energy security, and a low carbon economy.

## 3. Why is NHTSA presenting CAFE standards for MYs 2017–2025 now?

### a. President's Memorandum

During the public comment period for the MY 2012–2016 proposed rulemaking, many stakeholders encouraged NHTSA and EPA to begin

working toward standards for MY 2017 and beyond in order to maintain a single nationwide program. After the publication of the final rule establishing MYs 2012–2016 CAFE and GHG standards, President Obama issued a Memorandum on May 21, 2010 requesting that NHTSA, on behalf of the Department of Transportation, and EPA work together to develop a national program for model years 2017–2025.<sup>930</sup> Specifically, he 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 that 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 Presidential Memorandum stated “*The program should also seek to achieve substantial annual progress in reducing transportation sector greenhouse gas emissions and fossil fuel consumption, consistent with my Administration's overall energy and climate security goals, through the increased domestic production and use of existing, advanced, and emerging technologies, and should strengthen the industry and enhance job creation in the United States.*” Among other things, the agencies were tasked with researching and then developing standards for MYs 2017 through 2025 that would be appropriate and consistent with EPA's and NHTSA's respective statutory authorities, in order to continue to guide the automotive sector along the road to reducing its fuel consumption and GHG emissions, thereby ensuring corresponding energy security and

environmental benefits. Several major automobile manufacturers and CARB sent letters to EPA and NHTSA in support of a MYs 2017 to 2025 rulemaking initiative as outlined in the President's May 21, 2010 announcement.<sup>931</sup> The agencies began working immediately on the next phase of the National Program, work which has culminated in the standards for MYs 2017–2025 contained in this final rule.

### b. Benefits of Continuing the National Program

The National Program is both needed and possible because the relationship between improving fuel economy and reducing CO<sub>2</sub> tailpipe emissions is a very close one. There is a single pool of technologies for reducing fuel consumption and CO<sub>2</sub> emissions. Using these technologies to minimize fuel consumption also minimizes CO<sub>2</sub> emissions. While there are emission control technologies that can capture or destroy the pollutants that are produced by imperfect combustion of fuel (e.g., carbon monoxide), there are at present no such technologies for CO<sub>2</sub>. In fact, the only way at present to reduce tailpipe emissions of CO<sub>2</sub> is by reducing fuel consumption. The National Program thus has dual benefits: it conserves energy by improving fuel economy, as required of NHTSA by EPCA and EISA; in the process, it necessarily reduces tailpipe CO<sub>2</sub> emissions consonant with EPA's purposes and responsibilities under the Clean Air Act. While the vast majority of commenters strongly supported this goal, the Institute for Energy Research (IER) argued that because the agencies' analysis showed that the proposed standards would reduce global climate change by roughly 2/100th of a degree Celsius in 2100, therefore EPA was not accomplishing the goal of reducing the risk of GHGs to public health and welfare, and should not be regulating GHGs for light-duty vehicles under the CAA.<sup>932</sup> Environmental Consultants of Michigan commented similarly, and suggested that EPA regulate fuels rather than vehicles to reduce emissions more effectively.<sup>933</sup> Competitive Enterprise Institute (CEI)<sup>934</sup> also argued, as did the

<sup>928</sup> Panel on Policy Implications of Greenhouse Warming, National Academy of Sciences, National Academy of Engineering, Institute of Medicine, “Policy Implications of Greenhouse Warming: Mitigation, Adaptation, and the Science Base,” National Academies Press, 1992, at 287. Available at [http://www.nap.edu/catalog.php?record\\_id=1605](http://www.nap.edu/catalog.php?record_id=1605) (last accessed Jun. 23, 2012).

<sup>929</sup> EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2010 (April 2012), p. 2–20. Available at <http://www.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2012-Chapter-2-Trends.pdf> (last accessed Jun. 23, 2012).

<sup>930</sup> The Presidential Memorandum is found at: <http://www.whitehouse.gov/the-press-office/presidential-memorandum-regarding-fuel-efficiency-standards>. For the reader's reference, the President also requested the Administrators of EPA and NHTSA to issue joint rules under the CAA and EISA to establish fuel efficiency and greenhouse gas emissions standards for commercial medium- and heavy-duty on-highway vehicles and work trucks beginning with the 2014 model year. The agencies promulgated final GHG and fuel efficiency standards for heavy duty vehicles and engines for MYs 2014–2018 in 2011. 76 FR 57106 (September 15, 2011).

<sup>931</sup> These commitment letters in response to the May 21, 2010 Presidential Memorandum are available at <http://www.nhtsa.gov/Laws+&+Regulations/CAFE+&+Fuel+Economy/Stakeholder+Commitment+Letters> (last accessed August 5, 2012).

<sup>932</sup> IER, Docket No. EPA–HQ–OAR–2010–0799–9573, at 3–7.

<sup>933</sup> Environmental Consultants of Michigan, Docket No. NHTSA–2010–0131–0166, at 1–4.

<sup>934</sup> CEI, Docket No. EPA–HQ–OAR–2010–0799–9552, at 1–2.

U.S. Chamber of Commerce,<sup>935</sup> the National Automobile Dealers Association,<sup>936</sup> and joint comments from the American Petrochemical Institute (API), the National Manufacturers Association (NAM), and the American Fuel and Petrochemical Manufacturers Association (AFPM),<sup>937</sup> that NHTSA should be setting CAFE standards and that EPA should not be concurrently setting GHG standards under the CAA. Some commenters, such as CEI<sup>938</sup> and AFPM,<sup>939</sup> further argued that standards for MYs 2017–2025 should not be set at this time. Other commenters, such as the Natural Resources Defense Council (NRDC), strongly supported the joint action, pointing to EPA’s relatively broad authority under the CAA to argue that a joint action can accomplish more than what NHTSA can accomplish under its EPCA/EISA authority.<sup>940</sup> Consumer Federation of America also supported the joint action, stating that coordinated national standards reflecting a steady rate of increase in stringency over a long time give consumers and the industry certainty and time to adapt to change.<sup>941</sup> Again, we note that of the hundreds of thousands of comments received to the proposals, the overwhelming majority were positive.

NHTSA believes that the benefits of the National Program extend far beyond the potential future reduction in global temperature that can be associated with the standards being finalized today. The fuel savings and related CO<sub>2</sub> emissions reductions that will occur as a result of the standards will be real, and the fact that this rulemaking cannot, by itself, solve our energy security and climate change challenges does not obviate the agencies’ need to act.<sup>942</sup> NHTSA is required by Congress to set CAFE

standards to promote energy conservation, and today’s standards will meaningfully reduce consumers’ future fuel expenses and the nation’s exposure to economic and other risks related to petroleum consumption. Moreover, EPA, due to its Endangerment Finding, is required to prescribe standards under the CAA to reduce the risks associated with climate change. By setting harmonized Federal standards now to regulate both fuel economy and greenhouse gas emissions, the agencies are able to provide a predictable regulatory framework for the automotive industry while preserving the legal authorities of NHTSA, EPA, and the State of California. Consistent, harmonized, and streamlined requirements under the National Program, both for MYs 2012–2016 and for MYs 2017–2025, hold out the promise of continuing to deliver energy and environmental benefits, cost savings, and administrative efficiencies on a nationwide basis that might not be available under a less coordinated approach. The National Program makes it possible for the standards of two different Federal agencies and the standards of California and other “Section 177” states to act in a unified fashion in providing these benefits. A harmonized approach to regulating passenger car and light truck fuel economy and GHG emissions is critically important given the interdependent goals of addressing climate change and ensuring energy independence and security. Additionally, a harmonized approach would help to mitigate the cost to manufacturers of having to comply with multiple sets of Federal and State standards.

One aspect of this phase of the National Program that is unique for NHTSA, however, is that the passenger car and light truck CAFE standards presented in this final rule for MYs 2022–2025 are augural, while EPA’s standards for those model years will be legally binding when adopted in this round. As noted above, EISA requires NHTSA to issue CAFE standards for “at least 1, but not more than 5, model years.” To maintain the harmonization benefits of the National Program, NHTSA has finalized standards for MYs 2017–2021 and presented standards for MYs 2022–2025, but the last 4 years of standards are not legally binding as part of this rulemaking. The passenger car and light truck CAFE standards for MYs 2022–2025 will be determined with finality in a subsequent, *de novo* notice and comment rulemaking conducted in full compliance with EPCA/EISA and

other applicable law—more than simply reviewing the analysis and findings in the present rulemaking to see whether they are still accurate and applicable, but taking a fresh look at all relevant factors based on the best and most current information available at that future time. Global Automakers commented that NHTSA should not include the passenger car and light truck standards for MYs 2022–2025 in its regulatory text for inclusion in the CFR, on the grounds that those standards must be finalized in the future *de novo* rulemaking.<sup>943</sup> We are continuing to include the augural standards for MYs 2022–2025 in the regulatory text as part of this final rule, but we have clarified, as will be evident in NHTSA’s revisions to 49 CFR Part 531 and Part 533 at the end of this preamble, that they are separate from the final standards for MYs 2017–2021. The proposed regulatory text already explained that the standards for MYs 2022–2025 would only be applicable if NHTSA determines in the future rulemaking that they are maximum feasible; those provisions are made final in this rule. NAM and Toyota argued that the agencies should immediately rescind the standards for MYs 2022–2025 if they are determined to be inappropriate, leaving the MY 2021 standards in effect for those future model years until new standards are finalized.<sup>944</sup> Since NHTSA’s standards for MYs 2022–2025 are augural and must be finalized in a subsequent *de novo* rulemaking, this concern is not an issue for the CAFE program. Toyota suggested that NHTSA simply enact standards at the MY 2021 levels for MYs 2022–2025 if the future rulemaking is not completed prior to 18 months before the start of MY 2022,<sup>945</sup> but NHTSA does not intend to prejudge the outcome of that future rulemaking, and at any rate fully expects to complete it well in advance of the statutory lead-time requirement.

To facilitate that future rulemaking effort, NHTSA and EPA will concurrently conduct a comprehensive mid-term evaluation. Up to date information will be developed and compiled for the evaluation, through a collaborative, robust, and transparent process, including notice and comment. Toyota commented that it supported the participation of the California Air Resources Board (CARB) in the mid-

<sup>935</sup> U.S. Chamber of Commerce, Docket No. EPA–HQ–OAR–2010–0799–9521, at 3–5.

<sup>936</sup> NADA, Docket No. NHTSA–2010–0131–0261, at 12.

<sup>937</sup> API/NAM/AFPM, Docket No. EPA–HQ–OAR–2010–0799–9509, at 8.

<sup>938</sup> CEI, Docket No. EPA–HQ–OAR–2010–0799–9552, at 1–2.

<sup>939</sup> AFPM, Docket No. EPA–HQ–OAR–2010–0799–9485, at 2.

<sup>940</sup> NRDC, Docket No. EPA–HQ–OAR–2010–0799–9472, at 2, 7–8.

<sup>941</sup> CFA, Docket No. EPA–HQ–OAR–2010–0799–9419, at 10.

<sup>942</sup> As the Supreme Court has stated, “Agencies, like legislatures, do not generally resolve massive problems in one fell regulatory swoop. See *Williamson v. Lee Optical of Okla., Inc.*, 349 U.S. 483, 489 (1955) (“[A] reform may take one step at a time, addressing itself to the phase of the problem which seems most acute to the legislative mind”). They instead whittle away at them overtime, refining their preferred approach as circumstances change and as they develop a more nuanced understanding of how best to proceed.” *Massachusetts v. EPA*, 549 U.S. 497, 524 (2007).

<sup>943</sup> Global Automakers, Docket No. NHTSA–2010–0131–0237, at 12.

<sup>944</sup> NAM, Docket No. EPA–HQ–OAR–2010–0799–9587, at 3; Toyota, Docket No. EPA–HQ–OAR–2010–0799–9586, at 8–9.

<sup>945</sup> Toyota, Docket No. EPA–HQ–OAR–2010–0799–9586, at 8–9.

term evaluation process, and the conditioning of the CAA preemption waiver for CARB's MYs 2017–2025 GHG standards on CARB's acceptance of any changes to the EPA GHG standards for MYs 2022–2025 that may result from the mid-term evaluation.<sup>946</sup> The agencies fully expect to conduct the mid-term evaluation in close coordination with the CARB, consistent with the agencies' commitment to maintaining a single national framework for regulation of fuel economy and GHG emissions.<sup>947</sup> Prior to beginning NHTSA's rulemaking process and EPA's mid-term evaluation, the agencies plan to jointly prepare a draft Technical Assessment Report (TAR) to examine afresh the issues and, in doing so, conduct similar analyses and projections as those considered in the current rulemaking, including technical and other analyses and projections relevant to each agency's authority to set standards as well as any relevant new issues that may present themselves. The agencies plan to provide an opportunity for public comment on the draft TAR, and to arrange for appropriate peer review of underlying analyses, and to make the assumptions and modeling underlying the TAR available to the public to the extent consistent with law. The draft TAR is expected to be issued no later than November 15, 2017. The agencies plan to consult and coordinate as NHTSA develops its NPRM. NHTSA will ensure that the subsequent final rule will be timed to provide sufficient lead time for industry to make whatever changes to their products that the rulemaking analysis deems maximum feasible based on the new information available. At the very latest, NHTSA will complete its subsequent rulemaking on the standards with at least 18 months lead time as required by EPCA,<sup>948</sup> but additional lead time may be provided.

**B. Background**

**1. Chronology of Events Since the MY 2012–2016 Final Rule Was Issued**

Section I above covers the chronology of events in considerable detail, and we refer the reader there.

<sup>946</sup> Toyota, Docket No. EPA-HQ-OAR-2010-0799-9586, at 9.

<sup>947</sup> The agencies also fully expect that any adjustments to the standards as a result of NHTSA's rulemaking and the mid-term evaluation process from the levels enumerated in the current rulemaking will be made with the participation of CARB and in a manner that continues the harmonization of state and Federal vehicle standards.

<sup>948</sup> 49 U.S.C. 32902(a).

2. How has NHTSA developed the CAFE standards since the President's announcement, and what has changed between the proposal and the final rule?

The CAFE standards proposed in the NPRM and presented in this final rule are based on much more analysis conducted by the agencies since the TAR, including in-depth modeling analysis by DOT/NHTSA to support the CAFE standards, and further refinement of a number of our baseline, technology, and economic assumptions used to evaluate the standards and their impacts. While much of the analytical basis for the proposed standards was carried forward into the final rule analysis, some aspects of the final rule are different from the proposal, such as the following:

**a. Programmatic Changes**

- As discussed above and in more detail in Section IV.E below, NHTSA is clarifying in this final rule that the standards for MYs 2022–2025 are *de novo* rulemaking;

- Fuel consumption improvements due to A/C efficiency improvements—menu: the agencies had originally proposed that manufacturers must perform the A-to-B “AC17” test and report their full results in order to access the credit/fuel consumption improvement menu. For the final rule, manufacturers are required to report only results of the AC17 “B” testing for MY 2017–2019 in order to access the full menu credit for installed technologies. For MY 2020 and beyond, AC17 “A” test results or engineering analysis and AC17 “B” test results must be submitted to determine actual credit availability.<sup>949</sup>

- As proposed, a manufacturer could obtain credit for installation of off-cycle technologies but had to meet a 10% penetration threshold requirement. The minimum penetration rate requirements have been eliminated for this final rule.

- NHTSA is adding to its regulations a description of the process it plans to use provide its views to EPA related to manufacturers' applications to use off-cycle technologies to improve their average CAFE performance values.

- To obtain credits for implementation of mild hybrids on large pick-up trucks, the installation rate has been reduced in the final rule from 30% and 40% to 20% and 30% for MYs 2017 and 2018, respectively.

<sup>949</sup> The fuel consumption improvement values in the A/C efficiency menu have not changed, but this procedural change has the effect of making it easier for manufacturers to demonstrate improvements in their A/C systems.

- Certain proposed definitions have been revised to address comments and add further clarification:

- The base tire definition is revised to better align with the approach manufacturers use to determine model type target standards.

- Mild hybrid and strong hybrid vehicle definitions are no longer limited to gasoline-electric vehicles but may include non-gasoline (i.e., diesel, ethanol, and CNG-fueled) hybrid vehicles.

- Proposed Part 537 reporting requirements have been revised to address comments and add further clarification:

- Manufacturers will be required to submit pre- and mid-model year reports containing purported confidential business information on CD-ROM (2-copies) versus email to a secure agency email address as stated in the NPRM.

- Aspects of the proposed requirement that manufacturers of light trucks provide specific data in the pre-model year report substantiating classification decisions have been clarified.

- Manufacturers taking advantage of technology incentives (A/C efficiency, off-cycle and large pick-up hybrid and efficiency improvement technology) are required to report cumulatively for the application of its vehicles versus for each vehicle configuration as was proposed.

- Modified requirements to include the provision that manufacturers can optionally report target standard values for each reported unique model type/ footprint combination.

**b. Analytical Changes**

- NHTSA and EPA have revised the 2008-based baseline market forecast to correct some errors in the version used for the NPRM, and added a 2010-based baseline market forecast. Analysis throughout the NHTSA rulemaking documents reflects both forecasts.

- Battery costs: Argonne National Laboratories (ANL) updated its “BatPaC” battery cost model to include cost estimates of options for liquid or air thermal management with adequate surface area and cell spacing, the option of parallel subpacks or modules battery configuration, and NHTSA-estimated costs for a battery discharging system. Using these updates, EPA updated the battery costs for strong hybrids, PHEVs, and EVs, and the results are used in both agencies' analyses.

- Work with ANL: Between the NPRM and the final rule, DOT/NHTSA contracted with ANL (separately from the battery cost work described above) to study some aspects of advanced

## VII.

EPA Administrator Scott Pruitt (@EPAScottPruitt), TWITTER (Apr. 3, 2018, 11:39 AM), archived at <https://web.archive.org/web/20180608153304/https://twitter.com/epascottpruitt/status/981239876971565056>



**Administrator Pruitt** ✓

@EPAScottPruitt

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Today, we announced @EPA plans to roll back Obama Admin fuel standards. These standards were inappropriate & needed to be revised. The focus should be on providing consumer choice and the strongest environmental protections.

Catch the full event here 

[m.youtube.com/watch?feature=...](https://m.youtube.com/watch?feature=...)



11:39 AM - 3 Apr 2018

222 Retweets 459 Likes



## VIII.

EPA Administrator Scott Pruitt (@EPAScottPruitt), TWITTER (Apr. 2, 2018, 12:05 PM), archived at <https://web.archive.org/web/20180407164951/https://twitter.com/epascottpruitt/status/980883819468386304>



**Administrator Pruitt** ✓  
@EPAScottPruitt

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The previous administration's determination was wrong. Obama's EPA cut the Midterm Evaluation process short with politically charged expediency, made assumptions about the standards that didn't comport with reality & set the standards too high. Read more:

12:05 PM - 2 Apr 2018

111 Retweets 208 Likes



398 111 208

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**Administrator Pruitt** ✓ @EPAScottPruitt · Apr 2 ▾

Cooperative federalism doesn't mean 1 state can dictate standards for the rest of the country. @EPA will set a nat'l standard for GHG emissions that allows auto manufacturers to make cars ppl want & can afford, while still expanding environmental & safety benefits of newer cars.

695 95 196

**IX.**

**Declarations of Center for Biological Diversity**

1. Sylvia Arredondo, Center for Biological Diversity member

**DECLARATION OF SYLVIA ARREDONDO**

I, Sylvia Arredondo, state and declare as follows:

1. I am over 18 years of age and competent to give this declaration. I have personal knowledge of the following facts, and if called as a witness could and would testify competently to them. As to those matters which reflect an opinion, they reflect my personal opinion and judgment on the matter.

2. I live on West F Street in Wilmington, California, and have lived there since 2015. I am a Civic Engagement Coordinator for Communities for a Better Environment, an environmental justice organization that seeks to prevent pollution and build healthy communities and environments. I have been a member of the Center for Biological Diversity (the "Center") since 2015, and I rely upon the Center to represent my interests in protecting our air quality and our environment through gathering and dissemination of information about air pollution, advocacy to remediate that pollution, and enforcement of our environmental laws in the courts. I work on air pollution issues through my employer, Communities for a Better Environment.

3. I live about a mile from Phillips 66 Wilmington, a large oil refinery. I am aware that this refinery refines large amounts of oil and emits large quantities of pollutants, including particulate matter (PM 2.5) and nitrogen oxides that are precursors to ozone. Sometimes I can smell the pollution from the refinery when I drive on roads close to the refinery and when I take a walk in the vicinity, which I often do. I also bike in the area now and then and have the same unpleasant and worrying experience. I can also smell the pollution from the refinery at my doorsteps when the wind blows in the right direction. Sometimes I can't smell the pollution anymore because I have become used to it, even though visitors point it out to me.

4. I also live about a mile from both the Port of Los Angeles and the 110 freeway. The 110 freeway carries very heavy car and truck traffic where I live, including traffic to and from the port and the refinery. I can sometimes smell vehicle exhaust when I walk on roads close to the freeway, as I often do, and I am aware of and can see the soot and grime that comes from the refinery and from the vehicle traffic. I have fruit trees in my yard, and I can see a layer of black dust

1 on their leaves. When I haven't used my car for a while, it is covered with a heavy layer of black  
2 dust as well.

3 5. I grew up in Wilmington and lived with my parents about a mile from a different  
4 refinery and directly across the street from oil wells, drilling installations and train switching  
5 stations. As a child I was diagnosed with mild asthma and once developed bronchitis. I lived in  
6 Wilmington until I was in my 20s and then moved away to the Bay Area for college. I began feeling  
7 better there and my health improved, but became sick again after I moved back to the harbor area in  
8 2012 and began living in Wilmington and close to the Phillips 66 refinery, the 110 freeway and the  
9 port in 2015.

10 6. I am extremely concerned and care greatly about the bad air quality where I live, both  
11 for myself personally and for the community where I live and on whose behalf I advocate. The air is  
12 polluted around my home, within a large radius of the Phillips 66 refinery, in the vicinity of the Port  
13 of Los Angeles, and in the area close to the 110 freeway.

14 7. I fall ill and must take medication as a result of the air pollution from the refinery and  
15 the heavy traffic on the 110 freeway and throughout the Port of Los Angeles area. This past year, I  
16 suffered from sinus infections that were worse than any I had experienced previously. In one  
17 instance, I was home sick and missed work for about a week, and I might have lost my job if I were  
18 working for an organization with a mission other than caring for communities and people affected by  
19 air pollution. When I get sinus infections, I become extremely sensitive to light and noise, and feel  
20 painful pressure in my nasal cavities, above my eyelids, in my temples and in my ears. When my  
21 nasal cavities are inflamed, it feels as if I have a painful ear infection even though the problem is the  
22 nasal cavity inflammation. My throat becomes sore, and the discomfort and pain keep me from  
23 working and home in bed. I was fully incapacitated in this way twice last year and once the year  
24 before. My sinus infections are becoming worse and more frequent, and my health worsens when  
25 temperatures rise, as they have in recent years, the hottest years I've ever experienced in the Los  
26 Angeles area. I know that the greenhouse gases produced by refineries and by vehicles are  
27 responsible for the ever-rising temperatures that make my symptoms worse.

28

1           8.       I am now on medication, administering a nasal decongestant weekly or daily,  
2 depending on the temperature. I also take allergy tablets and prescribed eye drops as my eyes get dry  
3 and itchy. I try to use these preventatively, hoping to keep more sickness away, but I still have  
4 become incapacitated. I suffer all these effects even though I have changed my diet to make it as  
5 healthy as possible and even though I have increased my fluid intake. I also use an inhaler whenever  
6 I exercise and when I go out for a hike or go biking. I get short of breath and sometimes feel like I  
7 can't breathe at all, and feel that my lung capacity is extremely limited. It feels like I have asthma  
8 again, even though that has not been diagnosed. I know it is the pollution from the oil refinery and  
9 from vehicles that makes me so sick. Because of my job, I am also aware of many people in  
10 Wilmington that live close to the refinery, the Port of Los Angeles and the freeway who suffer from  
11 pollution-related illnesses, such as asthma, infections like mine, other lung diseases and even heart  
12 attacks. PM2.5 and ozone are known causes for all of these diseases. In addition, refineries such as  
13 the Phillips 66 Wilmington refinery emit benzene, which is a carcinogen. The Wilmington area is a  
14 known cancer cluster, particularly for leukemia, a cancer directly associated with benzene emissions.  
15 I know many Wilmington community members suffering from leukemia, including children already  
16 diagnosed with the disease; in 2015, a friend of mine died of leukemia. This dreadful consequence in  
17 my own community of benzene refinery emissions makes me anxious, and I fear for my own health  
18 and risk of contracting cancer as well.

19           9.       Because of my personal health issues from pollution and my job duties, I am aware of  
20 regulations that reduce pollution affecting my health and that of the communities I serve. As such, I  
21 know that in 2012, the Environmental Protection Agency ("EPA") and the National Highway Traffic  
22 Safety Administration ("NHTSA") issued regulations that set increasingly stringent standards which  
23 reduce pollution, such as PM2.5, ozone precursors like nitrogen oxides, and greenhouse gases, from  
24 cars and light trucks built during the years 2017-2025 (the "Vehicle Rule"). Because of the Vehicle  
25 Rule, I was assured that less oil would be refined in America's refineries, including at the Phillips 66  
26 refinery where I live, because less fuel will be required by America's fleet of cars. Lower vehicle  
27 fuel consumption meant less of the PM2.5, nitrogen oxides, benzene and other refinery pollution  
28 where I live and less pollution to make me and others sick. The Vehicle Rule would also have

1 reduced PM2.5 and nitrogen oxides from the vehicles that travel on the 110 freeway, as increasingly  
2 stringent fuel efficiency standards would make sure that vehicles emit fewer of these pollutants that  
3 make me sick. And the Vehicle Rule would also have reduced the greenhouse gases from both  
4 refining and from vehicle traffic that contribute to the worrisome temperature increases I have  
5 personally observed in the last five years, and that make my health problems worse than when the  
6 temperature is lower.

7 10. In early 2017, EPA issued a final determination that the Vehicle Rule standards  
8 remained appropriate and would remain in place through 2025. EPA actually found that the  
9 standards could be achieved at less cost than it had assumed in 2012 and, if anything, could be  
10 strengthened. I learned, however, that in April of this year, EPA issued a different decision that  
11 reversed and withdrew that 2017 final determination (the “Withdrawal Decision”), finding that the  
12 vehicle standards were no longer appropriate, were too stringent, and would be rolled back. Now that  
13 the Withdrawal Decision is in place, the Vehicle Rule and its pollution reduction and fuel efficiency  
14 requirements will be significantly weakened. The Phillips 66 Wilmington refinery and the vehicles  
15 on the 110 freeway will emit more of the air pollution I must breathe in and that make me sick, and I  
16 and the members of the community I serve will suffer more of the severe health consequences I have  
17 described.

18 11. EPA’s Withdrawal Decision causes direct harm to my health. Because of the  
19 increased pollution stemming from weakened standards, my health will continue to suffer and may  
20 get worse and I will very likely miss more days of work. I am anxious about the prospect of more  
21 traumatic health experiences such as severe sinus infections, unnerving light and noise sensitivity,  
22 pressure in my head, pain in my ears, shortness of breath and inability to work. I experience fear and  
23 anxiety about how much my health and that of my community will continue to deteriorate. But if  
24 EPA’s Withdrawal Decision is reversed in court, the Vehicle Rule will continue to reduce more of  
25 the pollution that makes me sick, redressing the harm I experience.

26 12. EPA’s Withdrawal Rule includes no information about the specific facts that made  
27 EPA decide to roll back the Vehicle Rule. It talks vaguely about the burden the Vehicle Rule  
28 supposedly places on the auto industry, but says next to nothing about the amount of extra pollution

1 that will result from rolling it back, the consequences to my health and the health of others, and the  
2 additional burdens placed on communities like mine that are already suffering disproportionately  
3 from the degradation of the air we must breathe. My job requires me to reach out to that community  
4 and provide it with information about air quality, how much pollution is coming from which air  
5 pollution sources, what that will do to the community's health and wellbeing, and how to advocate to  
6 stop these effects. Now, however, a rule that has protected us from pollution in increasing amounts  
7 every year will be frozen or made less effective, and yet EPA provided no analysis of the  
8 consequences, either by analyzing the record EPA assembled just over a year ago when it found the  
9 Vehicle Rule to be appropriate, or by determining why that record is now incorrect, or by describing  
10 the amount of additional pollution I and the members of my community must contend with and the  
11 consequences in health and well-being we will have to suffer.

12 13. This lack of information deprives me of my procedural rights to be informed about  
13 the reasons for and the effects that come from the Withdrawal Rule, and I cannot pass on that  
14 information to the members of my community. I need this information as part of my job to enable  
15 its members to advocate more effectively on behalf of stronger pollution control measures. As it is, I  
16 cannot fully understand and explain to others on what basis and facts the Vehicle Rule has been  
17 deemed not appropriate and will be rolled back. For the same reason, the Center, on which I also rely  
18 to advocate for air pollution reduction, is hampered in its ability to protect me and others by sharing  
19 that information. But if the Withdrawal Rule is invalidated in court and EPA must perform the  
20 proper analysis and provide the necessary facts for any finding that the Vehicle Rule is no longer  
21 appropriate and must be rolled back, I will come into possession of this information and can perform  
22 the duties of my job in effectively advocating for the right of disproportionately affected  
23 communities to breathe air that does not sicken them. The violation of my procedural and  
24 informational rights will have been remedied.

25 I declare under penalty of perjury that the foregoing is true and correct and was executed on  
26 August 20, 2018 at Wilmington, California.

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Sylvia Arredondo

IX.

Declarations of Center for Biological Diversity

2. Janet DietzKamei, Center for Biological Diversity member

**DECLARATION OF JANET DIETZKAMEI**

I, Janet DietzKamei, state and declare as follows:

1. I am over 18 years of age and competent to give this declaration. I have personal knowledge of the following facts, and if called as a witness could and would testify competently to them. As to those matters which reflect an opinion, they reflect my personal opinion and judgment on the matter.

2. I live in Fresno, California, and have lived there since 2003. I am retired from a career as a Federal employee, having worked for the Air Force, the U.S. Department of the Treasury, the Veterans' Administration and the United States Department of Agriculture Forest Service for 25 years.

3. I am deeply concerned and care greatly about the quality of the air in Fresno and the surrounding areas. The poor air quality in my home town, my community and California's air-polluted Central Valley makes me severely ill, and I am keenly interested in doing all I can to improve the air I must breathe. I have been a member of the Center for Biological Diversity (the "Center") since 2017, and I rely upon the Center to represent my interests in protecting our air quality and our environment through the gathering and dissemination of information about air pollution, advocacy to remediate that pollution, and enforcement of our environmental laws. I also have been a member of the Central Valley Air Quality Coalition ("CVAQ") since June, 2016 and have been active with CVAQ since May, 2015. Since December 2015, I have also been active with the Fresno Environmental Reporting Network ("FERN"). CVAQ and FERN are organizations that monitor and report on the pollution in our air and advocate on behalf of myself and other citizens to reduce that pollution.

1. I am aware that in 2012, the Environmental Protection Agency ("EPA") and the National Highway Transportation and Safety Administration ("NHTSA") issued fuel efficiency and greenhouse gas standards for all cars and light trucks manufactured during model years 2017 to 2025 (the "Vehicle Rule") and that those standards increased these vehicles' fuel efficiency and greenhouse gas reductions every year through 2025, on a rising curve that contains steeper increases in the later years. I know that in January 2017, as required by regulations promulgated in 2012 as

1 part of the Vehicle Rule, EPA issued a final determination finding that the Vehicle Rule continued to  
2 be “appropriate” and would remain in effect through 2025. EPA issued this final determination after  
3 notice and comment and based on an extremely thorough analysis and a complete technical review,  
4 and found that the Vehicle Rule could be readily achieved, at less cost than anticipated in 2012, and,  
5 if anything, could be made more stringent. In April of this year, however, EPA reversed course and  
6 issued a decision withdrawing the January 2017 final determination (the “Withdrawal Rule”), now  
7 finding that the Vehicle Rule was “not appropriate,” was too stringent, and needed to be rolled back.  
8 Now that the 2017 final determination has been withdrawn by the Withdrawal Rule, the Vehicle  
9 Rule will be made less stringent. Lower stringency means that vehicles will combust more gasoline  
10 per mile traveled, thereby increasing the amount of dangerous pollutants they emit, including ozone-  
11 forming nitrogen oxides and particulate matter. The vehicles will also emit more greenhouse gases  
12 as the fuel they combust increases.

13       2. I am extremely concerned about and personally injured by the Withdrawal Rule.  
14 Because the Vehicle Rule will be made less stringent than it was, I fear that the increased pollution  
15 from the vehicle fleet will restrict my daily life activities even more since I cannot help but breathe  
16 the pollution. The Withdrawal Rule directly harms my health and has concrete, direct and  
17 frightening daily effects on my personal quality of life.

18       3. Since about 2009, or some six years after moving to Fresno, I have suffered from  
19 severe asthma. I had allergies before moving to Fresno in 2003, but had never had asthma. Around  
20 2009, I was diagnosed with asthma after having a severe reaction to an unknown trigger pollutant  
21 when I was in Virginia on vacation. Within 5 days of the onset of this reaction, I was in the  
22 Emergency Room (“ER”) with severe bronchitis, exceedingly sick. The consulting doctor was  
23 leaning toward admitting me to hospital. I was prescribed inhalers and other asthma relieving  
24 medications with the understanding that if I did not improve, I would return to the ER. Until the ER  
25 visit in Virginia, I had not known that I had asthma. After I was diagnosed, I realized that I had been  
26 suffering from asthma-related sicknesses since 2006.

27       4. Air quality in Fresno and the San Joaquin Valley is among the worst in the nation,  
28 and the many vehicles on the road in Fresno and in the Valley contribute enormously to the problem.

1 My house is located about 1,400 feet from the busy 180 freeway as the crow flies. I must monitor  
2 both the particulate matter and the ozone in my area on a daily and sometimes hourly basis, and  
3 when the air quality for either of these pollutants turns from good to moderate, I am immediately  
4 affected: when ozone is less than “good”, I cannot leave the house, and when particulates are less  
5 than “good,” I cannot leave the house without wearing a mask, and even then I still take the risk of  
6 suffering a severe and debilitating asthma attack. I also cannot leave my house any time there is  
7 smoke in the air. During the months of November through February, my asthma symptoms are  
8 exacerbated by smoky air. To prevent pollutants picked up while outside from coming into our  
9 home, my husband and I take off our outside clothing to put on clean clothing only worn inside of  
10 the house. I have towels on my sofa and chairs which can be washed after visitors sit on our  
11 furniture. No one can wear shoes inside of the house. We have a nine pound dog which lives inside  
12 of the house. When he returns from a walk, or goes out for potty breaks, we wash his feet and wipe  
13 him with a damp towel.

14 5. Asthma has made me exceedingly sick. When I suffer an attack, it is difficult just to  
15 breathe. A particularly severe attack occurred in the summer of 2012 when I simply went outside to  
16 take my dog for a walk. Even though I wore a mask, PM2.5 particulates and ozone were in the  
17 moderate level, and I began having trouble breathing as I could not inhale any air. Feeling faint and  
18 lightheaded, I panicked and turned around to go back home. I nearly lost consciousness right there  
19 on the road. I believe that only the adrenaline produced by my panic allowed me to make it back  
20 home, where I administered asthma medication and then passed out. The mask only protected me  
21 from the PM2.5 particulates, not the ozone, a lesson I learned that day. The entire experience was  
22 horrific. Because I never want to experience such an attack again, I now do not leave my home if  
23 either the particulate matter or the ozone is not within the “good” range as indicated by real-time  
24 monitoring websites. I access those sites with my computer or on the phone, and often again on my  
25 phone after leaving my house to make sure the air quality has not changed. I receive alerts on my  
26 phone indicating air quality has degraded to air I can not breathe. I depend upon these alerts. I now  
27 have my own monitor for PM2.5. I always consult it before I go outside. It gives me “real-time”  
28 readings of PM2.5 air quality. This past winter, I did not become air pollution sick due to the

1 readings I used from my personal monitor positioned in my back yard. I have it hanging outside at  
2 the same level where I am breathing air.

3         6.         When I begin having an attack, I feel a heaviness in my chest and cannot get air.  
4 Often I also start coughing. I feel like a fish out of water, gasping. If I am outside and begin to feel  
5 this chest pressure, shortness of breath, and/or coughing, I go into a building, a house, a car, or  
6 anywhere else that is enclosed so that I am better sheltered from the polluted air. Other effects of  
7 particulate matter and ozone air pollution on my health sometimes include sneezing and sniffing,  
8 feeling tired, achy, suffering from headaches, and feeling as if I am about to come down with a cold  
9 or flu. I also have a chronic cough when the particulate matter count increases. I love to ride my  
10 bike and have been an avid outdoor person for my entire life, but now must spend most of my time  
11 inside my house. Because my activity level is so severely restricted, I now also suffer from  
12 unhealthy weight gain. To protect myself from pollutants, I always check air quality before going to  
13 the gym to do some water aerobics. Sometimes there is an unexpected trigger, so when I do drive to  
14 the gym, I sometimes cannot walk from the parking lot to the gym because I begin to feel an asthma  
15 attack coming on, and I must drive back home.

16         7.         Many of my friends and acquaintances and their children who live in Fresno or  
17 elsewhere in the Central Valley suffer from asthma or other severe health complications because of  
18 the air pollution caused by motor vehicles. I am concerned for them as well and fear for their well-  
19 being. During periods when air pollution is above moderate, many asthmatics end up in Central  
20 Valley Emergency Rooms and hospitals. I do all I can possibly do to avoid becoming so ill.

21         8.         Now that the Withdrawal Rule is in place, the Vehicle Rule's fuel efficiency and  
22 greenhouse gas standards will be weakened, and PM2.5, ozone-forming nitrogen oxides and  
23 greenhouse gases will all increase. As a result, the air I must breathe will often become or continue  
24 to be too polluted, and I will become sick if I go outside or I will be compelled to stay shut into my  
25 house. The Withdrawal Rule causes direct and severe harm to me personally. My health will  
26 continue to suffer and get even worse, and my quality of life cannot improve. I suffer emotional  
27 distress knowing that the Vehicle Rule will be weakened. But on the other hand, if the Withdrawal  
28 Rule is invalidated, the Vehicle Rule will again become effective, particulate matter and ozone

1 pollution will continue to be reduced, days when the air quality remains good will increase, my  
2 health will improve and I will be able to leave my house more often.

3 9. EPA issued the Withdrawal rule without providing information vital to me, including  
4 an analysis showing the facts and any reasoned conclusions for abandoning the 2017 final  
5 determination, the necessary technical analysis, and the effects that weakening the Vehicle Rule will  
6 have on emissions and the enormous attendant costs. EPA did not analyze the extensive record of the  
7 2017 final appropriateness determination at all, and did not consider what the increased pollution  
8 resulting from a weakened Vehicle Rule will do to me and others. This lack of information deprives  
9 me of my procedural rights to be informed about the specific facts and reasons that caused the  
10 agency to act and what the consequences are, hindering my ability to inform others and seek to stop  
11 the negative consequences for me, my friends and neighbors. I am active in learning about and  
12 disseminating information about Fresno's poor air quality and its causes. When the air quality  
13 permits it, I speak about the effects of air pollution on my health at local, district and state-level air  
14 quality board meetings and I travel to Sacramento to speak to lawmakers on the subject. I also  
15 participate in air quality improvement workshops and training on subjects such as electric vehicle  
16 programs. I am currently attending workshops, participating in, and following Fresno City Plans to  
17 develop strategies to reduce city vehicle usage, including promoting and improving city  
18 transportation such as bus service. The Withdrawal Decision's lack of information has deprived me  
19 of my ability to learn and understand what EPA has done, how that affects other air pollution control  
20 efforts, and to communicate effectively with others about this action so it might be stopped, or to  
21 rely on the Center to do so. As such, the lack of information has harmed my procedural rights as a  
22 citizen and a member of the Center.

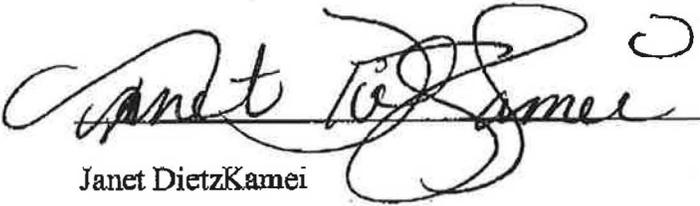
23 10. However, if the Withdrawal Rule is overturned, EPA will have to provide all the  
24 necessary analysis, technical assessments, cost comparisons, pollution analysis and other  
25 information required if it were again trying to overturn the 2017 final appropriateness determination,  
26 and the violation of these procedural and informational rights will be effectively resolved.

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I declare under penalty of perjury that the foregoing is true and correct and was executed on August 21, 2018 at Fresno, California.



Janet Dietz Kamei

IX.

Declarations of Center for Biological Diversity

3. Kassia R. Siegel, Director of Center for Biological Diversity's Climate Law Institute



1 otherwise “protected” areas like the Everglades and the Northwest Hawaiian Islands, climate  
2 change threatens to render many other biodiversity conservation efforts futile. To prevent  
3 extinctions from occurring at levels unprecedented in the last 65 million years, emissions of  
4 carbon dioxide and other greenhouse gases must be reduced deeply and rapidly. Given the lag time  
5 in the climate system and the likelihood that positive feedback loops will accelerate global  
6 warming, leading scientists have warned that we have only a few decades, at most, to significantly  
7 reduce greenhouse gas emissions if we are to avoid catastrophic effects. Deep and immediate  
8 greenhouse gas reductions are required if we are to save many species which the Center is  
9 currently working to protect, including but not limited to the polar bear, Pacific walrus, bearded  
10 seal, ringed seal, ribbon seal, Kittlitz’s murrelet, American pika, Emperor penguin, and many  
11 species of corals. Leading scientists have also stated that levels of carbon dioxide, the most  
12 important greenhouse gas, must be reduced to no more than 350 parts per million (ppm) and likely  
13 less than that, “to preserve a planet similar to that on which civilization developed and to which  
14 life on Earth is adapted” (J. Hansen et al., *Target Atmospheric CO<sub>2</sub>: Where Should Humanity*  
15 *Aim?*, 2 *Open Atmospheric Sci. J.* 217, 218 (2008)). In May of this year, greenhouse gases  
16 exceeded 411 ppm for the first time in recorded history. *CO<sub>2</sub> Levels Break Another Record,*  
17 *Exceeding 411 Parts Per Million*, YaleEnvironment 360 (June 7, 2018), available at  
18 <https://e360.yale.edu/digest/co2-levels-break-another-record-exceeding-411-parts-per-million>.

19 6. One of the Climate Law Institute’s top priorities is the full and immediate use of  
20 the Clean Air Act to rein in greenhouse gases and other pollutants. The Clean Air Act is our  
21 strongest and best existing tool for doing so, and we have long worked through advocacy and  
22 litigation to enforce the Clean Air Act’s mandates to accomplish this goal. For example, the  
23 Center was a Plaintiff in *Massachusetts vs. EPA*, which resulted in the landmark Supreme Court  
24 decision finding that greenhouse gases are pollutants under the Clean Air Act, ultimately leading  
25 to EPA’s first rulemaking to reduce greenhouse gas emissions from passenger cars and light trucks  
26 under section 202. That rulemaking is comprised of the *Endangerment and Cause or Contribute*  
27 *Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66,496  
28 (Dec. 15, 2009) (“Endangerment Finding”), and the *Light-Duty Vehicle Greenhouse Gas Emission*

1 *Standards and Corporate Average Fuel Economy Standards*, 75 Fed. Reg. 25,324, 25,397 (May 7,  
2 2010), updated twice since then, the last time by EPA and the National Highway Traffic Safety  
3 Administration through 2025, *2017 and Later Model year Light-Duty Vehicle Greenhouse Gas*  
4 *Emissions and Corporate Average Fuel Economy Standards, Final Rule*, 77 Fed. Reg. 62624 (Oct.  
5 15, 2012) (the “Vehicle Rule”). The Center submitted comments to each of those light duty  
6 vehicle rules, as well as to the first medium duty/heavy duty vehicle rule and its successor, the  
7 *Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines*  
8 *and Vehicles – Phase 2*, 81 Fed. Reg. 73478 (October 25, 2016).

9 7. The Center has been an active commenter and participant in other vehicle-related  
10 greenhouse gas and fuel efficiency rulemakings and associated litigation. For example, as noted  
11 below, the Center commented on a proposed rule proposing the repeal of emission regulations for  
12 glider trucks, *Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider*  
13 *Kits*, 82 Fed. Reg. 53,442, and it is an intervenor in *Truck Trailer Manufacturers Association, Inc.*  
14 *v. EPA*, No. 16-1430 (D.C. Cir., filed Oct. 12, 2017), a case involving emission limits for tractor  
15 trailers, and a petitioner in *NRDC et al. v. NHTSA*, No. 17-2780 (2nd Cir., filed Sept. 7, 2017), in  
16 which the Second Circuit reversed NHTSA’s indefinite suspension of inflation adjustments of  
17 civil penalties applicable to non-compliance with NHTSA’s corporate average fuel efficiency  
18 standards for light duty vehicles.

19 8. The Center has also been an active commenter in other Clean Air Act greenhouse  
20 gas rulemakings and associated litigation, including rulemakings that enforce the Clean Air Act’s  
21 PSD permitting program for greenhouse gases (*e.g.*, *Prevention of Significant Deterioration and*  
22 *Title V Greenhouse Gas Tailoring Rule*, 75 Fed. Reg. 31,514 (2010); *Coalition for Responsible*  
23 *Regulation v. EPA* (D.C. Cir. 2012) 684 F.3d 102; *Util. Air Reg. Group v. EPA*, 573 U.S. \_\_\_, 134  
24 S. Ct. 2427, 2449 (2014)); the setting of greenhouse gas standards for aircraft (*Center for*  
25 *Biological Diversity v. EPA*, 794 F. Supp. 2d 151 (D.D.C. 2011); *Center for Biological Diversity*  
26 *v. EPA*, No. 1:16-CV-00681; *Finding that Greenhouse Gas Emissions From Aircraft Cause or*  
27 *Contribute to Air Pollution That My Reasonably Be Anticipated To Endanger Public Health and*  
28 *Welfare*, 81 Fed. Reg. 54422 (Aug. 15, 2016); the setting of greenhouse gas standards for the

1 power sector (*West Virginia v. EPA*, No. 15-1363 (D.C. Cir. filed October 23, 2015); *North*  
2 *Dakota v. EPA*, No. 15-1381 (D.C. Cir. Oct. 23, 2015); and many administrative and other  
3 proceedings seeking to enforce the Act’s provisions for greenhouse gases (e.g., *Center for*  
4 *Biological Diversity v. EPA*, 722 F.3d 401 (D.C. Cir 2013).

5 9. In addition to our work on greenhouse pollution, the Center has also worked  
6 through the Clean Air Act to address other pollutants that adversely impact biodiversity and  
7 human health. For example, we filed suit against EPA for failing to review and revise the air  
8 quality criteria for oxides of nitrogen and sulfur oxides and the NAAQS for nitrogen dioxide and  
9 sulfur dioxide, resulting in new regulations (e.g., *Primary National Ambient Air Quality Standards*  
10 *for Nitrogen Dioxide; Final Rule*, 75 Fed. Reg. 6474 (February 9, 2010); *Primary National*  
11 *Ambient Air Quality Standard for Sulfur Dioxide; Final Rule*, 75 Fed. Reg. 35520 (June 22, 2010).  
12 These examples of the Center’s comprehensive work on air pollution are illustrative only.

13 10. In January 2017, pursuant to special regulations governing the mid-term evaluation  
14 of the Vehicle Rule promulgated in 2012 (the “Mid-Term Evaluation Regulations”), EPA  
15 conducted a thorough analysis of an extensive technical and scientific record, including updated  
16 costs and benefits assessments and safety studies, and concluded that the Vehicle Rule remained  
17 “appropriate” and, if anything, could be strengthened (*Final Determination on the*  
18 *Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions*  
19 *Standards under the Midterm Evaluation* (Jan. 2017), available at  
20 <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ91.pdf> (the “2017 Final Determination”).  
21 Just 15 months later, on April 2, 2018, EPA withdrew its own 2017 Final Determination and now  
22 concluded that the Vehicle Rule was inappropriate, too stringent, and must be rolled back (the  
23 “Withdrawal Decision”). Weakening the Vehicle Rule will result in additional greenhouse gas  
24 pollutants and other pollutants such as particulate matter (PM2.5), nitrous oxides and ozone.

25 11. The additional pollutants resulting from weakening the Vehicle Rule endanger  
26 human health and welfare and cause serious adverse health effects to the public, including  
27 members of the Center. These pollutants particularly affect persons living next to busy highways  
28 and freeways, as well as near oil refineries that will refine the additional oil necessary to operate

1 less fuel efficient vehicles. Short-term exposure to emissions of nitrogen dioxide “can aggravate  
2 respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing,  
3 wheezing, or difficulty breathing), hospital admissions and visits to emergency rooms”; longer-  
4 term exposure “may contribute to the development of asthma and potentially increase  
5 susceptibility to respiratory infections.”<sup>1</sup> Emissions of nitrogen oxides also contribute to the  
6 formation of tropospheric ozone. Ozone can reduce lung function, harm lung tissue, and trigger a  
7 variety of respiratory health problems in humans, and can damage “sensitive vegetation and  
8 ecosystems, including forests, parks, wildlife refuges and wilderness areas.”<sup>2</sup> Exposure to  
9 particulate matter can affect both the lungs and heart and cause premature death in people with  
10 heart or lung disease, nonfatal heart attacks, aggravated asthma, decreased lung function, and  
11 increased respiratory symptoms, such as irritation of the airways, coughing or difficulty  
12 breathing.<sup>3</sup> Members of the Center suffer severely from this pollution.

13 12. Because EPA’s Withdrawal Decision will result in less stringent fuel efficiency and  
14 greenhouse gas standards for the nation’s fleet of passenger vehicles and light trucks, emissions of  
15 particulate matter, nitrous oxides, ozone and greenhouse gases will increase, and the pollution will  
16 directly affect the health and well-being of our members. Conversely, if the Withdrawal Rule is  
17 reversed, additional dangerous pollution will be prevented, improving air quality, increasing our  
18 members’ health and well-being, and providing redress of harm they will otherwise suffer.

19 13. The Center’s members rely on the organization to support efforts to decrease air  
20 pollution harmful to their health and well-being, increase the fuel efficiency from the nation’s  
21 vehicle fleet and enforce the Vehicle Rule, other provisions of the Clean Air Act, and other laws.

22 14. The Center’s members also rely on the organization to protect their procedural and  
23 informational rights. As shown above, the Center, on behalf of its members, frequently comments  
24 on agency rulemakings, including many of the regulations affecting motor vehicles, and the Center  
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26 <sup>1</sup> EPA, Basic Information about NO<sub>2</sub>, available at <https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects>.

27 <sup>2</sup> EPA, Ozone Basics, available at <https://www.epa.gov/ozone-pollution/ozone-basics#effects>.

28 <sup>3</sup> EPA, Health and Environmental Effects of Particulate Matter (PM), available at <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>.

1 analyzes and disseminates the information it obtains, advocates on behalf of more stringent and  
2 effective standards, and seeks to enforce applicable laws and regulations to protect its members'  
3 health and well-being from the negative effects of vehicle pollution. The Mid-Term Regulations  
4 required EPA, before making a finding whether the Vehicle Rule should be changed, to conduct a  
5 thorough technical analysis, based on peer-reviewed studies, and to make that analysis available  
6 for public comment. EPA's Withdrawal Rule, however, is not accompanied by any technical  
7 record, and does not address the extensive record, analysis, and technical and scientific findings of  
8 the 2017 Final Determination. It provides no analysis about why that Final Determination record  
9 purportedly no longer pertains. It does not include information about the specific facts that made  
10 EPA decide to roll back the Vehicle Rule, nor follow the procedures and informational  
11 requirements of the Mid-Term Regulations governing the Vehicle Rule's midterm evaluation. It  
12 talks vaguely about the burden the Vehicle Rule supposedly places on the auto industry, but says  
13 next to nothing about the amount of extra pollution that will result from rolling it back, the  
14 consequences to the health and well-being of the Center's members, or the additional burdens  
15 placed on communities living near freeways and refineries that are already suffering  
16 disproportionately from the degradation of the air we must breathe. The Withdrawal Rule's failure  
17 to follow the Mid-Term Regulations governing the Vehicle Rule's midterm evaluation and its lack  
18 of basic information concerning EPA's decision deprives the Center and its members of their  
19 informational and procedural rights, the opportunity to analyze and disseminate precise  
20 information about the Withdrawal Decision's effects, and to seek to change the outcome. These  
21 deficiencies directly injure the Center's and its members' procedural and informational rights.

22         15. Conversely, a reversal of the Withdrawal Decision would require EPA to engage  
23 with the 2017 Final Determination's voluminous technical and scientific record and provide the  
24 specific facts, information, technical assessment and detailed analysis necessary for any decision  
25 to reverse it. It would allow the Center, on behalf of its members, and those members themselves  
26 to analyze and disseminate this information and to advocate for a different outcome, redressing the  
27 violations of the procedural and informational rights of the Center and its members.  
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I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct. Executed on August 21, 2018, at Joshua Tree, California.



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Kassia R. Siegel

X.

Declarations of Conservation Law Foundation

1. Heather Greenwood, Conservation Law Foundation staff and member

**DECLARATION OF HEATHER L. GREENWOOD  
FOR CONSERVATION LAW FOUNDATION**

I, Heather L. Greenwood, hereby declare and state:

1. This declaration is based on my personal knowledge, information, and belief. I am over the age of eighteen years and suffer from no legal incapacity.

2. I live at 38 Autumn Street, Cranston, RI 02910. I have lived in Rhode Island since August, 2016.

3. Since August, 2017, I have worked for Conservation Law Foundation (CLF) as Office Manager in the Providence, Rhode Island office.

4. I have been an environmentalist for as long as I can remember. From my fifth-grade class authoring a book about endangered species to working as a naturalist in Vermont State Parks to getting my master's degree in resource management and conservation; my passion has always been to preserve and protect the natural environment. CLF is an environmental law organization who fights climate change, big oil, and pushes for policy that will protect the environment I care so deeply about. This overlapping interest is what attracted me to the position with CLF. CLF has given me an opportunity to be able to voice environmental issues that I care about, such as clean air, clean water, and species protection, while being surrounded by people who are very knowledgeable about and care about these same issues.

5. As an employee and member of CLF, I rely on CLF to advocate on behalf of me and the health of my community and region.

6. At one and a half years old, I was diagnosed with asthma. I spent most of my early childhood and elementary years in and out of hospitals and doctor offices. Asthma

limited my ability to engage in normal childhood activities such as playing tag, participating in gym class, and sleepovers with friends, and caused me to have frequent absences throughout my young education. Although my last asthma-related hospitalization was when I was in elementary school, I have been on daily medication for asthma my entire life. My asthma is exercise-induced, environmentally-induced (allergens, perfumes, air quality) and stress-induced.

7. As an adult, my asthma is managed through daily use of a steroid inhaler, nasal sprays, and oral medications. In case of emergencies, I always carry a “rescue inhaler,” meant to quickly stop asthma attacks. Because allergies can play a big role in my asthma management, I have been getting allergy shots for most of the last ten years. I have severe allergies to several types of grasses, several types of trees, dust, dogs, cats, and many other environmental allergens, which tend to be exacerbated by air pollution. At this point in my adult life, my asthma is generally well-managed by medication, with a few exceptions.

8. On days when I look out my window and see a haze on the horizon, I know that it is going to be a tough day for breathing. In the summer, with the heat and humidity, it can be much worse. For instance, I used to live in Pittsburgh, Pennsylvania and had to walk one block to the T-station to get to work. The street I walked on was in downtown Pittsburgh and close to heavy traffic. Those days when it was hot, humid, and hazy meant that I would struggle to walk this block without using my rescue inhaler.

9. I try not to let my asthma control my life. Unfortunately, this is unrealistic and managing these challenges is just part of my daily routine. For example, I generally take a walk around Providence on my lunch break. Those days when the horizon is hazy, the temperatures are soaring, and the humidity is so high the air feels thick, I have to stay inside

because it is not safe for me to spend extended amounts of time outside in this triple threat on my asthma. At home, on these same days, I have to close windows and use air conditioning to ensure that the air quality within the house is safe for me (unlike the air quality outside).

10. Having asthma adds an extra layer of concern and decision-making to my daily activities, even when it does not preclude me from doing something. I need to ask myself, is it dangerous for me to be outside? Should I not be out here?

11. I am a runner. I keep a schedule for my runs, including which days and distances I need to tackle. When there is flexibility in my schedule, I try to avoid running on days that I can tell are going to be tough days for breathing (like those triple threat days in paragraph 9 above). During the week, my runs are shorter, so I try to push through any potential discomfort or risk. If I do wind up running on a low air quality day, I get up really early to try to finish my run before it gets too hot and make sure to use my rescue inhaler before I even start the run to try to prevent an asthma attack. On these days, I have to acknowledge that I am going to try, but may not be able, to complete all or even a small portion of my run. While running, I have to work a little extra to be able to breathe well, and I have to take it one minute at a time. It is kind of like going out for a run on a sprained ankle – you take a preventative Advil so that it does not swell up, and then see how it feels after the first half mile. With asthma, I use my rescue inhaler as a preventative measure before I begin my run and then constantly check in and ask myself, “am I hurting myself more than I am helping myself?” It is always a little bit of a gamble.

12. Car emissions can exacerbate my asthma, both as a result of additional smells in the environment and poor air quality. When I am driving behind a vehicle with visible emissions from their tailpipe(s) or a strong “my exhaust is kind of broken” sort of smell, I

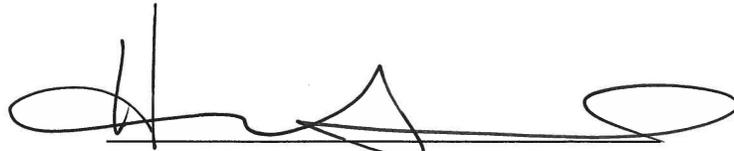
instantly close the windows and switch the air control within the car so it is not cycling air from the outside. When I fail to take these actions, I feel my lungs tighten, and have a difficult time breathing. Sometimes I may begin to wheeze.

13. I am concerned about the health risks I face from breathing more air pollution caused by emissions from cars and trucks. I have experienced air pollution exacerbating my asthma. I worry that increased emissions from cars and trucks will mean an increase in low air quality days on which I need to change my regular day-to-day activities by rescheduling a run for another day, closing windows and using air conditioning, or even staying inside at lunch time and after work. I understand that greenhouse gas emissions from vehicles contribute to climate change. Climate change has been linked to a variety of factors that negatively influence my asthma and impair my health – like increased temperatures, longer pollen seasons, and worsening air pollution. These factors scare me and have me concerned about my quality of life as greenhouse gas emissions increase.

14. Because of these risks to my health, efforts by the federal government to reduce the stringency of fuel efficiency regulations and vehicle emissions standards concern and harm me.

15. I am unable to control my exposure to at least some amount of airborne allergens in order to live a healthy life, engaging in normal recreational, personal and professional activities. Increased air pollution from vehicles raises the likelihood that my asthma will negatively impact me on more days, resulting in health impacts (and costs), significant physical discomfort, and a reduction in my ability to participate in regular physical and recreational activities.

SIGNED UNDER THE PENALTIES OF PERJURY THIS 28<sup>th</sup> DAY OF AUGUST, 2018.

A handwritten signature in black ink, consisting of a series of loops and a vertical line at the beginning, positioned above a horizontal line.

Heather L. Greenwood

X.

Declarations of Conservation Law Foundation

2. Daniel Hildreth, Conservation Law Foundation member and member of Maine State Board of Directors

**DECLARATION OF DANIEL W. HILDRETH  
FOR CONSERVATION LAW FOUNDATION**

I, Daniel W. Hildreth, hereby declare and state:

1. This declaration is based on my personal knowledge, information, and belief. I am over the age of eighteen years and suffer from no legal incapacity.

2. I live at 55 Thornhurst Rd, Falmouth, Maine 04105. I have been living at this address since approximately 1995. I rented the property initially and purchased it in 2003.

3. I first started contributing to Conservation Law Foundation (CLF) in 1994. I joined the Maine State Board of CLF in January, 2018. I continue to support CLF because of their promotion of policies to implement a transition to a clean energy economy and away from reliance on fossil fuels. This is important to me because I believe that climate change poses a catastrophic threat to our economy and to our society.

4. The property where I live is on a cove in Casco Bay. I own approximately 460 feet of coastal waterfront land. At high tide, the high-water mark comes, in my approximation, to about 50 feet from the nearest corner of my house, and reaches an area of steep banking. The banking is about 25 to 30 feet high, and is composed of ledge at the base, but most of the rest of the banking is made of clay, and is vegetated, except where the erosion is worst. At low tide, there are roughly 300 yards of mudflat between the seawater and the base of the banking. My house sits above, on clay soil atop ledge, about 50 feet from the edge of the banking.

5. In storms, the water comes higher up the banking than it does at other times. In some storms, the higher water levels have caused erosion at the base. The water has begun to undercut the banking, and there are a few places where the edge is sagging as a result.

6. I am aware that climate change is causing both sea level rise and an increase in the intensity of storms, and it is very present in my mind that my house is under threat from these

impacts of climate change. Because of climate change, I expect that it will become impossible to live there at some point in the future.

7. My understanding is that climate change is driving sea level rise because of the melting of glaciers and ice caps. The warming atmosphere is also driving sea level rise because as ocean water temperatures warm, the ocean expands. The rate of glacial melt seems to be increasing. It is my understanding that the problems associated with climate change will only continue to build. I have looked at maps of certain areas of coastal Maine depicting projections of sea level rise and I know that it will have an increasing impact on my community and my home. This in turn will raise storm surge levels, and could exacerbate the erosion of the banking that is on my property. Based on my own observations since 1995 when I moved to my property, the storm surges appear to be higher than they used to be. Additionally, the best means I have of judging the tide levels is a rock in the middle of the cove. The top is always above water at high tide, but in my perception, the highest tides are covering more of it than they used to.

8. I also understand that climate change has been linked to increases in storm intensity. I have read that there are two dynamics at play – the atmosphere is warmer, and there is more moisture in it. Climate change results in systemic impacts on the formation of storms and makes them more intense. As a coastal homeowner, this is particularly concerning for both economic and safety reasons. My personal experiences with storms on my property over the last 20+ years gives me the impression that the storms have increased in intensity.

9. There is a tree on the ocean-side of the house that I am concerned about during storms. Our house has previously experienced storms with sustained winds of 60 mph. I have been cutting the tree back dramatically because I am worried that increasing wind gusts due to

more extreme storms could cause the tree to snap mid-trunk. The tree could cause damage to my house if it were to break in a storm.

10. I understand that the Environmental Protection Agency's vehicle emissions standards and the Department of Transportation's fuel efficiency rules are critical to reducing carbon emissions from the transportation sector and to addressing climate change.

11. My enjoyment of and investment in my home is dependent upon stable sea levels and weather. Any efforts by the federal government to lessen the stringency of rules controlling greenhouse gas emissions from vehicles increase the risk of sea level rise and storm intensity, which adversely impact my economic and social well-being.

SIGNED UNDER THE PENALTIES OF PERJURY THIS 28th DAY OF AUGUST, 2018.

/s/ Daniel W. Hildreth

Daniel W. Hildreth

X.

Declarations of Conservation Law Foundation

3. Sean Mahoney, Executive Vice President & Director of the Maine Advocacy Center, Conservation Law Foundation

**DECLARATION OF SEAN MAHONEY  
FOR CONSERVATION LAW FOUNDATION**

I, Sean Mahoney, hereby declare and state:

1. This declaration is based on my personal knowledge, information, and belief. I am over the age of eighteen years and suffer from no legal incapacity.

2. I am the Executive Vice President of Conservation Law Foundation (CLF), a membership-supported nonprofit corporation organized and existing under the laws of the Commonwealth of Massachusetts. I have held this position since 2013. I also continue to serve as the Director of CLF's Maine Advocacy Center, a position I have held since 2007.

3. In my capacity as Executive Vice President, I am familiar with CLF's mission: to protect New England's environment for the benefit of all people. CLF uses the law, science and the market to create solutions that preserve our natural resources, build healthy communities, and sustain a vibrant economy.

4. Given my role as Executive Vice President, I also understand the nature and scope of CLF's organizational structure. Founded in 1966, CLF has its principal office at 62 Summer Street, Boston, MA. CLF also has offices in Maine, New Hampshire, Rhode Island and Vermont, and its members reside throughout New England and other states. CLF has more than 5,000 members.

5. CLF works on behalf of its members toward comprehensive long-term solutions to environmental challenges. Our members rely upon CLF to advocate for and safeguard the health, quality of life, and economic prosperity of our communities for generations to come, with a priority of meeting the challenge of climate change. CLF engages in federal and state

regulatory and legislative advocacy as well as policy development and litigation to work toward a healthy climate and resilient communities across New England.

6. One of CLF's areas of focus is reducing emissions from the transportation sector. CLF recognizes that in order for the New England states to achieve their greenhouse gas emissions reductions targets and limit the impacts of climate change, emissions from mobile units must be addressed at both the state and federal level. Across the country, the transportation sector is the greatest source of greenhouse gas emissions. In New England, the transportation sector contributes an even higher percentage of overall greenhouse gas emissions due to the relatively cleaner mix of electric generation units in the region.

7. CLF's federal work aimed at reducing emissions from the transportation sector includes, for instance: writing to former Environmental Protection Agency (EPA) Administrator Scott Pruitt opposing the roll back of environmental safeguards under the Clean Air Act that reduce pollution from motor vehicles and engines; commenting to urge the Department of Transportation's (DOT) National Highway Traffic Safety Administration (NHTSA) to conduct a comprehensive analysis of environmental consequences of revisions to fuel standards; and writing to DOT to oppose weakening of rules regarding fuel efficiency and fuel consumption.

8. At the state level, CLF's advocacy aimed at reducing emissions from the transportation sector includes, for instance: promoting zero emission vehicle legislative policies, including by submitting oral and written comments; serving on the Massachusetts Zero Emission Vehicle Commission to recommend policies increasing access to electric vehicle infrastructure; intervening in utility rate cases and other utility proceedings before state public utilities commissions to advocate for investments and rate structures promoting beneficial electrification of the transportation sector; developing regional transportation policy white papers; and submitting comments on state transportation plans. CLF regularly submits

comments on rulemakings and challenges regulations by petition for reconsideration to the agency or by seeking judicial review in court.

9. Based on my work with CLF, I understand that in 2012, EPA, in a joint rulemaking with NHTSA, promulgated emissions and fuel efficiency standards for model years 2017-2025, with annual increases in stringency. These standards represented a significant effort by the federal government to reduce emissions from light-duty vehicles, which are a primary source of emissions from the transportation sector. The rule also required EPA to engage in a mid-term evaluation to determine whether the standards remain appropriate part way through the term (by April 1, 2018).

10. I am aware that EPA conducted the mid-term evaluation required by rule and issued a Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation in January 2017 (“Final Determination”). I understand that, based on a voluminous record, EPA concluded in the Final Determination that the standards in place for model years 2022-2025 were appropriate, and that it was practical and feasible for automakers to meet those standards. I understand that EPA projected that over vehicle lifetimes, the model year 2022-2025 standards would reduce greenhouse gas emissions by 540 million metric tons, and that the benefits of the standards, including significant health benefits, would far outweigh the costs of compliance.

11. I am also aware that EPA subsequently reconsidered the Final Determination in a decision published on April 13, 2018 (“Revised Determination”). The Revised Determination withdrew the Final Determination and deemed the model year 2022-2025 standards inappropriate, based upon what EPA termed “additional data” that was not specified nor made available to the public. I understand that under the 2012 rule, EPA’s Revised Determination that

the standards were inappropriate created an obligation that EPA “shall” undertake a rulemaking to revise the standards.

12. Based on my work at CLF, I understand that the challenged Revised Determination will degrade air quality in the areas lived in, worked in, and otherwise used by CLF’s members. CLF has many members who live in Boston, Providence, Worcester and other heavily trafficked areas in New England. CLF’s members have no choice but to breath the air that is available to them; they are unable to completely control their exposure to airborne allergens and pollutants. Weakened fuel efficiency and vehicle emissions standards will lead to increased pollutants in the air that CLF’s members breath, particularly those that live or work near heavily traveled highways and in condensed, high-population areas that are disproportionately harmed by air pollution. CLF’s members who already suffer from respiratory ailments exacerbated by low air quality will suffer the most severe health consequences.

13. I am also aware that the challenged Revised Determination will result in increased greenhouse gas emissions that contribute to climate change. Climate change has been linked to increases in allergens that severely impact our members already suffering from respiratory ailments. Further, CLF has many members, being a New England based organization, who live along the coast. Climate change is linked to both rising sea levels as well as increases in storm intensity. Our members’ enjoyment of and investment in their homes and coastal property is threatened by the amplified storm surges that are a result of climate change. Climate change directly threatens the value of our members’ coastal property and homes. Climate change also results in harm to the areas, resources, and wildlife enjoyed and visited by Plaintiffs’ members, ultimately reducing their likelihood of enjoying these in the future.

14. CLF's members rely on CLF to advocate at the federal level for increased fuel efficiency and vehicle emissions standards, and to ensure EPA's compliance with the Clean Air Act, thereby reducing emissions of harmful greenhouse gasses and other pollutants.

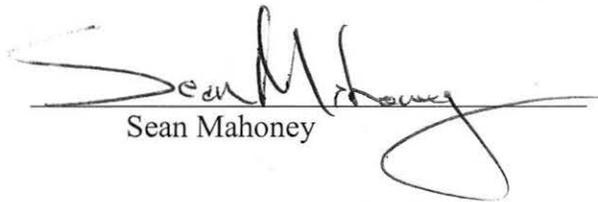
15. CLF's members also rely on the organization to protect their procedural and informational rights. As shown above, CLF frequently comments on agency rulemakings on behalf of its members, and also regularly litigates challenges to agency rules. To engage in these efforts, CLF reviews administrative records upon which agency rulemakings are premised as well as agencies' analyses and explanations for their results. CLF scrutinizes the agency's underlying documentation and rationales to fully understand agency rulemakings and other decisions, which informs and enables CLF's advocacy. CLF uses this information to advocate on behalf of more stringent and effective standards, and to enforce applicable laws and regulations to protect our members' health and well-being. Further, CLF disseminates information that we obtain to educate our members and to spread awareness. To fulfill our members' expectations and to ensure that agencies are engaging in appropriate, lawful regulation, thereby satisfying our mission, CLF must have access to information and analysis underlying agency decision making.

16. I understand that the Revised Determination is only 11 pages long and cites to unspecified data as the basis for its conclusions. I am also aware that the regulations pertaining to the mid-term evaluation create a heightened obligation for the agency to make publicly available a detailed analysis setting forth the basis for its determination. The rules create a legal right to information and CLF has a concrete interest, distinct from that of the general public, in obtaining the data, documentation, and analysis relied upon in the Revised Determination.

17. The agencies' failure to provide the information required by rule impairs CLF's ability to fully engage and hinders our ability to effectively advocate on behalf of our members.

The agencies' failure to provide the requisite information also hamper's our ability to communicate with and educate our members and to fulfill our role to provide them with critical information about their government's decision-making processes. Further, the deprivation of this information frustrates CLF's ability to effectively develop and implement our state level advocacy.

SIGNED UNDER THE PENALTIES OF PERJURY THIS 28th DAY OF AUGUST, 2018.



Sean Mahoney

XI.

Declarations of Environmental Defense Fund

1. James Ausman, Environmental Defense Fund member

## DECLARATION OF JAMES AUSMAN

I, James Ausman, declare as follows:

1. I am currently a member of Environmental Defense Fund (EDF). I reside in San Francisco, California with my wife and two daughters, who are 9 and 12 years old. I have resided in California for more than 46 years and have worked as a system architect at Yahoo! and a program manager at Google. I received my bachelor's degree in Biophysics from the University of California, Berkeley and my area of expertise is in engineering project management.

2. I understand that California has long experienced extraordinary air pollution challenges. Growing up as a child with asthma in Riverside, California I frequently experienced acute asthma symptoms such as shortness of breath and tightening in my chest. As an adult living with asthma I chose to move to San Francisco with my family in 1993 because of its superior air quality.

3. I am familiar with, and deeply concerned about, the impacts of climate change due to greenhouse gas emissions. I am aware of the latest scientific evidence, which concludes that warming of the climate is unequivocal, that it is extremely likely that human influences have been the dominant cause of this warming since the mid-20th century, and that continued emissions of greenhouse gases will cause further warming.

4. This evidence demonstrates that climate change is posing a significant threat to the wellbeing of humans, wildlife, and the natural environment. For instance, I am aware of scientific evidence suggesting that certain types of extreme weather events—including heat waves, heavy downpours, and, in some areas, floods and droughts—have become more frequent and/or intense. Studies also confirm that warming is causing sea levels to rise, oceans to become more acidic, and snowpack to decline.

5. I see many of these impacts occurring in California, where my family and I live and recreate. For instance, Californians are experiencing drought and increased incidence of wildfires, reduced snowfall in the mountains, and an increase in both the occurrence and severity of extreme weather events like droughts and heat waves.

6. The evidence also shows that these and other changes threaten human health. For example, among other things, climate change leading to increased risk of drought can contribute to water supply shortages and exacerbate wildfires. Wildfires can cause personal injury, damage infrastructure, and contribute to worsening air pollution problems. I am aware that the 2017 California wildfire season was the most destructive in the state's history<sup>1</sup> with 9,133 fires burning 1,248,606 acres across the

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<sup>1</sup> Dale Kasler, Wine country wildfire costs now top \$9 billion, costliest in California history, The Sacramento Bee, (Dec. 6, 2017), <https://www.sacbee.com/news/state/california/fires/article188377854.html>

state.<sup>2</sup> Climate change also leads to increased ground-level ozone formation, and exposure to ozone can lead to and exacerbate a variety of respiratory and cardiovascular problems, including asthma.

7. Those who suffer from respiratory illness are disproportionately impacted by poor air quality exacerbated by climate change. I have suffered from asthma since childhood. Over the years I have experienced acute asthma symptoms including shortness of breath requiring me to visit the Emergency Room and reduce outdoor physical activity, wheezing, many cases of bronchitis and pneumonia, and shortened vacations.

8. I have used several medications and inhalers throughout the years to treat my asthma. I currently treat my asthma with a steroidal inhaler and allergy medication administered in a series of shots. I have a rescue inhaler containing albuterol and Prednisone for emergencies.

9. These treatments are expensive and time consuming. Insurance does not cover the full cost of my asthma treatments and multiple treatments have cost me thousands of dollars. I also spend hours traveling to and from the doctor's office in addition to time spent meeting with physicians and receiving treatment.

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<sup>2</sup> California Department of Forestry and Fire Protection, 2017 Incident Information, [http://cdfdata.fire.ca.gov/incidents/incidents\\_stats?year=2017](http://cdfdata.fire.ca.gov/incidents/incidents_stats?year=2017) (last modified Jan. 24, 2018).

10. My family and I enjoy spending time and frequently engage in camping, hiking, bicycling and fishing.

11. Following exposure to degraded air quality—including smoke from climate change-exacerbated wildfires, and high ozone levels—I have experienced acute asthma symptoms including shortness of breath and tightness in my chest. Because exposure to air pollution can exacerbate my asthma symptoms, I am forced to limit my time engaging in outdoor activities when air quality is poor. For example, when ozone levels are high I refrain from riding my bike and limit the time I spend outside. Additionally, the acute asthma symptoms I experience during exposure to air pollution have caused me to cut short family vacations and to miss work.

12. In August of 2017, during a family trip to Mexico City following time spent outdoors, I began to have trouble breathing and started to feel disoriented. Over time my symptoms worsened even as I remained indoors. I began to experience shortness of breath, and was unable to lay down due to difficulty breathing when prone. I continued to experience these symptoms until a doctor could travel to and treat me by administering a steroidal (dexamethasone) shot.

13. More recently, I experienced acute asthma symptoms as a result of exposure to wildfire smoke while on vacation with my family in Yosemite National Park in early August of this year. The Ferguson Fire that started in Sierra National Forest located south of Yosemite had been burning in a northwest direction during

the weeks leading up to our vacation.<sup>3</sup> Within a day of arriving at the Evergreen Lodge located near Hetch Hetchy Valley in the northwestern portion of the Park, I began to experience shortness of breath and to feel lethargic. During my second night at the Park, I could not sleep and had trouble breathing. My wife and I feared that I would again have to receive medical treatment to alleviate my symptoms and so we returned home, ending our vacation two days early. Shortly after we left, Yosemite Valley residents were evacuated, and the National Park Service closed the park to the public.<sup>4</sup>

14. California wildfire smoke has caused me to experience acute asthma symptoms in the past. In the fall of 2017, as several wildfires burned in Sonoma and Santa Rosa California,<sup>5</sup> smoke blew into San Francisco<sup>6</sup> and I started to experience wheezing and shortness of breath on exertion. During this time, the EPA designated

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<sup>3</sup> The National Wildfire Coordinating Group, Incident Information System, Ferguson Fire, <https://inciweb.nwcg.gov/incident/5927/> (“The Ferguson Fire started on Friday night, July 13 at 9:36 PM in the South Fork Merced River drainage on Sierra National Forest...”)

<sup>4</sup> The National Wildfire Coordinating Group, Incident Information System, Ferguson Fire, <https://inciweb.nwcg.gov/incident/5927/> (“On August 3 the residents of Yosemite Valley were evacuated and the Park Service closed it to the public due to multiple hazards from firefighters working in the area.”).

<sup>5</sup> Peter Fimrite, Jill Tucker, Kurtis Alexander and Demian Bulwa, Wine Country wildfires leave a trail of death, devastation across the North Bay, San Francisco Chronicle (Oct. 10, 2017), <https://www.sfchronicle.com/news/article/2-big-wildfires-prompt-evacuations-in-Napa-County-12262945.php&cmpid=twitter-premium>

<sup>6</sup> Brock Keeling, Smoke and ash covering San Francisco: How bad is it and how long will it last?, Curbed San Francisco, (updated Oct. 10, 2017), <https://sf.curbed.com/2017/10/9/16447874/smoke-ash-fire-air-quality-napa>

San Francisco's air quality as "very unhealthy"<sup>7</sup> indicating that everyone, not just those with sensitivities, may experience negative health impacts.<sup>8</sup> I again started to experience asthma symptoms. In an attempt to limit my exposure, I bought face masks from a hardware store to wear until the smoke subsided and air quality improved. The symptoms I experienced as a result of this exposure caused me to miss about two days of work.

15. I understand that the transportation sector is the leading cause of carbon dioxide (CO<sub>2</sub>) emissions in the United States. Significantly, the majority of greenhouse gas emissions from the transportation sector are from passenger cars and light-duty trucks.<sup>9</sup>

16. I am aware that in announcing its *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles*, 83 Fed. Reg. 16077 (Apr. 13, 2018) (Revised Final Determination), EPA reversed its previous position that the model year 2022-2025 greenhouse gas emission standards

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<sup>7</sup> Brock Keeling, Smoke and ash covering San Francisco: How bad is it and how long will it last?, Curbed San Francisco, (updated Oct. 10, 2017), <https://sf.curbed.com/2017/10/9/16447874/smoke-ash-fire-air-quality-napa>

<sup>8</sup> Environmental Protection Agency, AirNow, Current Air Quality Index, <https://airnow.gov/index.cfm?action=airnow.main>

<sup>9</sup> EPA, *Sources of Greenhouse Gas Emissions-Transportation*, <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#transportation> (last updated April 11, 2018).

for light-duty vehicles were appropriate<sup>10</sup> and committed to “roll back” or weaken the existing standards.<sup>11</sup>

17. The greenhouse gas emission standards established for light-duty vehicles mark the single most significant federal regulatory effort to reduce climate harming pollutants in the United States. Maintaining the existing standards is necessary to mitigate the effects of climate change.

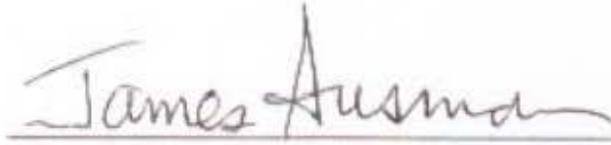
18. I am deeply concerned that EPA’s weakening of these standards will increase climate-harming and ozone-forming pollution, intensifying and extending California’s wildfire season and likewise worsening ground-level ozone pollution. These pollutants present an imminent and concrete injury to my health and well-being and that of my family. More intense wildfires likewise threaten the survival, health, and natural beauty of the ecosystems where I live and recreate.

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<sup>10</sup> See e.g., Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles, 83 Fed. Reg. 16077 (Apr. 13, 2018).

<sup>11</sup> Scott Pruitt (@EPAScottPruitt), Twitter (Apr. 3, 2018), *available at* <https://twitter.com/EPAScottPruitt/status/981239876971565056> (“Today, we announced @EPA plans to roll back Obama Admin fuel standards. These standards were inappropriate & needed to be revised. The focus should be on providing consumer choice and the strongest environmental protections.”).

I declare under penalty of perjury that the foregoing is true and correct.

A handwritten signature in black ink that reads "James Ausman". The signature is written in a cursive style and is positioned above a solid horizontal line.

James Ausman

Executed on August 27, 2018

XI.

Declarations of Environmental Defense Fund

2. Arthur Cooley, Environmental Defense Fund member

## DECLARATION OF ARTHUR P. COOLEY

I, Arthur P. Cooley, declare as follows:

1. I am a member of Environmental Defense Fund (“EDF”) and have been a board member since I and several other scientists founded EDF on Long Island, New York, in 1967. I reside in La Jolla, California, having moved here from New York in 2003. I respectfully submit this declaration in support of EDF’s petition for review of EPA’s Revised Final Determination regarding the appropriateness of the model year (MY) 2022-2025 greenhouse gas emission standards for light-duty vehicles.

2. I have a graduate degree in biology from Cornell University, and am a retired high school biology teacher. I am also a former adjunct Associate Professor in the Marine Sciences Research Center at Stony Brook University in Stony Brook, New York, a part of the New York State University System. In that role, I taught marine biology to secondary school teachers for seven summers. I served for 20 years as a Naturalist and Expedition Leader for Lindblad Expeditions, an organization that offers small-ship expedition cruises that give passengers the opportunity to encounter some of the world’s most pristine places with the experts who know them best. As a naturalist and expedition leader, I have taught guests about the natural world and have coordinated our guests’ outdoor activities.

Through this process I have traveled to all seven continents and learned a great deal about the birds, whales, geology, and other natural phenomena in these areas.

3. I am familiar with and concerned about emissions of greenhouse gases, which are causing climate change. I am aware of the latest scientific evidence, which concludes that warming of the climate is unequivocal, that it is extremely likely that human influences have been the dominant cause of this warming since the mid-20th century; and that continued emissions of greenhouse gases will cause additional warming.

4. I understand that climate change poses a significant threat to human health and the environment. I am aware of science suggesting that certain types of extreme weather events—including heat waves, heavy downpours, and, in some areas, floods and droughts—have become more frequent or more intense due to climate change. Data also shows that warming is causing sea levels to rise; oceans to become more acidic; and snowpack to decline.

5. These changes threaten human health. For example, among other things, climate change can contribute to deteriorating air quality by exacerbating ozone pollution and increasing the risk of wildfires. And rising sea levels can threaten public safety through increased risk of coastal flooding and storm surge.

6. I understand that immediate action to reduce greenhouse gas emissions is necessary to mitigate the impacts of climate change. Incremental actions

addressing significant emissions sources can lessen harms associated with a changing climate and can reduce the risk that the climate system reaches certain “tipping points”—reflecting abrupt or irreversible changes in climatic conditions. Meaningful actions in the United States can also help to encourage other countries to take similar action.

7. I live in La Jolla, a neighborhood in San Diego, California, one block from the ocean. The ability to live so close to the ocean and the beach was a significant reason why my wife and I chose this residence and it features prominently as a factor in the economic value of our property. I routinely visit the ocean where I walk along the beach, and intend to continue to do so. I also visit, examine, and immensely enjoy the biology and ecology of the ocean shore. I have a significant recreational, aesthetic, and personal connection to this particular area of the ocean and beach that I regularly visit, and intend to continue to do so. I will not be able to continue to enjoy our property and my current recreational routine if the sea level continues to rise and the current beach changes or disappears. Indeed, there is documented sea level rise in San Diego Harbor and other low-lying beaches close to my house, and the beach on which I take frequent walks is now completely inundated in high surf and high tide conditions. If greenhouse gas emissions continue unabated and the sea level continues to rise, the sandy beach will disappear, and I will be unable to enjoy this activity.

8. As a biologist who studies nature, I spend extensive time outside, along the coast and the beach, to carry out my work. As a naturalist for Lindblad Expeditions, my duties included teaching guests about many different types of wildlife including, birds, whales, and dolphins, and also educating guests about the geology of the areas we visited. As an Expedition Leader, I coordinated all the activities of the guests, which included landings, zodiac cruises, lectures, arrivals, and departures, much of which involves enjoyment, observation, or use of natural areas. I also spend additional time outside because of my deep appreciation for and interest in nature. I am very concerned about the adverse impact of global warming on the wildlife, resources, and ecosystems that I study and routinely visit. If global warming causes adverse impacts to these natural systems, as is occurring now and will likely continue to occur, I expect to be personally harmed by being unable to observe these systems free of such impacts.

9. Global warming is adversely impacting the natural systems that I value, including the oceans. For example, ocean acidification threatens to upset the ocean's delicate balance of marine life by harming those organisms that rely upon calcium carbonate to build their shells. This will negatively impact both far-away coral reefs as well as sensitive organisms in the tidal pools that I regularly visit with my children and with friends. These impacts will worsen unless greenhouse gas emissions are reduced.

10. I am aware that the greenhouse gas emission and fuel economy requirements established for light-duty vehicles mark the single most significant federal regulatory effort to reduce climate harming pollutants in the United States. I am further aware that in its *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles*, 83 Fed. Reg. 16077 (Apr. 13, 2018) (Revised Final Determination), EPA reversed a previous determination that the MY 2022-2025 greenhouse gas emission standards were appropriate.<sup>1</sup> In issuing the Revised Final Determination, former Administrator Pruitt set off a weakening of existing regulations, announcing that the decision was a “roll back” of the Obama-era standards.<sup>2</sup>

11. I understand that the transportation sector is the leading source of CO<sub>2</sub> emissions in the United States. I am therefore concerned that in weakening the greenhouse gas emission standards for light-duty vehicles, EPA is shirking its responsibility to regulate CO<sub>2</sub> and other climate harming pollutants. This in turn will increase the negative impacts of global warming that are already affecting the

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<sup>1</sup> *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles*, 83 Fed. Reg. 16,077 (Apr. 13, 2018).

<sup>2</sup> Scott Pruitt (@EPAScottPruitt), Twitter (Apr. 3, 2018), *available at* <https://www.epa.gov/newsroom/former-administrator-scott-pruitt-social-media-files> (“Today, we announced @EPA plans to roll back Obama Admin fuel standards. These standards were inappropriate & needed to be revised. The focus should be on providing consumer choice and the strongest environmental protections.”).

natural resources and biological diversity that I treasure and impeding my ability to enjoy the ocean shore near my home.

I declare under penalty of perjury that the foregoing is true and correct.



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Arthur P. Cooley

Executed on August 25, 2018

XI.

Declarations of Environmental Defense Fund

3. Denise Fort, Environmental Defense Fund member

## DECLARATION OF DENISE FORT

I, Denise Fort, declare as follows:

1. I am currently a member of Environmental Defense Fund (EDF), and I have been a supporter for many years, beginning with a position as an intern while still in law school. I reside in Santa Fe County, New Mexico. I have resided in New Mexico for more than 25 years and am a tenured faculty member at the University of New Mexico School of Law, with the title of Research Professor and Emerita Professor of Law. My area of expertise is environmental and natural resources law.

2. As a law school professor specializing in the environmental field, I closely follow regulatory developments concerning the Clean Air Act, climate change, and greenhouse gas emissions, including through communications that I receive as an EDF member. With this expertise, I have taught classes on environmental law, climate change, and natural resources law.

3. Because of my concerns about air pollution and climate change, I am also engaged in advocating for environmental protection and renewable energy. I do this work with EDF as well as other environmental organizations. I give speeches at various venues and publish opinion pieces in the media regarding the need for well-funded, functional, and effective state and federal environmental agencies. I am also participating in discussions regarding the need to strengthen New Mexico's renewable portfolio standard and bring more renewable energy into the State's energy

mix. Additionally, I have asked my county and city elected officials to pursue capital funding for solar installations on public buildings.

4. I understand that the transportation sector is the leading source of CO<sub>2</sub> emissions in the United States. Significantly, the majority of greenhouse gas emissions from the transportation sector are from passenger cars and light-duty trucks.<sup>1</sup> I am aware that between 2013 and 2016, vehicle miles traveled on New Mexico's roads and highways increased by 11%.<sup>2</sup> I am also aware that CO<sub>2</sub> emissions from New Mexico's transportation sector increased from 13.7 million metric tons in 2013<sup>3</sup> to 14.4 million metric tons in 2015.<sup>4</sup>

5. As an environmental law professor, I am aware that in its *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles*, 83 Fed. Reg. 16077 (Apr. 13, 2018) (Revised Final

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<sup>1</sup> EPA, *Sources of Greenhouse Gas Emissions-Transportation*, available at <https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions#transportation> (last updated April 11, 2018).

<sup>2</sup> TRIP, *New Mexico Transportation by the Numbers-Meeting the State's need for Safe and Efficient Mobility*, 1 (Jan. 2018), available at [http://www.tripnet.org/docs/NM\\_Transportation\\_by\\_the\\_Numbers\\_TRIP\\_Report\\_January\\_2018.pdf](http://www.tripnet.org/docs/NM_Transportation_by_the_Numbers_TRIP_Report_January_2018.pdf).

<sup>3</sup> U.S. Energy Information Administration, *Transportation Emissions by State (1980-2013)*, [www.eia.gov/environment/emissions/state/excel/transportation\\_CO2\\_by\\_state\\_2013.xlsx](http://www.eia.gov/environment/emissions/state/excel/transportation_CO2_by_state_2013.xlsx) (last accessed Aug. 21, 2018).

<sup>4</sup> U.S. Energy Information Administration, *State Carbon Dioxide Emissions Data, 2015 State analysis, Table 3 – 2015 State energy-related carbon dioxide emissions by sector* (Jan 22, 2018), <https://www.eia.gov/environment/emissions/state/analysis/>

Determination), EPA concluded that the MY 2022-2025 greenhouse gas emission standards were not appropriate, reversing its previous position.<sup>5</sup> Upon releasing the Revised Final Determination, former Administrator Pruitt announced that the decision was a “roll back” of the Obama-era greenhouse gas and fuel economy regulations, promising to weaken the existing standards.<sup>6</sup>

6. The greenhouse gas emission and fuel economy requirements established for light-duty vehicles mark the single most significant federal regulatory effort to reduce climate harming pollutants in the United States. Because of my work as an environmental advocate, I am familiar with, and deeply concerned about, the impacts of climate change due to greenhouse gas emissions. I am aware of the latest scientific evidence, which concludes that warming of the climate is unequivocal, that it is extremely likely that human influences have been the dominant cause of this warming since the mid-20th century, and that continued emissions of greenhouse gases will cause further warming.

7. This evidence demonstrates that climate change is posing a significant threat to the wellbeing of humans, wildlife, and the natural environment. For

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<sup>5</sup> See e.g., Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles, 83 Fed. Reg. 16077 (Apr. 13, 2018).

<sup>6</sup> Scott Pruitt (@EPAScottPruitt), Twitter (Apr. 3, 2018), *available at* <https://www.epa.gov/newsroom/former-administrator-scott-pruitt-social-media-files> (“Today, we announced @EPA plans to roll back Obama Admin fuel standards. These standards were inappropriate & needed to be revised. The focus should be on providing consumer choice and the strongest environmental protections.”).

instance, I am aware of scientific evidence suggesting that certain types of extreme weather events—including heat waves, heavy downpours, and, in some areas, floods and droughts—have become more frequent and/or intense. Studies also confirm that warming is causing sea levels to rise, oceans to become more acidic, and snowpack to decline.

8. The evidence also shows that these and other changes threaten human health. For example, more intense heatwaves lead to more heat-related disease and deaths. An increased risk of drought can contribute to water supply shortages and exacerbate wildfires, which can cause personal injury, damage infrastructure, and contribute to worsening air pollution problems. Extreme precipitation events can lead to flooding that can cause injuries and increase the risk of contracting waterborne diseases. And rising sea levels can threaten public safety through an increased risk of coastal flooding and storm surges. These are just some of the numerous public health and safety harms associated with climate change.

9. I see many of these impacts occurring in New Mexico, where my family and I live. For instance, New Mexicans are experiencing elevated temperatures, reduced snowfall in the mountains, and an increase in both the occurrence and severity of extreme weather events like droughts and heat waves. Summertime temperatures for the southwest region due to climate change are higher than the rest of country, making New Mexicans like myself particularly vulnerable to heat-related diseases and deaths. New Mexico is also currently experiencing an extreme monsoon

season and I am concerned that this pattern of extreme drought and extreme precipitation will continue to damage property and put human lives at risk.

10. Personally, I have in the past and intend to continue enjoying the outdoors on my own property. I am aware that climate change has caused an increased risk of forest fires—New Mexico has already experienced an increase in the frequency and severity of wildfires in recent years. My home in Santa Fe is in a pinon-juniper forest, which is affected by a bark beetle that spreads during conditions that are more prevalent in warmer climates. The bark beetle kills pinons. The resulting dead trees make ready fuel for increasingly intense and frequent wildfires. I have removed lower branches from trees in my yard and removed dead vegetation close to the house. The potential destruction of the landscape around my home and possibly my home itself from forest fires has an obvious negative effect on my life and on my property value.

11. I enjoy hiking, skiing, engaging in river sports, and bird watching in many areas across New Mexico. I have visited the Bisti Badlands and traveled around the Four Corners area of New Mexico. Often accompanied by my daughter and friends, I hike at all elevations in the nearby Santa Fe and Carson National Forests, as well as in natural areas surrounding Albuquerque, in Bernalillo County. We kayak on the Rio Grande and the Chama rivers. We engage in birdwatching during these outings, and regularly do so in our own backyard. On these excursions, I derive great pleasure from viewing trees, other natural vegetation, and wildlife.

12. A warming climate, in which there is less snow, will reduce our recreational opportunities. Reduced snowfall caused by global warming will limit my ability to ski in the winter, and changes in snowpack will reduce runoff during the summer, which will lower water levels, limiting my ability to recreate in the river.

13. I am also concerned about the health risks posed by greenhouse gas emissions from light-duty vehicles. I understand that these emissions exacerbate climate change, which in turn can increase ground-level ozone formation. I further understand that exposure to ozone can lead to and exacerbate a variety of respiratory and cardiovascular problems. I am troubled by the fact that I am exposed to this dangerous air pollution where I live and recreate.

14. Maintaining the MY 2022-2025 standards is necessary to mitigate the effects of climate change and reduce harmful air pollution in New Mexico. I am concerned that EPA's weakening of the standards presents an imminent and concrete injury to my health and well-being and that of my family, as well as to the survival, health, and natural beauty of the ecosystems where I live and recreate.

I declare under penalty of perjury that the foregoing is true and correct.



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Denise Fort

Executed on August 25, 2018

XI.

Declarations of Environmental Defense Fund

4. Jason Mathers, Director of On-Road Vehicles, Environmental Defense Fund

## DECLARATION OF JASON MATHERS

I, Jason Mathers, declare as follows:

1. I am the Director of On-road Vehicles at the Environmental Defense Fund (EDF). I have worked at EDF for twelve years in several capacities aimed at advancing clean vehicle solutions. I received my Bachelor of Science degree in Environmental Science from the University of Massachusetts, Amherst and my graduate degree in Economics from Suffolk University. I have authored several publications including the Green Freight Handbook,<sup>1</sup> utilized by companies and stakeholders to improve freight performance.

2. My responsibilities are to develop and pursue solutions specific to cars and trucks that are protective of public health and climate. My role involves shaping EDF's efforts to create, strengthen and defend well-designed public policies that reduce the environmental impact of the transportation sector, like the federal greenhouse gas emission and corporate average fuel economy standards for light-duty vehicles (Clean Car Standards). My work also requires significant engagement with EDF's membership and the general public, as well as managing

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<sup>1</sup> Jason Mathers, et al., The Green Freight Handbook: A Practical Guide for Developing a Sustainable Freight Transportation Strategy for Business (EDF, 2014), available at <http://business.edf.org/files/2014/07/EDF-Green-Freight-Handbook.pdf>.

EDF's partnerships with auto industry stakeholders. I routinely publish blogs, present at conferences, and speak with press detailing the innovative solutions employed by industry to meet and even surpass current emissions standards.<sup>2</sup> This public outreach is vital in building understanding and support for transformative solutions among key stakeholders, including industry.

### **EDF Advocates to Protect Human Health and the Environment**

3. EDF is a membership organization incorporated under the laws of the State of New York. It is recognized as a not-for-profit corporation under section 501(c)(3) of the United States Internal Revenue Code. We rely on science, economics and law to protect and restore the quality of our air, water and other natural resources. EDF advocates on behalf of its members by employing legal, analytical, and communications strategies. To advocate for strong environmental policy, we often draft comments in proposed rulemakings, participate in litigation, craft white papers, and engage with our members and the public by publishing blogs, press statements, and action alerts.

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<sup>2</sup> Jason Mathers; *Leadership: The auto industry's missing ingredient*, Environmental Defense Fund (EDF) Climate 411 (Jan. 16, 2018), available at <http://blogs.edf.org/climate411/2018/01/16/leadership-the-auto-industrys-missing-ingredient/>; Mathers, *The accelerating market for zero emission trucks*, EDF Climate 411 (Dec. 1, 2017), available at <http://blogs.edf.org/climate411/2017/12/01/the-accelerating-market-for-zero-emission-trucks/>; Mathers, *Electric Vehicles enter the here and now*, EDF Climate 411 (Jul. 25, 2017), available at <http://blogs.edf.org/climate411/2017/07/25/electric-vehicles-enter-the-here-and-now/>.

4. EDF has long pursued initiatives aimed at protecting human health and the environment,<sup>3</sup> including longstanding work aimed at reducing health and climate-harming emissions from the transportation sector. Our partnership with FedEx helped to demonstrate that a new generation of trucks could deliver packages with lower emissions and reduced costs. Our Green Freight initiative works to reduce emissions in the freight industry by partnering with companies to improve practices and maximize efficiency.<sup>4</sup> We also actively support common-sense standards, like the phase 2 heavy-duty standards setting greenhouse gas and fuel efficiency requirements for heavy-duty trucks<sup>5</sup> and similarly advocate for maintaining and further strengthening greenhouse gas and fuel economy standards for light-duty vehicles.

### **Greenhouse Gas Emission Standards for Light-Duty Vehicles**

5. The greenhouse gas emission and fuel economy standards, established in 2012 for model year (MY) 2017-2025 light-duty vehicles, set more protective standards, building from the first set of standards promulgated in 2010 for MY

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<sup>3</sup> EDF, *Our Story: How EDF got started*, available at <https://www.edf.org/about/our-history>.

<sup>4</sup> EDF, *Green Freight*, available at <http://business.edf.org/projects/featured/green-freight>.

<sup>5</sup> EDF, et al., Comment on the Environmental Protection Agency's Proposed Rule, Repeal of Emission Requirements for Glider Vehicles, Glider Engines, and Glider Kits (Jan. 5, 2018), Docket ID: EPA-HQ-OAR-2014-0827.

2012-2016. These standards constitute a joint rulemaking effort initiated by the Environmental Protection Agency (EPA), National Highway Traffic Safety Administration (NHTSA), and the California Air Resources Board (CARB) to establish one National Program. These standards mark the single most significant federal regulatory effort to reduce climate harming pollutants. As a compromise between regulatory agencies and the auto industry, EPA promulgated a regulation requiring the agency to assess the MY 2022-2025 standards through a Mid-Term Evaluation Process (MTE) and make an appropriateness determination no later than April of 2018.<sup>6</sup>

6. In its *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles*, 83 Fed. Reg. 16077 (Apr. 13, 2018) (Revised Final Determination), EPA concluded that the MY 2022-2025 standards were not appropriate and should be revised.<sup>7</sup> The Revised Final Determination issued by former Administrator Pruitt reversed the 2017 Final Determination issued pursuant to the MTE regulatory process outlined in 40 CFR 86.1818-12(h). In reaching this conclusion, former Administrator Pruitt failed to produce the required detailed analysis of the factors clearly identified in the MTE regulations. Instead, EPA relied primarily on automaker comments to support its findings.<sup>8</sup>

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<sup>6</sup> 40 CFR 86.1818-12(h).

<sup>7</sup> *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles*, 83 Fed. Reg. 16,077 (Apr. 13, 2018).

<sup>8</sup> 83 Fed. Reg. 16,080-16,081 (EPA relied on data submitted by Global Automakers, and the Alliance for Automobile Manufacturers in determining “it would not be practicable to meet the MY 2022-2025 emission standards without significant electrification...”); 83 Fed. Reg. 16,084 (EPA relied on comments

**EDF has an Organizational Interest in Obtaining Information EDF is Entitled  
to under the MTE Regulations**

7. It is my understanding that the MTE regulations create a targeted disclosure requirement. Under 40 CFR 86.1818-12(h), EPA is required to conduct a technical analysis and make that analysis publically available for review and scrutiny.<sup>9</sup> Importantly, in making a final determination regarding the appropriateness of the standards, former Administrator Pruitt was required to “set forth *in detail* the bases for the determination”<sup>10</sup> including an assessment of several factors relating to availability of technology, cost to producers and consumers, feasibility, energy security, impacts on auto industry and auto safety, impacts on the Corporate Average Fuel Economy (CAFE) standards, and impacts on other relevant factors.<sup>11</sup> I further understand that the EPA Administrator’s assessment of

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submitted by Global Automakers and the Alliance regarding cost of fuel efficient vehicles to conclude that the Original FD “did not give appropriate consideration to the effect on low-income consumers.”).

<sup>9</sup> 40 CFR 86.1818-12(h).

<sup>10</sup> 40 CFR 86.1818-12(h)(4) (emphasis added).

<sup>11</sup> 40 CFR 86.1818-12(h)(1) (“In making the determination required by this paragraph (h), the Administrator shall consider the information available on the factors relevant to setting greenhouse gas emission standards under section 202(a) of the Clean Air Act for model years 2022 through 2025, including but not limited to:

- (i) The availability and effectiveness of technology, and the appropriate lead time for introduction of technology;
- (ii) The cost on the producers or purchasers of new motor vehicles or new motor vehicle engines;
- (iii) The feasibility and practicability of the standards;
- (iv) The impact of the standards on reduction of emissions, oil conservation, energy security, and fuel savings by consumers;
- (v) The impact of the standards on the automobile industry;

each of these factors and ultimately his final determination, must be based on a robust technical record including public comments, other relevant materials *and* the Draft Technical Assessment Report (TAR).<sup>12</sup> In purporting to address each of these factors, former Administrator Pruitt did not engage with the data and analysis in the existing Draft TAR, or any other new EPA analyses supportive of a determination that the standards are not appropriate, and instead restated concerns raised in automaker comments.<sup>13</sup>

8. I am aware that as part of the process supporting the EPA's 2017 determination that the current standards are appropriate, EPA made publicly available a 1200 page Draft TAR, a 270 page Proposed Determination,<sup>14</sup> a Technical Support Document containing 700 pages of EPA analysis in support of the Proposed Determination,<sup>15</sup> and a 170-page response to stakeholder comments.<sup>16</sup>

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(vi) The impacts of the standards on automobile safety;  
(vii) The impact of the greenhouse gas emission standards on the Corporate Average Fuel Economy standards and a national harmonized program; and  
(viii) The impact of the standards on other relevant factors.”).

<sup>12</sup> 40 CFR 86.1818-12(h)(2).

<sup>13</sup> 83 Fed. Reg. 16,077 (Apr. 13, 2018) (EPA cites to automaker comments on the Draft TAR, but does not engage with its own data and analysis provided in the Draft TAR.)

<sup>14</sup> EPA, Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Greenhouse Gas Emissions Standards under the Midterm Evaluation, EPA-420-R-16-020 (Nov. 2016), *available at* <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100Q3DO.pdf>

<sup>15</sup> EPA, Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Greenhouse Gas Emissions Standards under the Midterm Evaluation, Technical Support Document, EPA-420-R-16-021 (Nov. 2016), *available at* <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100Q3L4.pdf>

<sup>16</sup> EPA, Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm

I am also aware that as part of the Revised Final Determination process supporting the EPA's determination that the standards are not appropriate, EPA issued a Request for Comment on the agency's proposed reconsideration of the 2017 final determination,<sup>17</sup> a notice of intention to reconsider the standards<sup>18</sup> in March of 2017 and a Revised Final Determination that the standards are not appropriate and require revision in April of 2018.<sup>19</sup> I am further aware that as part of the Revised Final Determination process, EPA failed to timely publish a new or revised TAR, a Proposed Determination, a response to comments, a technical support document, or any other detailed analyses to support the Revised Final Determination. I understand that the only "new" EPA report disclosed in the Revised Final Determination as forming the bases for EPA's determination that the standards were not appropriate was a Manufacturer Compliance Report showing all manufacturers to be in compliance with the standards through MY 2016.<sup>20</sup> Relying

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Evaluation, Response to Comments, EPA-420-R-17-002 (Jan. 2017), *available at* <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ9Y.pdf>

<sup>17</sup> Request for Comment on Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles; Request for Comment on Model Year 2021 Greenhouse Gas Emissions Standards, 82 Fed. Reg. 39551 (Aug. 21, 2017).

<sup>18</sup> Notice of Intention to Reconsider the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light Duty Vehicles, 82 Fed. Reg. 14,671 (Mar. 22, 2017).

<sup>19</sup> Midterm Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles, 83 Fed. Reg. 16,077 (Apr. 13, 2018).

<sup>20</sup> 83 Fed. Reg. 16,079, n. 14; *see e.g.* EPA, Greenhouse Gas Emission Standards for Light-Duty Vehicles—Manufacturer Performance Report for the 2016 Model Year, Office of Transportation and Air Quality, EPA-420-R-18-002 (Jan. 2018), *available at* <https://www.epa.gov/regulations-emissions-vehicles-and-engines/greenhouse-gas-ghg-emission-standards-light-dutyvehicles> ("No

on automaker comments and producing a single compliance report unresponsive of the conclusions reached in the Revised Final Determination clearly does not offer sufficient detail to meet the disclosure requirements outlined in the MTE regulations and prevents the public and interested stakeholders from understanding the detailed bases for the former Administrator's reversal in position.

9. EDF has a strong organizational interest in obtaining information required to be disclosed throughout the MTE to enable our meaningful participation in the rulemaking process. EDF actively engaged in the initial 2012 rulemaking establishing the MY 2017-2025 standards. We filed comments in response to the 2010 Notice of Intent,<sup>21</sup> and again in response to the 2012 Notice of Proposed Rulemaking.<sup>22</sup> EDF also provided testimony for the January 24, 2012 public hearing on the proposed standards.<sup>23</sup> EDF's testimony highlighted the substantial CO<sub>2</sub> emissions reductions projected under the program and the

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manufacturer is yet out of compliance with the GHG program in any of these first five model years.”).

<sup>21</sup> EDF, Comment on 2017 and Later Model Year Light Duty Vehicle GHG Emissions and CAFE Standards; Notice of Intent, 6 (Oct. 31, 2010), Docket ID: EPA-HQ-OAR-2010-0799-0531.

<sup>22</sup> EDF, Comment 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards; Proposed Rule, 2-3; 10 (Feb. 13, 2012), Docket ID: EPA-HQ-OAR-2010-0799-9519

<sup>23</sup> *Proposed Greenhouse Gas Emissions Standards and Fuel Economy Standards for Model Year 2017-2025 Light-duty Vehicles: Public Hearing before EPA/NHTSA Panel*, (Jan. 24, 2012), Docket ID: EPA-HQ-OAR-2010-0799-7955.

importance of these reductions in mitigating climate harming impacts.<sup>24</sup>

Throughout the rulemaking process, EDF published several blogs that relied on EPA data and analyses in quantifying fuel cost savings, oil consumption, and CO<sub>2</sub> reductions.<sup>25</sup> EDF also created issue briefing documents to inform our members, press and other stakeholders about the ability of automakers to meet NHTSA's augural MY 2022-2025 CAFE standards.

10. EDF has also been actively engaged throughout the MTE process. After EPA, NHTSA, and CARB jointly issued the Draft TAR analyzing the achievability of the standards through 2025, we issued a press release alerting the public that EPA had initiated the MTE process and that a public comment period

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<sup>24</sup> *Proposed Greenhouse Gas Emissions Standards and Fuel Economy Standards for Model Year 2017-2025 Light-duty Vehicles: Public Hearing before EPA/NHTSA Panel*, (Jan. 24, 2012) (testimony from Erica Morehouse), Docket ID: EPA-HQ-OAR-2010-0799-7955.

<sup>25</sup> Peter Zalzal, *Broad Support for Cleaner Cars – Except from Some in Congress*, EDF Climate 411 (Oct. 17, 2011), available at <http://blogs.edf.org/climate411/2011/10/17/broad-support-for-cleaner-cars-except-from-some-in-congress/>; Vickie Patton, *EDF Applauds New Fuel Efficiency and Emissions Standards for Cars and Trucks*, EDF Climate 411 (Nov. 17, 2011), available at <http://blogs.edf.org/climate411/2011/11/17/edf-applauds-new-fuel-efficiency-and-emissions-standards-for-cars-and-trucks/>; Mandy Warner, *Finally, A Good Record High! Car Fuel Efficiency in 2012*, EDF Climate 411 (Jul. 30, 2012), available at <http://blogs.edf.org/climate411/2012/07/30/finally-a-good-record-high-car-fuel-efficiency-in-2012/>; Jackie Roberts, *Growing Jobs, One Auto Supplier at a Time*, EDF Climate 411 (Sept. 7, 2012), available at <http://blogs.edf.org/climate411/2012/09/07/growing-jobs-one-auto-supplier-at-a-time/>

would follow this release of the Draft TAR.<sup>26</sup> EDF also submitted comments on the Draft TAR, supporting EPA's technical findings that the MY 2022-2025 standards were both achievable and affordable.<sup>27</sup> In commenting on the Draft TAR, EDF interpreted the MTE regulations as requiring that the Draft TAR "serve as the primary basis for EPA's appropriateness determination."<sup>28</sup> Following release of the Proposed Determination finalizing the MY 2022-2025 standards, EDF again conducted outreach by publishing a blog citing EPA data and analysis regarding the feasibility of the standards.<sup>29</sup>

11. When EPA issued its Notice of Intention to reconsider the 2017 Final Determination, EDF filed a request urging EPA and NHTSA to withdraw the notice because the robust technical record did not support a decision to reopen the MTE process or weaken the standards.<sup>30</sup> EDF also commented on the

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<sup>26</sup> Press Release, EDF, Mid-Term Review Begins for America's Clean Cars (July 18, 2016), available at <https://www.edf.org/media/mid-term-review-begins-americas-clean-cars>

<sup>27</sup> EDF et al., Comment on Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025, 4-16 (Sept. 26, 2016), Docket ID: EPA-HQ-OAR-2015-0827-4086.

<sup>28</sup> EDF et al., Comment on Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025, 5 (Sept. 26, 2016), Docket ID: EPA-HQ-OAR-2015-0827-4086.

<sup>29</sup> Nicholas Bianco, *5 Things You Should Know About America's Clean Car Standards*, EDF Climate 411 (Dec. 19, 2016), available at [http://blogs.edf.org/climate411/2016/12/19/5-things-you-should-know-about-americas-clean-car-standards/?\\_ga=2.233715866.563423076.1528729357-1461891325.1527709443](http://blogs.edf.org/climate411/2016/12/19/5-things-you-should-know-about-americas-clean-car-standards/?_ga=2.233715866.563423076.1528729357-1461891325.1527709443).

<sup>30</sup> EDF, et al., Request to Withdraw Notice of Intention to Reconsider the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions

Reconsideration of the 2017 Final Determination, again emphasizing that the record supported the appropriateness of the standards.<sup>31</sup> In these comments EDF asserted that if EPA were relying on technical determinations that had not previously been published, it was compelled to publish that information prior to issuing its final determination.<sup>32</sup>

12. After former Administrator Pruitt issued the Revised Final Determination, announcing a plan to “roll back” the standards<sup>33</sup> we joined a coalition of environmental and consumer advocates in writing a letter to automaker executives expressing our opposition to the course EPA was taking to weaken of these vital regulations.<sup>34</sup> In response to former Administrator Pruitt’s promise to

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Standards for Model Year 2022-2025 Light Duty Vehicles, 2; 12 (Jun. 6, 2017), Docket ID: PA-HQ-OAR-2015-0827-6300.

<sup>31</sup> EDF, et al., Comment on Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles; Comment on Model Year 2021 Greenhouse Gas Emissions Standards, 16 (Oct. 5, 2017), Docket ID: EPA-HQ-OAR-2015-0827-9203.

<sup>32</sup> EDF, et al., Comment on Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles; Comment on Model Year 2021 Greenhouse Gas Emissions Standards, 16 (Oct. 5, 2017), Docket ID: EPA-HQ-OAR-2015-0827-9203.

<sup>33</sup> Scott Pruitt (@EPAScottPruitt), Twitter (Apr. 3, 2018), available at <https://twitter.com/EPAScottPruitt/status/981239876971565056> (“Today, we announced @EPA plans to roll back Obama Admin fuel standards. These standards were inappropriate & needed to be revised. The focus should be on providing consumer choice and the strongest environmental protections.”).

<sup>34</sup> Letter from EDF et al., to Automakers (May 2018), *available at* <https://www.edf.org/sites/default/files/content/GG%20CEO%20letter%20to%20autos.pdf>.

weaken the standards,<sup>35</sup> EDF authored several blogs detailing the resulting loss in CO<sub>2</sub> emissions reductions, consumer savings, and American automaker jobs.<sup>36</sup> We also issued an action alert to members outlining the consequences of weakening the standards and prompting members to communicate their disapproval of the action to former Administrator Pruitt directly.<sup>37</sup>

13. EDF has been involved in the regulatory process for the Clean Car Standards for the better part of this decade, filing our first comments in 2010. We clearly have a strong organizational interest in obtaining this information so as to meaningfully participate in this and subsequent rulemakings.

14. EDF also has a strong organizational interest in obtaining the information required to be disclosed as part of the Revised Final Determination so we can effectively advocate for standards that protect human health and the

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<sup>35</sup> Scott Pruitt (@EPAScottPruitt), Twitter (Apr. 3, 2018), available at <https://twitter.com/EPAScottPruitt/status/981239876971565056> (“Today, we announced @EPA plans to roll back Obama Admin fuel standards. These standards were inappropriate & needed to be revised. The focus should be on providing consumer choice and the strongest environmental protections.”).

<sup>36</sup> Alice Henderson, *EPA Administrator Scott Pruitt’s Dirty Cars Action – By the Numbers*, EDF Climate 411 (Apr. 3, 2018), available at <http://blogs.edf.org/climate411/2018/04/03/epa-administrator-scott-pruitts-dirty-cars-action-by-the-numbers/>; Martha Roberts, Erin Murphy, *An outpouring of support for clean car standards, in the face of Pruitt’s attempted rollback*, EDF Climate 411 (Apr. 6, 2018), <http://blogs.edf.org/climate411/2018/04/06/an-outpouring-of-support-for-clean-car-standards-in-the-face-of-pruitts-attempted-rollback/>; Alice Henderson, *Five things you need to know about the U.S. Clean Car Standards*, EDF Climate 411 (Apr. 30, 2018), available at <http://blogs.edf.org/climate411/2018/04/30/five-things-you-need-to-know-about-the-u-s-clean-car-standards/>.

<sup>37</sup> Action Alert, EDF, *They’re Taking Aim at Our Biggest Climate Success Story* (April 2, 2018), available at <https://www.edf.org/news-headlines?page=12>.

environment. The transportation sector is now the leading source of climate-altering pollution in the United States.<sup>38</sup> Our analysis indicates that weakening the standards would result in a loss of more than 2 billion tons of CO<sub>2</sub> emissions reductions.<sup>39</sup> We are already seeing the impacts of climate altering pollution throughout the United States. Moreover, weakening the standards will increase exposure to harmful air pollution that exacerbates heart and respiratory illnesses.<sup>40</sup> EDF has an interest in obtaining information documenting the purported technical bases underpinning the Revised Final Determination, as that action would increase the harmful impacts of climate change and put human lives at risk.

15. As a member organization, EDF also has an interest in informing our members about EPA's reasoning regarding potential changes to the MY 2021-2025 standards. EDF members likewise have a strong interest in protecting human health and the environment, and so these members have an interest in understanding why EPA is changing course and dramatically weakening standards that have already proven instrumental in reducing impacts associated with climate and health-harming air pollution. Without this technical data and analysis, EDF

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<sup>38</sup> U.S. Energy Information Administration, DOE/EIA-0035(2018/05), Monthly Energy Review (May 2018), *available at* <https://www.eia.gov/totalenergy/data/monthly/pdf/mer.pdf>.

<sup>39</sup> EDF, Impacts of Weakening the Existing EPA Phase 2 GHG Standards, (Apr. 2018), *available at* <http://blogs.edf.org/climate411/files/2018/04/MTE-Relaxation-Impacts-Final.pdf>.

<sup>40</sup> Allergy & Asthma, et al., Comments on the EPA's Reconsideration of Final Determination of Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-duty Vehicles; Model Year 2021 Greenhouse Gas Emissions Standards (Oct. 5, 2017), Docket ID: EPA-HQ-OAR-2015-0827-9171.

cannot draft blogs, issue press releases, or release action alerts that inform our membership and enable effective outreach to policy makers about changes in EPA's technical approach that would benefit our members' interests in reducing pollution and protecting the environment. Understanding in detail why EPA is reversing its position on the appropriateness of the standards will likewise enable EDF and our members to meaningfully evaluate that reasoning and engage with policymakers – including agency officials, members of Congress, and state officials – regarding our concerns related to changes in EPA's policies that affect our lives.

### **Analysis of Technical Data is Central to EDF's Work**

16. In advocating for policies protective of public health and the environment, EDF frequently relies on the technical analyses released by federal agencies to participate in regulatory rulemakings, increase our understanding of the effectiveness of potential emissions reduction strategies in highly technical and dynamic industries, inform our communications strategy, and analyze policy decisions. Such technical analysis is central to EDF's work.

17. In preparing comments and developing white papers, EDF analyzes and evaluates technical findings rigorously, undertaking deep assessment of the data that goes beyond a generalized and widely-shared public interest in the information. To effectively participate in complex environmental regulatory rulemakings, we develop detailed comments analyzing the legal and technical evidence supporting a proposed regulation. For example, EDF, along with a coalition of environmental groups, recently filed comments on EPA's proposal to

withdraw “Control Technique Guidelines for the Oil and Gas Industry” in which EDF synthesized EPA data on exposure to ozone<sup>41</sup> and benzene<sup>42</sup> to demonstrate the harmful human health impacts of EPA’s proposed action.

18. In composing white papers, EDF engages with technical data to analyze the impacts of a proposed regulatory action. In a recent EDF white paper, EDF attorneys and policy analysts synthesized EPA air pollution data and technical analysis to quantify the potential impacts of former Administrator Pruitt’s reversal of the “once in always in” policy for major sources of air pollution.<sup>43</sup> In analyzing this and other technical data, EDF demonstrated that a reversal of this policy would have devastating human health impacts on Houston’s most vulnerable populations.<sup>44</sup>

19. EDF also frequently relies on technical data in engaging with the public and membership about proposed regulatory actions impacting human health

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<sup>41</sup> EDF, et al., Comments on the Proposed Withdrawal of the Control Techniques Guidelines for the Oil and Natural Gas Industry (Apr. 23, 2018), at 3, n.4, Docket ID: EPA-HQ-OAR-2015-0216-0630.

<sup>42</sup> EDF, et al., Comments on the Proposed Withdrawal of the Control Techniques Guidelines for the Oil and Natural Gas Industry (Apr. 23, 2018), at 5, n.23, Docket ID: EPA-HQ-OAR-2015-0216-0630.

<sup>43</sup> Thomas Carbonell, Rama Zakaria, Surbhi Sarang, Pruitt’s New Air Toxics Loophole –An Assessment of Potential Air Pollution Impact sin the Houston-Galveston Region, EDF, at 9 (Apr. 10, 2018), *available at* <https://www.edf.org/sites/default/files/documents/OIAI-Houston%20case%20study%20FINAL.pdf>

<sup>44</sup> Thomas Carbonell, Rama Zakaria & Surbhi Sarang, Pruitt’s New Air Toxics Loophole –An Assessment of Potential Air Pollution Impact sin the Houston-Galveston Region, EDF, at 9 (Apr.10, 2018), *available at* <https://www.edf.org/sites/default/files/documents/OIAI-Houston%20case%20study%20FINAL.pdf>

and the environment.<sup>45</sup> In a recent blog focusing on Hurricane Harvey and the impact of climate change on hurricane intensity, EDF relied on reports by the National Oceanic Atmospheric Administration and the National Weather Service to demonstrate the devastating impact intensifying hurricanes, like Harvey, can have on human life.<sup>46</sup>

20. Analysis of technical data is also central to EDF's transportation-related work. EDF relies on technical data in our discussions with stakeholders, including vehicle manufacturers, automotive parts suppliers and companies that operate large fleets. Agency data enables EDF and our representatives to discuss the technical feasibility of standards without having access to otherwise confidential business information. It also enables EDF and our representatives to understand specific points of disagreement, such as the efficacy or costs of specific

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<sup>45</sup> See e.g. Thomas Carbonell, *Administrator Pruitt opened the door to making Houston's air toxics problem worse*, EDF Climate 411 (Apr. 10, 2018), available at <http://blogs.edf.org/climate411/2018/04/10/administrator-pruitt-opened-the-door-to-making-houstons-air-toxics-problem-worse/>; David Lyon, *EPA Draft Says Oil & Gas Methane Emissions Are 27 Percent Higher than Earlier Estimates*, EDF Energy Exchange (Feb. 23, 2016), available at <http://blogs.edf.org/energyexchange/2016/02/23/epa-draft-says-oil-gas-methane-emissions-are-twenty-seven-percent-higher-than-earlier-estimates/>; Nichole Saunders, *Hydraulic Fracturing and the EPA Water Stud: Where Do We Go from Here?*, EDF Energy Exchange (Jul. 30, 2015), available at <http://blogs.edf.org/energyexchange/2015/07/30/hydraulic-fracturing-and-the-epa-water-study-where-do-we-go-from-here/>.

<sup>46</sup> Kate Zerrenner, *Hurricane Harvey: Climate change, staggering costs, and people at the heart of it all*, EDF Climate 411 (Feb. 21, 2018), available at <http://blogs.edf.org/climate411/2018/02/21/hurricane-harvey-climate-change-staggering-costs-and-people-at-the-heart-of-it-all/>

technologies. This level of detail is critical in developing jointly-held position statements that have been a critical component in our advocacy efforts.<sup>47</sup>

21. Throughout the MTE process, EDF has similarly relied on technical analyses to engage in the rulemaking process, develop white papers, and conduct outreach. In commenting on the Draft TAR, EDF synthesized the Draft TAR and other EPA data to offer recommendations to improve EPA's cost benefit analyses in affirming the MY 2022-25 standards.<sup>48</sup> Following release of the 2017 Final Determination, EDF supported efforts to develop a technical report on post-2025 passenger vehicle emissions reductions, which relied on EPA data in several MTE technical documents, including the Draft TAR, Proposed Determination, and 2017 Final Determination.<sup>49</sup> In response to the Revised Final Determination's promise to weaken the standards, EDF authored several blogs relying on EPA data projecting benefits of the program to quantify the resulting loss in CO<sub>2</sub> emissions

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<sup>47</sup> See e.g., Fred Krupp, *Clear rules can create better engines, clean air*, Indianapolis Star, (Oct. 28, 2010), available at <https://www.newspapers.com/newspage/126297968/> (on file with EDF); see also Jason Mathers, *EPA SmartWay and Clean Truck Standards save U.S. business millions*, EDF+ Business (Mar 2, 2017), available at <http://business.edf.org/blog/tag/pepsico>.

<sup>48</sup> EDF et al., Comment on Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022-2025, 5 (Sept. 26, 2016), Docket ID: EPA-HQ-OAR-2015-0827-4086.

<sup>49</sup> Tom Cackette & Rick Rykowski, Technical Assessment of CO<sub>2</sub> Emission Reductions for Passenger Vehicles in the Post-2025 Timeframe (Feb. 2017), available at [https://www.edf.org/sites/default/files/content/final\\_public\\_white\\_paper\\_post\\_2026\\_co2\\_reductions2.27\\_clean.pdf](https://www.edf.org/sites/default/files/content/final_public_white_paper_post_2026_co2_reductions2.27_clean.pdf).

reductions, consumer savings, and American automaker jobs.<sup>50</sup> The action alert we issued to members similarly relied on EPA data and statistics to quantify the threat of weakening the standards.<sup>51</sup>

**Without access to this information, EDF's ability to perform Detailed Analysis and to effectively pursue our Organizational Mission is Hindered**

22. In being deprived of our right to evaluate EPA data and analysis in support of the Revised Final Determination, EDF's analytical work is constrained. We recently supported efforts to develop a report on the benefits of implementing California's Advanced Clean Car Standards (State Standards) in Colorado.<sup>52</sup> This paper relied on EPA data and projections outlined in the Draft TAR because no new detailed analysis was produced by EPA in support of the Revised Final Determination. Without access to the analysis supporting the Revised Final

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<sup>50</sup> Alice Henderson, *EPA Administrator Scott Pruitt's Dirty Cars Action – By the Numbers*, EDF Climate 411 (Apr. 3, 2018), available at <http://blogs.edf.org/climate411/2018/04/03/epa-administrator-scott-pruitts-dirty-cars-action-by-the-numbers/>; Martha Roberts, Erin Murphy, *An outpouring of support for clean car standards, in the face of Pruitt's attempted rollback*, EDF Climate 411 (Apr. 6, 2018), <http://blogs.edf.org/climate411/2018/04/06/an-outpouring-of-support-for-clean-car-standards-in-the-face-of-pruitts-attempted-rollback/>; Alice Henderson, *Five things you need to know about the U.S. Clean Car Standards*, EDF Climate 411 (Apr. 30, 2018), available at <http://blogs.edf.org/climate411/2018/04/30/five-things-you-need-to-know-about-the-u-s-clean-car-standards/>.

<sup>51</sup> Action Alert, EDF, *They're Taking Aim at Our Biggest Climate Success Story* (April 2, 2018).

<sup>52</sup> Richard Rykowski, *The Benefits of Protective Advanced Clean Car Standards in Colorado* (May 2018), available at [https://www.edf.org/sites/default/files/content/The\\_Benefits\\_of\\_Protective\\_Clean\\_Car\\_Standards\\_CO.pdf](https://www.edf.org/sites/default/files/content/The_Benefits_of_Protective_Clean_Car_Standards_CO.pdf).

Determination, EDF could not critically evaluate whether we should suggest updating or revising any assumptions in the report related to the costs and benefits of a revised National Program in those states considering whether to adopt the State Standards.

23. EDF's current ability to conduct outreach, employ communications strategies, and engage in advocacy is also constrained by our inability to synthesize the technical data that purportedly supports the Revised Final Determination. EDF's communications efforts following the Revised Final Determination were substantively limited because our blogs, press releases, and action alerts could not identify any EPA data or analyses that supported EPA's reversal in position. If EDF does not have access to the data and information EPA is relying on, we cannot evaluate those sources or EPA's reliance on those sources effectively and communicate that information to our members. Without access to this detailed analysis, we are hindered in our ability to communicate with our membership.

24. EDF's ability to engage in effective and productive dialogue with industry members is harmed by the inability to analyze technical data in support of the Revised Final Determination. For example, in being deprived of this data, we cannot work as effectively with component suppliers to identify potential solutions where the agency discounted their efficacy or overstated their cost. This also undercuts our ability to undertake public accountability campaigns that demonstrate the ability of automakers to cost-effectively improve the environmental performance of the vehicle fleet.

25. EDF has made efforts to obtain supporting data ahead of the Notice of Proposed Rulemaking (NPRM) to roll back the standards<sup>53</sup> by engaging with NHTSA and EPA, but our requests for information have been routinely denied.

26. In response to the lacking data and analysis made available during the reconsideration of the 2017 Final Determination, EDF along with a coalition of non-governmental organizations sent letters to both NHTSA and EPA requesting the agencies make publically available all information regarding models and analyses informing their decision-making in revising the standards.<sup>54</sup> We have yet to receive any response from EPA, and NHTSA has yet to produce the information requested.<sup>55</sup> EDF has also sought to obtain this information—which EPA was

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<sup>53</sup> The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks, 83 Fed. Reg. 42986 (Aug. 24, 2018).

<sup>54</sup> See Letter from EDF et.al, to Heidi King, Deputy Administrator, NHTSA (Mar. 20, 2018) (on file with EDF) (EDF requested NHTSA make publically available all information regarding use of their Volpe models and other agency analysis in revising the MY 2021 and beyond standards); See Letter from EDF et.al, to William Wehrum, Assistant Administrator, EPA (Mar. 20, 2018) (on file with EDF) (EDF requested EPA make publically available all information regarding use of their Omega models and all other agency analysis in revising the MY 2021 and beyond standards).

<sup>55</sup> See e.g. Letter from Heidi King, Deputy Administrator, NHTSA, to EDF et.al (Apr. 2, 2018) (on file with EDF) (In response to EDF’s request NHTSA wrote that it “plans to release full documentation related to the Notice of Proposed Rulemaking analysis performed for the proposed rule when it is issued” denying EDF’s request that NHTSA promptly release this information to the public); see also Letter from EDF et al., to Heidi King, Deputy Administrator (May 7, 2018) (EDF responded expanding our request for information regarding “all” models, data, and analysis impacting NHTSA’s decision-making regarding the proposed fuel economy standards. We also requested that NHTSA extend the comment period to 120 days to provide the time necessary to review and synthesize this data and offer an effective response in our comments. We have yet to receive a response).

required to affirmatively disclose pursuant to its MTE regulations—from EPA through the Freedom of Information Act (FOIA).<sup>56</sup> EPA has yet to produce any documents related to these requests, and has failed to meet statutory production deadlines.

27. Without this information EDF is unable to respond as effectively to EPA's decision to revise the standards. The deprivation of this information hinders EDF's effort to submit detailed comments on the subsequent NPRM. Without the information or the time necessary to deconstruct and evaluate the models, data, and analyses supporting the Revised Final Determination, EDF is limited in our ability to draft robust comments within the limited comment period.

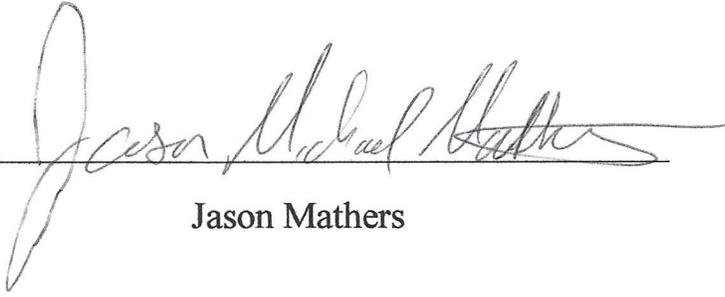
28. The MTE process outlines a binding commitment made by EPA to provide detailed information about specific aspects of the standards to facilitate public participation in any EPA decision to change standards that had been the product of constructive collaboration across a diverse range of stakeholders. The

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<sup>56</sup> See EDF, Freedom of Information Act Request for Records Related to the EPA's Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light Duty Vehicles (Apr. 16, 2018), Tracking ID: EPA-HQ-2018-007517, *available at* <https://foiaonline.regulations.gov/foia/action/public/view/request?objectId=090004d2818c38fa> (On April 4, 2016, EDF submitted a FOIA request to EPA requesting copies of all records related to the development and release of the Revised Final Determination); *see also* EDF, Freedom of Information Act Request for Records Relating to EPA Analyses of Safety in the Context of Greenhouse Gas Emissions Standards for Light-Duty Vehicles (May 9, 2018), Tracking ID: EPA-HQ-2018-007517, *available at* <https://foiaonline.regulations.gov/foia/action/public/view/request?objectId=090004d2819121ad> (On May 9, 2018, EDF submitted a FOIA Request to EPA for records related to EPA's vehicle safety data and analysis conducted in setting greenhouse gas emission standards for light-duty vehicles.).

Revised Final Determination failed to provide the information EPA committed to providing in promulgating the MTE regulations. Although the MTE regulations are intended to increase the amount of information shared with the public to facilitate discourse and participation, EDF and our members are no better off in understanding the upcoming rulemaking than they would have been absent the MTE regulations. Without the information EDF is entitled to under the MTE regulations, we cannot effectively engage with our members and advocate on behalf of human health and the environment.

I declare that the foregoing is true and correct.



Jason Mathers

Dated: August 24, 2018

XI.

Declarations of Environmental Defense Fund

5. Dr. Jeremy Michalek, Environmental Defense Fund member

## DECLARATION OF DR. JEREMY MICHALEK

I, Jeremy Michalek, declare as follows:

1. I am a Professor of Engineering and Public Policy and Professor of Mechanical Engineering at Carnegie Mellon University. I am the director of the Carnegie Mellon Design Decision Laboratory, which studies the preferences and economics that drive product design tradeoff decisions as well as the impact of those decisions on public and private stakeholders. I am also the Director of the Carnegie Mellon Vehicle Electrification Group, which studies technology, life cycle, consumer behavior, and public policy for electric and advanced vehicle technologies. I received my MS and PhD from the University of Michigan in Mechanical Engineering in 2002 and 2005, respectively.

2. I have published extensively in peer-reviewed scientific journals on automotive technology and policy and have given briefings on my light-duty vehicle policy research findings at the U.S. EPA, committees of the U.S. House of Representatives and U.S. Senate, nonpartisan groups like the Congressional Budget Office, and other federal and state government entities.

3. I am a member of the Environmental Defense Fund. My views are not necessarily representative of Carnegie Mellon University and are not provided on behalf of Carnegie Mellon University or any other organization.

### Expertise and Research Focus

4. As a professor of engineering and public policy, I engage in the study of federal policies relating to vehicles, and their implications for economics, energy, human health, and the environment. I also assess the implications of such policies for automobile manufacturers, consumers, and citizens affected by environmental impacts. Access to rigorous government data and analyses is necessary to adequately assess the technical feasibility of policy decisions that impact the auto industry. I am particularly focused on electric and advanced technology vehicles, so the regulation of greenhouse gas emissions from vehicles is highly relevant to my work.

5. In the context of light-duty vehicles, I have published research that assesses key technical and policy questions in light of the regulatory landscape. For example:

- a. M Jenn, A., I.L. Azevedo and J.J. Michalek (2018a) "U.S. alternative-fuel-vehicle policy interactions increase greenhouse gas emissions," in review, Transportation Research Part A: Policy and Practice.
- b. Ciez, R. and J.J. Michalek (2018) "Evaluating consumer risk perceptions of recycled batteries in the electric vehicle market," working paper.
- c. Helveston, J.P., I Azevedo, S. Seki, J. Min, E. Fairman, A. Boni, and J.J. Michalek (2018) "Choices at the pump: measuring consumer preferences for alternative vehicle fuels," working paper.
- d. Jenn, A., I.L. Azevedo and J.J. Michalek (2018b) "Understanding the effect of policy designs on the future light-duty vehicle fleet," working paper.

- e. Seki, S., I. Azevedo, W.M. Griffin and J.J. Michalek (2018) "Potential for cost effective ethanol fuels from natural gas: case study of Pennsylvania," working paper.
- f. Tong, F., I. Azevedo, J.J. Michalek and W.M. Griffin (2018) "Clean hydrogen supply? A review of hydrogen production pathways and use applications," working paper.
- g. Ward, J., J.J. Michalek, I. Azevedo, and C. Samaras (2018) "Effect of shared mobility services on vehicle ownership and travel patterns in the United States," working paper.
- h. Sakti, A., I.M.L. Azevedo, E.R.H. Fuchs, J.J. Michalek, K.G. Gallagher and J.F. Whitacre (2017) "Consistency and robustness of forecasting for emerging technologies: the case of Li-ion batteries for electric vehicles," *Energy Policy* v106 p415-426.
- i. Yuksel, T., S. Litster, V. Viswanathan, and J.J. Michalek (2016) "Plug-in hybrid electric vehicle LiFePO<sub>4</sub> battery life implications of thermal management, driving conditions, and regional climate" *Journal of Power Sources*, v338 n15 p49-64.
- j. Haaf, C.G., W.R. Morrow, I. Azevedo, E. Feit and J.J. Michalek (2016) "Forecasting light-duty vehicle demand using alternative-specific constants for endogeneity correction versus calibration," *Transportation Research Part B: Methodology*, v84 p182-210.
- k. Jenn, A., I.L. Azevedo and J.J. Michalek (2016) "Alternative fuel vehicle adoption increases fleet gasoline consumption and greenhouse gas emissions under United States corporate average fuel economy policy and greenhouse gas emissions standards," *Environmental Science & Technology*, v50 n5 p.2165-2174.
- l. Weis, A., P. Jaramillo and J.J. Michalek (2016) "Consequential life cycle air emissions externalities for plug-in electric vehicles in the PJM interconnection," *Environmental Research Letters*, v11 n2 024009.
- m. Yuksel, T., M. Tamayao, C. Hendrickson, I. Azevedo and J.J. Michalek (2016) "Effect of regional grid mix, driving patterns and climate on the comparative carbon footprint of electric and

- gasoline vehicles," *Environmental Research Letters*, v11 n4 044007.
- n. Helveston, J.P., Y. Liu, E. Feit, E. Fuchs, E. Klampfl, and J.J. Michalek (2015) "Will subsidies drive electric vehicle adoption? Measuring consumer preferences in the U.S. and China," *Transportation Research Part A: Policy and Practice* v73 p96-112.
  - o. Sakti, A., J.J. Michalek, E.R.H. Fuchs, and J.F. Whitacre (2015) "A techno-economic analysis and optimization of Li-ion batteries for light-duty passenger vehicle electrification," *Journal of Power Sources* v273 p966-980.
  - p. Tamayao, M., J.J. Michalek, C. Hendrickson and I. Azevedo (2015) "Regional variability and uncertainty of electric vehicle life cycle CO2 emissions across the United States," *Environmental Science & Technology*, v49 n14 p8844-8855.
  - q. Weis, A., J.J. Michalek, P. Jaramillo and R. Lueken (2015) "Emissions and cost implications of controlled electric vehicle charging in the US PJM interconnection," *Environmental Science & Technology*, v49 n9 p5813-5819.
  - r. Yuksel, T. and J.J. Michalek (2015) "Effects of regional temperature on electric vehicle efficiency, range, and emissions in the United States," *Environmental Science & Technology*, v49 n6 p3974-3980.
  - s. Haaf, C.G., J.J. Michalek, W.R. Morrow, and Y. Liu (2014) "Sensitivity of vehicle market share predictions to discrete choice model specification," *ASME Journal of Mechanical Design* v136 121402 p1-9.
  - t. Weis, A., P. Jaramillo and J.J. Michalek (2014) "Estimating the potential of controlled plug-in hybrid electric vehicle charging to reduce operational and capacity expansion costs for electric power systems with high wind penetration," *Applied Energy* v115 p190-204.
  - u. Karabasoglu, O. and J.J. Michalek (2013) "Influence of driving patterns on lifetime cost and life cycle emissions of hybrid and plug-in electric vehicle powertrains," *Energy Policy*, v60 p445-461.

- v. Peterson, S. and J.J. Michalek (2013) "Cost effectiveness of plug-in hybrid electric vehicle battery capacity and charging infrastructure investment for reducing US gasoline consumption," *Energy Policy*, v52 p429-438.
- w. Sakti, A., J.J. Michalek, S-E Chun and J.F. Whitacre (2013) "A validation study of lithium-ion cell constant C-rate discharge simulation with Battery Design Studio©," *International Journal of Energy Research*, v37 n12 p1562-1568.
- x. Traut, E., C. Cherg, C. Hendrickson, and J.J. Michalek (2013) "U.S. residential charging potential for electric vehicles," *Transportation Research Part D* v25 p139-145.
- y. Traut, E.J., C.T. Hendrickson, E. Klampfl, Y. Liu, and J.J. Michalek (2012) "Optimal design and allocation of electrified vehicles and dedicated charging infrastructure for minimum life cycle greenhouse gas emissions and cost," *Energy Policy*, v51 pp 524-534.
- z. Michalek, J.J., M. Chester, P. Jaramillo, C. Samaras, C.S. Shiau, and L. Lave (2011) "Valuation of plug-in vehicle life cycle air emissions and oil displacement benefits" *Proceedings of the National Academy of Sciences*, v108 n40 p16554-16558.
- aa. Shiau, C.-S., C. Samaras, R. Hauffe and J.J. Michalek (2009) "Impact of battery weight and charging patterns on the economic and environmental benefits of plug-in hybrid vehicles," *Energy Policy* v37 p2653-2663.
- bb. Shiau, C.-S., J.J. Michalek, and C.T. Hendrickson (2009) "A structural analysis of vehicle design responses to corporate average fuel economy policy," *Transportation Research Part A: Policy and Practice*, v43 p814-828.

6. I also participate in the policymaking process on the legislative side. I have been called on to brief members of Congress and other policymakers regarding light-duty vehicle technologies. For example:

- a. Commentary on Pennsylvania House Bill 1446 for Office of PA Representative Dan Frankel on providing transportation fueling infrastructure development (2018)

- b. Policy Briefing, U.S. House of Representatives on “When, where and which electric vehicles are green?” (2017)
- c. Policy Briefing, National Governors Association on “When, where and which electric vehicles are green?” (2017)
- d. Policy Briefing, U.S. Department of Transportation on “When, where and which electric vehicles are green?” (2017)
- e. Policy Briefing, Office of U.S. Senator Toomey on “When, where and which electric vehicles are green?” (2017)
- f. Policy Briefing, National Resources Defense Council on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2016)
- g. Policy Briefing, National Renewable Energy Laboratory on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2016)
- h. Policy Briefing, Environmental Protection Agency on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2016)
- i. Policy Briefing: California Energy Commission on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2015)
- j. Policy Briefing: California Air Resources Board on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2015)
- k. Policy Briefing: California State Senate Transportation Committee on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2015)
- l. Policy Briefing: California State Assembly Transportation Committee on “Electric Vehicle Benefits and Costs in the

United States” and “Electric Vehicle Adoption Potential in the United States” (2015)

- m. Policy Briefing: Office of State Senator Fran Pavley on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2015)
- n. Policy Briefing: California State Assembly Natural Resources Committee on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2015)
- o. Policy Briefing, Union of Concerned Scientists on “Electric Vehicle Benefits and Costs in the United States” and “Electric Vehicle Adoption Potential in the United States” (2015)
- p. Policy Briefing, U.S. Congressional Budget Office on “Air Emissions and Oil Displacement Benefits from Plug-in Vehicles” (2012)
- q. Policy Briefing, U.S. Congressional Research Service on “Air Emissions and Oil Displacement Benefits from Plug-in Vehicles” (2012)
- r. Policy Briefing, U.S. Senate Energy and Natural Resources Committee on “Air Emissions and Oil Displacement Benefits from Plug-in Vehicles” (2012)
- s. Policy Briefing, U.S. Senate Commerce, Science and Transportation Committee on “Air Emissions and Oil Displacement Benefits from Plug-in Vehicles” (2012)
- t. Policy Briefing, Office of U.S. Representative Levin on “Air Emissions and Oil Displacement Benefits from Plug-in Vehicles” (2012)
- u. Policy Briefing, National Academy of Engineering, Maxine Savitz, Vice President on “Air Emissions and Oil Displacement Benefits from Plug-in Vehicles” (2012)

- v. National Petroleum Council study on Future Transportation Fuels, Electricity Subgroup (2010-2012)
- w. Policy Briefing, U.S. House of Representatives Energy and Commerce Committee on “Economic, Environmental and Security Implications of Plug-in Vehicles” (2009)
- x. Policy Briefing, U.S. House of Representatives Committee on Science and Technology on “Economic, Environmental and Security Implications of Plug-in Vehicles” (2009)
- y. Policy Briefing, U.S. House of Representatives Select Committee on Energy Independence and Global Warming on “Economic, Environmental and Security Implications of Plug-in Vehicles” (2009)
- z. Policy Briefing, U.S. Congressional Research Service on “Economic, Environmental and Security Implications of Plug-in Vehicles” (2009)
- aa. Policy Briefing, Office of U.S. Senator Specter on “Economic, Environmental and Security Implications of Plug-in Vehicles” (2009)
- bb. Policy Briefing, Office of U.S. Representative Markey on “Economic, Environmental and Security Implications of Plug-in Vehicles” (2009)

7. It is important that the statements I make in these briefings, which influence state and federal policy decisions, are correct and supported by complete and accurate information.

**Need for EPA Data and Analysis to Participate in Regulatory  
Proceedings as a Public Stakeholder**

8. In addition to contributions to academic publications and participation in policy briefings, I also submit public comments to regulatory agencies regarding

proposed actions affecting vehicle policy. Specifically, I have been engaged with the Environmental Protection Agency and Department of Transportation's establishment of and review of light-duty greenhouse gas emission standards for MY2022-2025. For example:

- a. Whitefoot, K., J.J. Michlalek and I. Azevedo (2017) "Comment on [Docket No. NHTSA-2017-0059] Civil Penalties Rate for Violations of Corporate Average Fuel Economy Standards," U.S. Federal Register.  
<https://www.regulations.gov/document?D=NHTSA-2017-0059-0013>.
- b. Whitefoot, K., J.J. Michalek, and I. Azevedo (2017) "Comment on Docket No.: EPA-HQ-OAR-2015-0827 and NHTSA-2016-0068, Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles; and Model Year 2021 Greenhouse Gas Emissions Standards," U.S. Federal Register, <https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-10126>.
- c. Whitefoot, K., J.J. Michalek, and I. Azevedo (2016) "Comment on [Docket No.: EPA-HQ-OAR-2015-0827] Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation,"  
<https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6163>

9. Being able to assess the technical, economic, energy, environmental, and human health implications of U.S. policies including the federal light-duty vehicle corporate average fuel economy (CAFE) and greenhouse gas (GHG) emissions standards is central to my work. Thus, I have followed and analyzed the development, adoption and implementation of the Model Year (MY) 2012 -2016 (Phase 1 standards) and MY 2017 -2025 light-duty vehicle greenhouse gas

emission and CAFE standards (Phase 2 standards) by the U.S. Environmental Protection Agency and the Department of Transportation.<sup>1</sup>

10. As indicated above, I submitted comments during the public comment period for the EPA action, *Request for Comment on Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles; Request for Comment on Model Year 2021 Greenhouse Gas Emissions Standards*, 82 Fed. Reg. 39551 (Aug. 21, 2017).

11. I understand that in April 2018, without further opportunity for public comment, EPA issued *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles*, 83 Fed. Reg. 16077 (April 13, 2018) (Revised Final Determination), withdrawing the Final Determination that EPA issued in January 2017, which had determined that the standards were appropriate and did not need to be changed, *Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation*, January 2017 (EPA-420-R-17-001).

12. In contrast to the record developed to support EPA's January 2017 Final Determination, and the opportunities for public participation that led up to the issuance of that determination, in which I engaged as indicated above, EPA did

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<sup>1</sup> U.S. EPA and DOT, *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards*, 75 Fed. Reg. 25324 (May 7, 2010); U.S. EPA and DOT, *2017 and Later Model Year Light-Duty Vehicle GHG and CAFE Standards*, 77 Fed. Reg. 62,624 (Oct. 15, 2012).

not develop a similar record to support the Revised Final Determination. The lack of a substantive technical record accompanying either the Request for Comment or the Revised Final Determination limited my ability to meaningfully participate as a public stakeholder on EPA's decision that the "standards are not appropriate."<sup>2</sup> As noted in my public comment on the Request for Comment, "transparent and rigorous evidence [had] not been provided to support reducing the stringency of the standards."<sup>3</sup>

### **Need for EPA Data and Analysis in Research**

13. To conduct my research, I make use of data and analysis provided by EPA detailing the basis for the level of stringency of the standards, including information on the cost, feasibility, and effectiveness of technologies to reduce vehicle greenhouse gas emissions. I use the data and analysis in the course of performing independent research on the implications of the policy as well as its interactions with other federal, state, and local policies, technology trends, and consumer behavior.

14. For example, in one publication—Jenn, Azevedo and Michalek (2016)—my coauthors and I used and cited the Phase 1 standards, the Phase 2

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<sup>2</sup> 83 Fed. Reg. at 16077.

<sup>3</sup> Whitefoot, K., J.J. Michalek, and I. Azevedo (2017) "Comment on Docket No.: EPA-HQ-OAR-2015-0827 and NHTSA-2016-0068, <https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-10126>.

standards, and the associated Regulatory Impact Analyses to conduct our own independent analysis on the implications of alternative-fuel vehicle incentives in the standards. We are currently conducting a follow-up study, Jenn et al., 2018a,<sup>4</sup> making use of these same data and analyses to investigate the interactions of federal policy with state policy. For the follow-up study we will utilize any comparable data, analysis, interpretation, and justification for modifications to the rule.

15. As mentioned, we are currently pursuing research that extends our prior work (Jenn et al, 2018a) and continues to use and cite agency analysis and rationale. The lack of transparent and rigorous information provided by EPA in its reconsideration of the Mid-Term Evaluation (MTE) for the MY2022-2025 light-duty vehicle standards has hindered our ability to revise this ongoing research in light of the agency's apparently changed views on technology availability, effectiveness, and costs.

16. In contrast to the detailed data and analysis EPA has provided in the past, which we have drawn on to inform our research, the agency's April 2018 Revised Final Determination, which was issued after EPA took public comment on its reconsideration of the MTE, consists of only 11 pages in the Federal Register

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<sup>4</sup> Jenn, A., I.L. Azevedo and J.J. Michalek (2018a) "U.S. alternative-fuel-vehicle policy interactions increase greenhouse gas emissions," in second review, Transportation Research Part A: Policy and Practice.

and lacks substantive agency analysis.<sup>5</sup> Though EPA regulations require that the agency “set forth in detail the bases for [its] determination ..., including [EPA’s] assessment of [seven enumerated] factors,”<sup>6</sup> the Revised Final Determination refers to data and claims submitted in comments by interest groups, without substantive analysis or explanation from EPA sufficient to document the purported bases for EPA’s reversal from its prior technical conclusions.

17. In order to move forward with my research, it is useful for me and my colleagues in academia to have access to the information and analyses related to the cost, feasibility, and effectiveness of technologies to reduce greenhouse gas emissions . In order to conduct a rigorous analysis of the impact of such an action on the automotive industry, consumers, and the economy with the high quality, objectivity, relevance, and contextualization we strive for, I need to review the technology assessments, policy objectives, modeling and other data, and assumptions that contributed to the agency’s decision. Furthermore, I need to see what analysis of that information was conducted by the agency to reach a conclusion. Thus, I am harmed by EPA’s failure to disclose data and analyses related to its reconsideration of the MTE and subsequent Revised Final Determination.

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<sup>5</sup> U.S. EPA, *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles*, 72 Fed. Reg. 16077 (Apr. 13, 2018).

<sup>6</sup> 40 C.F.R., § 86.1818-12(h)(4).

18. I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 27, 2018



Jeremy Michalek

XI.

Declarations of Environmental Defense Fund

6. Dr. Kate Whitefoot, Environmental Defense Fund member

## DECLARATION OF DR. KATE WHITEFOOT

I, Kate Whitefoot, declare as follows:

1. I am an Assistant Professor of Engineering and Public Policy and Assistant Professor of Mechanical Engineering at Carnegie Mellon University. I am a Faculty Affiliate of the Carnegie Mellon Scott Institute for Energy Innovation, which works through the university's academic units to find solutions for the nation's and the world's energy challenges, including pathways to a low carbon future. I am also a member of the NextManufacturing Center for additive manufacturing research. I received my PhD from the University of Michigan in Design Science, with a concentration in mechanical engineering and economics, as well as my M.S. in Mechanical Engineering.

2. I have over 10 years of experience studying light-duty vehicle energy policies, and have given briefings on my research at the U.S. EPA and U.S. House of Representatives. My research has been featured in several major news outlets including the Washington Post, Wall Street Journal, and Businessweek.

3. I am a member of the Environmental Defense Fund. My views are not necessarily representative of Carnegie Mellon University and are not provided on behalf of Carnegie Mellon University or any other organization.

### Expertise and Research Focus

4. As a professor of engineering and public policy, I engage in the study of federal policies relating to vehicles, and their implications for economics, energy, human health, and the environment. I also assess the technical feasibility of such policies and the implications for automobile manufacturers, vehicle part suppliers, and other regulated entities. Access to rigorous government data and analyses is necessary to adequately assess the technical feasibility of policy decisions that impact the auto industry. Much of my research focuses on the influence of policies on engineering design decisions in the automotive industry, so the regulation of greenhouse gas emissions from vehicles is highly relevant to my work.

5. In the context of light-duty vehicles, I have published research that assesses key technical and policy questions in light of the regulatory landscape. For example:

- a. Yip, Arthur, Jeremy J. Michalek, and Kate S. Whitefoot. 2018. "On the Implications of Using Composite Vehicles in Choice Model Prediction." *Transportation Research: Part B*. Forthcoming.
- b. Whitefoot, Kate S., Meredith L. Fowlie, and Steven J. Skerlos. 2017. "Compliance by Design: Influence of Acceleration Trade-Offs on CO2 Emissions and Costs of Fuel Economy and Greenhouse Gas Regulations." *Environmental Science & Technology* 51 (18): 10307–15.
- c. Whitefoot, Kate S., and Steven J. Skerlos. 2012. "Design Incentives to Increase Vehicle Size Created from the US

Footprint-Based Fuel Economy Standards.” *Energy Policy* 41: 402–11.

- d. Whitefoot, Kate S., Hilary G. Grimes-Casey, Carol E. Girata, W. Ross Morrow, James J. Winebrake, Gregory A. Keoleian, and Steven J. Skerlos. 2011. “Consequential Life Cycle Assessment with Market-driven Design.” *Journal of Industrial Ecology* 15 (5): 726–42.
- e. Whitefoot, Kate S. 2011. “Quantifying the Impact of Environmental Policy on Engineering Design Decisions.” PhD Dissertation. University of Michigan.

6. In addition to contributions to academic publications, I also submit public comments to regulatory agencies regarding proposed actions affecting vehicle policy. Specifically, I have been engaged with the Environmental Protection Agency and Department of Transportation’s establishment of and review of light-duty greenhouse gas emission standards for MY2022-2025. For example:

- a. Whitefoot, K., J.J. Michlalek and I. Azevedo (2017) “Comment on [Docket No. NHTSA-2017-0059] Civil Penalties Rate for Violations of Corporate Average Fuel Economy Standards,” U.S. Federal Register. <https://www.regulations.gov/document?D=NHTSA-2017-0059-0013>.
- b. Whitefoot, K., J.J. Michalek, and I. Azevedo (2017) “Comment on Docket No.: EPA-HQ-OAR-2015-0827 and NHTSA-2016-0068 Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles; and Model Year 2021 Greenhouse Gas Emissions Standards,” U.S. Federal Register, <https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-10126>.

- c. Whitefoot, K., J.J. Michalek, and I. Azevedo (2016) "Comment on [Docket No.: EPA-HQ-OAR-2015-0827] Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation,"  
<https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6163>.

7. I also participate in regular briefings and seminars informing policymakers, NGOs, and policy research groups about light-duty vehicle technologies. For example:

- a. "Compliance by Design: Acceleration Tradeoffs on CO2 Emissions and Costs of Fuel Economy and Greenhouse Gas Regulations," Energy Policy Institute at University of Chicago Seminar Series, Chicago, IL, February 14, 2017.
- b. Policy Briefing, U.S. Senate Commerce, Science and Transportation Committee, 2015.
- c. Policy Briefing, U.S. Department of Commerce, 2015.
- d. "Discussion of the Economics of Attribute-Based Regulation: Theory and Evidence from Fuel-Economy Standards," National Tax Association Spring Symposium (Session on Energy Policy), Washington, DC, May 15, 2014.
- e. "Product design and market responses to footprint-based fuel economy standards," Resources for the Future Workshop on Identifying Research Priorities for the Midterm Review of US Light Duty Vehicle Fuel Economy and Greenhouse Gas Emissions Rate Standards, Washington, DC, December 17, 2013.
- f. Policy Briefing, Environmental Protection Agency, Office of Transportation and Air Quality, Ann Arbor, MI, July 29, 2010.

8. It is very important that the statements I make in these briefings and seminars, which influence the decisions of policy actors, are correct and supported by complete and accurate information.

### **Need for EPA Data and Analysis in Research**

9. In order to conduct my research, as catalogued above, it is necessary that I have access to the information and analysis that forms the basis for and justifies government decisions and policy choices related to the transportation sector. Being able to assess the technical, economic, energy, environmental, and human health implications of U.S. policies including the federal light-duty vehicle corporate average fuel economy (CAFE) and greenhouse gas (GHG) emissions standards is central to my work. Thus, I have closely followed and analyzed the development, adoption and implementation of the Model Year (MY) 2012 -2016 (Phase 1 standards) and MY 2017 -2025 light-duty vehicle greenhouse gas emission and CAFE standards (Phase 2 standards) by the U.S. Environmental Protection Agency and the Department of Transportation.<sup>1</sup> To conduct this research, I make use of data and analysis provided by EPA detailing the basis for the level of stringency of the standards, including information on the cost,

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<sup>1</sup> U.S. EPA and DOT, *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards*, 75 Fed. Reg. 25324 (May 7, 2010); U.S. EPA and DOT, *2017 and Later Model Year Light-Duty Vehicle GHG and CAFE Standards*, 77 Fed. Reg. 62,624 (Oct. 15, 2012).

feasibility, and effectiveness of technologies to reduce vehicle greenhouse gas emissions. I use the data and analysis in the course of performing independent research on the implications of the policy as well as its interactions with other federal, state, and local policies, technology trends, and consumer behavior.

10. For example, in one publication, Whitefoot et al. (2017),<sup>2</sup> we assessed the assumptions made by the agency, the estimates calculated by the agency, and the methods of analysis employed by the agency in the Phase 1 Standards, Phase 2 Standards, and the joint technical support document for the MY2017-2025 standards.<sup>3</sup> Without question, it was crucial to our research that we had access to those assumptions, estimates, and methodologies underlying the agency's emission standards. We used and referenced the Phase 1 and Phase 2 standards, and the joint technical support document supporting EPA's 2016 Proposed Determination,<sup>4</sup> to conduct our independent analysis of the influence of the regulations on GHG

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<sup>2</sup> Whitefoot, Kate S., Meredith L. Fowlie, and Steven J. Skerlos. 2017. "Compliance by Design: Influence of Acceleration Trade-Offs on CO2 Emissions and Costs of Fuel Economy and Greenhouse Gas Regulations." *Environmental Science & Technology* 51 (18): 10307–15.

<sup>3</sup> *Supra* n. 1; U.S. EPA and DOT, Joint Technical Support Document: Final Rulemaking for 2017-2025 Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards (Aug. 2012), [https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/joint\\_final\\_tsd.pdf](https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/joint_final_tsd.pdf).

<sup>4</sup> Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation: Technical Support Document (November 2016), available at <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100Q3L4.pdf>.

emissions, producer profits, and consumer surplus. In this analysis, we modeled automakers' adoption of various combinations of technologies and other engineering design decisions to comply with the standards. We use information from EPA to inform our specification of the types of technologies that are available to automakers to comply with the standards, the impact the technologies have on fuel economy and GHG emissions, and the costs of incorporating these technologies into their vehicles. While estimates of some of these factors are provided by other organizations<sup>5</sup>, it is generally important for us to have access to EPA's assessment of the accuracy of these estimates because EPA often has access to proprietary information from the industry.

11. We are currently beginning research that extends our prior work (Whitefoot et al., 2017). The lack of transparent and rigorous information provided by EPA in its reconsideration of the Mid-Term Evaluation (MTE) for the MY2022-2025 light-duty vehicle standards stunts our ability to revise this ongoing research in light of the agency's apparently changed views on technology availability, effectiveness, and costs.

12. In contrast to the detailed data and analysis EPA has provided in the past, which we have drawn on to inform our research, the agency's April 2018

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<sup>5</sup> See, e.g., National Research Council. (2015) *Cost, Effectiveness and Deployment of Fuel Economy Technologies for Light-Duty Vehicles*. The National Academies Press.

Final Determination reversing an earlier determination that the Phase 2 standards remain appropriate and do not need to be changed (Revised Final Determination), which was issued after EPA took public comment on its reconsideration of the MTE, consists of only 11 pages in the Federal Register and lacks substantive agency analysis.<sup>6</sup> Though EPA regulations require that the agency “set forth in detail the bases for [its] determination . . . , including [EPA’s] assessment of [seven enumerated] factors,”<sup>7</sup> the Revised Final Determination refers to data and claims submitted in comments by interest groups, without substantive analysis or explanation from EPA sufficient to document the purported bases for EPA’s reversal from its prior technical conclusions. While the Proposed Rule issued subsequent to the Final Determination provides further analysis, it also lacks transparent and rigorous information that is necessary to understand EPA’s determination.

13. In order to conduct my research rigorously with consideration of the most up-to-date information, it is important for me and my colleagues in academia to have access to the information and analyses related to the cost, feasibility, and effectiveness of technologies to reduce greenhouse gas emissions, which was required by regulation to be (but was not) included in former Administrator Pruitt’s

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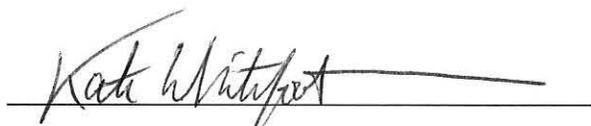
<sup>6</sup> U.S. EPA, *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles*, 72 Fed. Reg. 16077 (Apr. 13, 2018).

<sup>7</sup> 40 C.F.R. § 86.1818-12(h)(4).

Revised Final Determination concluding that the existing MY2022-2025 standards should be rolled back. In order to conduct a rigorous analysis of the impact of such an action on the automotive industry, consumers, and the economy, I need to review the technology assessments, policy objectives, modeling and other data, and assumptions about consumer behavior that contributed to the agency's decision. Furthermore, I need to see what analysis of that information was conducted by the agency to reach a conclusion. Thus, I am harmed by EPA's failure to disclose data and analyses related to its reconsideration of the MTE and subsequent Revised Final Determination.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 27, 2018

  
Kate Whitefoot

XI.

Declarations of Environmental Defense Fund

7. Kate Zalzal, Environmental Defense Fund member

## DECLARATION OF KATE ZALZAL

I, Kate Zalzal, declare as follows:

1. I am a member of the Environmental Defense Fund (EDF) and have been a member since 2012.
2. I reside in the town of Lyons, Colorado with my husband and three children.
3. I drive a 2006 Toyota 4Runner, and I am in the market to replace this vehicle. I am hoping to purchase a new car within the next year because my car has not been running smoothly, no longer meets the needs of my family, and no longer contains the attributes we desire in a vehicle. Our family also has a second vehicle, purchased before we had children, that no longer fits our whole family and so it is likely that we will have to replace that vehicle within the next five years as well.
4. We recently welcomed our youngest child to the family in January 2018, and as a mother of three, I need a car that will fit myself, my husband, and all of our children. I also use my vehicle for a variety of purposes that often require me to transport multiple passengers. One of my children attends dance classes, the other plays on a soccer team and goes to practices, and in the summer both of my older children participate in summer camps. I drive our kids to these activities and often participate in carpools with other families who likewise have children in these activities.

5. My family also travels around the Colorado mountains in the summertime and wintertime for camping trips and other vacation activities. We regularly visit my parents, who live in the mountains between Lyons and Estes Park. Driving to these places makes four-wheel drive, all-wheel drive, or other similar features valuable during both the summer and winter.

6. One of my highest priorities in shopping for a new car is high fuel efficiency. Because I often have to drive to surrounding towns, it is important for me to save on fuel costs by driving a car that gets better mileage than my current vehicle, which has a combined city / highway rating of only 17 miles per gallon. I am also concerned about the climate pollution emitted by passenger vehicles, and it is important to me to own a car that releases fewer of these harmful emissions.

7. In light of these vehicle capabilities and attributes that are important to me and my family, I am planning to purchase a minivan, larger SUV, or similar vehicle. My objective is to find a vehicle with high fuel efficiency that will comfortably fit my family and allow us to travel in the mountains during both the summer and the winter.

8. Since I started shopping for a new car, I have realized that there are not many options for minivans or large SUVs with high fuel economy. For instance, the fuel economy of the 4Runner has not improved significantly from Model Year 2006 to the current version. I have considered purchasing a plug-in-hybrid electric

vehicle. However, there is only one plug-in hybrid minivan currently available on the market—the Chrysler Pacifica—and it is not available with four-wheel or all-wheel drive. My husband and I have even discussed purchasing a truck—which is not a vehicle that I am otherwise interested in driving—because, at least one truck—the Ford F-150—can fit our family, offers four-wheel drive, and is equipped with some fuel-saving and greenhouse gas reducing technologies. While the F-150 delivers better fuel economy and fewer emissions than our current vehicle, it is not nearly as efficient as the Pacifica and is less maneuverable with no additional seating for friends and family.

9. The lack of choice of vehicles that meet all of our family's needs—passenger capacity, fuel economy, decreased air pollution, and all-weather capabilities—limits my options as a consumer and means that it is likely I will be forced to purchase a vehicle that compromises on some of the attributes that are important to me and my family.

10. I am aware that the Environmental Protection Agency and the National Highway Traffic Safety Administration have adopted Clean Car Standards, which require automakers to reduce greenhouse gas emissions and improve the fuel efficiency of new vehicles sold in the United States. I understand that these standards are based on a vehicle's "footprint," meaning that for each class of

vehicles—including those we are considering purchasing—the standards require emission reductions and improvements in fuel economy over time.

11. I am aware that during 2015-17, the Environmental Protection Agency conducted a Mid-Term Evaluation of the Clean Car Standards for Model Year (MY) 2022-2025 vehicles, and the agency concluded that the strong standards should remain in place and are achievable by automakers. I am aware that former EPA Administrator Scott Pruitt reconsidered that finding, and that in April 2018 he issued a Revised Final Determination concluding that the Clean Car Standards are “not appropriate,”<sup>1</sup> and announced that EPA would “roll back” the existing standards.<sup>2</sup> Additionally, I am aware that EPA and NHTSA recently issued a proposal that would significantly weaken the requirements for MY 2021-2026 vehicles, so that fuel economy and climate pollution controls would not necessarily improve during that time.<sup>3</sup>

12. I understand that the current greenhouse gas emission standards for light-duty vehicles require automakers to achieve significant improvements during the

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<sup>1</sup> EPA, *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-duty Vehicles*, 83 Fed. Reg. 16077 (Apr. 13, 2018).

<sup>2</sup> Scott Pruitt (@EPAScottPruitt), TWITTER (Apr. 3, 2018, 11:39 AM), <https://web.archive.org/web/20180608153304/https://twitter.com/epascottpruitt/status/981239876971565056>.

<sup>3</sup> EPA & NHTSA, Proposed Rule: *The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks*, 83 Fed. Reg. 42986 (Aug. 24, 2018).

MY 2022-2025 period. As I look to purchase a new vehicle in the next year and likely replace our family's other, smaller car in the next five years, my priority is to find vehicles that comfortably hold our family, while achieving high fuel economy and low greenhouse gas emissions. I am concerned that former Administrator Pruitt's action, determining that Clean Car Standards in the 2022-25 timeframe are no longer appropriate, will lead to a weakening of the standards, further limiting the availability of an already limited selection of vehicles that meet my and my family's needs.

13.I declare that the foregoing is true and correct.

Executed August 28, 2018

  
Kate Zalzal

XII.

Declaration of Natural Resources Defense Council

1. Luke Tonachel, Director of the Clean Vehicles and Fuels Project, Natural Resources Defense Council

**UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA**

CENTER FOR BIOLOGICAL  
DIVERSITY., *et al.*,

Petitioners,

v.

UNITED STATES  
ENVIRONMENTAL PROTECTION  
AGENCY,

Respondent.

Case No. 18-1139 (consolidated with cases  
18-1114, 18-1118, 18-1162)

**DECLARATION OF LUKE TONACHEL**

I, Luke Tonachel, state and declare as follows:

1. I am the Director of the Clean Vehicles and Fuels project at the Natural Resources Defense Council (NRDC). I have been employed by NRDC for the past fourteen years. I have personal knowledge of the subject matter of this declaration and, if called as a witness, could and would competently testify as to its contents.

2. I received my Bachelor of Science Degree in Mechanical Engineering from the University of Rochester and my Master of Public Policy Degree from the University of California, Berkeley.

3. I have extensive professional experience working on clean transportation policies at the state and federal level. I have provided detailed technical comments on clean and efficient vehicle regulatory policies,

through proceedings conducted by the Environmental Protection Agency and the National Highway Traffic Safety Administration, as well as at state environmental and utility regulatory agencies. I have conducted detailed analyses of environmental and economic impacts to support comments and testimony before various agencies, and have been a lead author of recent reports including *Supplying Ingenuity II: U.S. Suppliers of Key Clean, Fuel-Efficient Vehicle Technologies* by NRDC and the BlueGreen Alliance, and the *Environmental Assessment of a Full Electric Transportation Portfolio* by NRDC and the Electric Power Research Institute.

4. For decades, a core part of NRDC's work has been decarbonizing and cleaning up transportation sector emissions, through pushing for stronger carbon emission and fuel-economy standards in passenger vehicles and trucks, promoting policies encouraging the adoption of electric vehicles, and advocating for cleaner fuels. Our staff relies on various tools to achieve these goals, ranging from education and advocacy at the state and federal level to litigation.

5. Ensuring strong vehicle greenhouse gas emission standards is an essential part of our work to reduce reliance on petroleum and associated pollution, and to slow climate change. We were key litigants in *Massachusetts v. Environmental Protection Agency*, which affirmed EPA's obligation to regulate greenhouse gas emissions from motor vehicles. We have also been active participants in past EPA rulemakings to develop vehicle greenhouse

gas emission standards, including the following proceedings: *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2012-2016* (Docket No. EPA-HQ-OAR-2009-0472; NHTSA-2009-0059); and *2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards* (Docket No. EPA-HQ-OAR-2010-0799/NHTSA-2010-0131).

6. We supported EPA's Final Determination, issued in January 2017, which concluded that EPA's vehicle greenhouse gas emission standards for model years 2022 to 2025 remained appropriate. The Final Determination was based on years of extensive technical analysis by EPA, including a Technical Assessment Report, which conducted a detailed study of the technology feasibility, manufacturer and consumer costs, pollution benefits, and other factors justifying the standards for model years 2022 to 2025. The Final Determination carefully explained the basis for EPA's conclusion, and covered all the factors required by EPA regulations. In addition, EPA provided ample time for public comment on the Technical Assessment Report and proposed Final Determination, which allowed NRDC time to review supporting technical materials and submit detailed comments.

7. EPA's Revised Final Determination, issued in April 2018, fails to provide the information required by EPA's regulations, which would allow NRDC to fully analyze and comment on EPA's Revised Final Determination and proposal to revise vehicle greenhouse gas emission standards. EPA's

failure to provide the required information includes: failure to provide an updated Technical Assessment Report, or similarly detailed document providing the technical, economic, and environmental basis for EPA's Revised Determination, failure to provide a detailed explanation in the Final Determination covering each of the factors required by EPA's regulations, and failure to supply the new information that warrants EPA's Revised Final Determination.

8. NRDC needs this information for multiple purposes. First, NRDC needs this information in order to conduct a thorough analysis of EPA's Revised Final Determination and EPA's proposed vehicle greenhouse gas emission standards. With our decades of expertise advocating for strong vehicle emissions standards and for the reduction of climate pollution, and with our in-house technical staff and affiliated technical consultants, we are in a unique position to provide detailed technical comments on EPA's regulatory actions regarding vehicle emissions standards, and to push for standards that adequately protect the environment and residents of the United States. We have been able to provide such comments in past proceedings related to vehicle emissions standards. Without the full set of information and opportunity for public comment that is required by EPA's Midterm Evaluation process, it is more difficult to complete our work. If EPA supplies the required information, we can better evaluate the technical, economic, environmental, and other assumptions underlying their proposed

regulatory changes, and can provide better informed and detailed technical comments. Further, because we do not know the full set of information EPA considered in making its Revised Final Determination, we are unable to make a meaningful comparison with the information EPA relies upon in its proposal to rollback clean car standards, or to determine whether the rollback proposal relies on the same information.

9. We also work to advocate for a cleaner transportation sector in other governmental and non-governmental forums. The information and analysis that EPA has failed to disclose may be important to this work as well.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. Executed on August 28, 2018, in New York, New York.



Luke Tonachel

XIII.

Declarations of Public Citizen

1. Joan Claybrook, member, former President, and current member of Board of Directors of Public Citizen



within the regulatory authority of the National Highway Traffic Safety Administration, such as fuel economy and motor vehicle safety. Public Citizen's organizational mission includes advocating for the interests of its members in the availability of clean, safe, and economical motor vehicles.

3. As a member of Public Citizen, I personally share those interests. I have owned an automobile through much of my adult life, and like many other members of Public Citizen, I periodically replace my vehicle. Public Citizen has tens of thousands of members nationwide, and a great many of them purchase new automobiles in any given year.

4. My current car will be nearing the end of its useful life by the early 2020s, and I expect to replace it with a new vehicle in the period covered by the automakers' model years 2022 to 2025.

5. When purchasing a new vehicle, it is important to me as an environmentally responsible consumer concerned about effects of global warming to be able to select one that produces relatively low emissions of greenhouse gases. Such low-emission vehicles are also beneficial to me as a consumer because they tend to achieve emissions reductions in

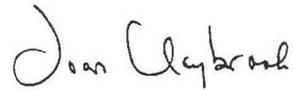
part through increased fuel efficiency, and they are therefore less expensive to operate.

6. The current EPA emissions standards require substantial decreases in greenhouse gas emissions for model years 2022 to 2025 and thus will require automakers to provide a wider range of lower emission vehicles than they would without those standards in place. The existing standards protect my interest, and the interests of thousands of other Public Citizen members, in the availability of a broad selection of low-emission vehicles during those model years.

7. EPA's issuance of a new "mid-term evaluation" finding the existing standards are not "appropriate" because they require too much reduction in emissions threatens the protection of my interests provided by the existing standards. The revision of the standards that EPA's action makes possible would allow automakers to produce a mix of vehicles including more higher-emission and fewer lower-emission vehicles. That would directly affect my interests, and cause me injury, by reducing my ability to choose from among a broad range of low-emission vehicles when I purchase a new car. Many other Public Citizen members are threatened with injury in the same way by EPA's action.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 29, 2018.



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Joan Claybrook

XIII.

Declarations of Public Citizen

2. Christopher Fleming, Public Citizen member

IN THE UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT

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CENTER FOR BIOLOGICAL		)
DIVERSITY, et al.,		)
		)
	Petitioners,	)
		)
	v.	)
		)
		)
UNITED STATES ENVIRONMENTAL		)
PROTECTION AGENCY,		)
		)
	Respondent.	)
<hr/>		)

No. 18-1139

**DECLARATION OF CHRISTOPHER FLEMING**

1. My name is Christopher Fleming. I am a member of Public Citizen, Inc.

2. I am a member of Public Citizen because I support its efforts to advocate for consumer interests, including interests in products that protect people and the environment and save consumers money.

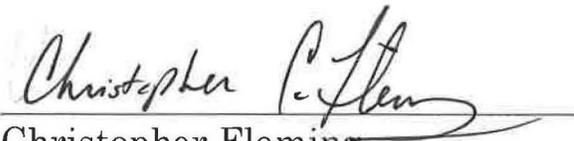
3. My wife and I currently have a 2011 model car that we expect to give to our son, who is now 13, when he is old enough to drive on his own. As a result, we expect to replace that car with a new vehicle sometime in the fall of 2021 or in the next few years after that.

4. When buying a new car, it is important to my family that we choose one that is environmentally friendly and that has lower emissions of greenhouse gases that contribute to global warming. It is also important to us to have a car that gets good gas mileage so that we have to refill it less often and spend less at the pump. When we purchase our next vehicle, we would like a broad range of choices of cars with low emissions and good gas mileage.

5. I believe that government rules that require auto companies to sell lower-emission, higher-mileage vehicles protect my interest in having a wide range of choices of those vehicles when the time comes to buy our new car. For the same reason, rolling back those rules will harm me by limiting my choice of low-emitting, high mileage cars.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on August 28, 2018.

  
Christopher Fleming

XIV.

Declarations of Sierra Club

1. Francis Blake, Sierra Club member

**DECLARATION OF FRANCIS BLAKE**

I, Francis Blake, declare as follows:

1. I live in Houston, Texas, in Harris County. I have lived in Harris County for over 37 years.
2. I am a member of the Sierra Club and have been since 1985. I have held various volunteer leadership positions within Sierra Club at the group and chapter level. I currently serve as the Outings Chair for the Sierra Club Lone Star Chapter's Houston Regional Group.
3. I enjoy engaging in outdoor activities such as biking, walking, hiking, bird watching, and leading Sierra Club outings. I regularly bicycle in the city to do errands and for recreation, and I periodically lead bicycle tours for Sierra Club. I walk outdoors daily, including to Buffalo Bayou Park approximately three to four times a week for personal recreation. I normally lead, approximately, one to two outings per month for Sierra Club, as well as seasonal camping weekends. Destinations for our Sierra Club outings include city and regional parks, and nearby public lands in and around Harris County. During outings we hike, conduct nature education, or work on service projects such as prairie restoration or coastal beach clean ups. I plan to continue engaging in these

outdoor activities in the future. Getting outdoors is extremely important to me and is essential to my wellbeing.

4. I have asthma. I was diagnosed with asthma in approximately 2001.

Throughout the year, I regularly use preventative medication to control my asthma. My asthma has impaired my breathing capacity, and, because of this, I can no longer run like I used to. On some days, poor air quality conditions can even make walking at a fast pace or bike riding difficult for me. Such conditions aggravate my asthma, and force me to limit my outdoor activities, even when I do not want to.

5. Through my involvement with Sierra Club and because of my breathing problems, I am aware that ozone can cause serious health problems, including irritation of the airways, coughing, difficulty breathing, inflammation, increased susceptibility to respiratory illnesses like pneumonia and bronchitis, and permanent lung damage. I am also aware that ozone can affect people with asthma by aggravating this condition. According to the Environmental Protection Agency (EPA), people with asthma, like me, are among the most likely to be adversely affected by ozone pollution. I know that Harris County, Texas is a nonattainment county for ozone under the National Ambient Air Quality Standards, meaning that the ozone levels here are unsafe for my health.

6. Houston's poor air quality impairs my ability to enjoy the outdoors like I want to. I can often tell when ozone levels are elevated as my airways feel more constricted and my breathing becomes more shallow and labored, thereby limiting my oxygen intake and my activity level. I also receive air pollution alerts from my local television and radio stations, as well as their respective websites. When there are severe pollution alerts for ozone, I must take extra precautions in preparing for the day. If I have outdoor activities planned, I prepare by, for example, taking medication earlier than usual, taking a dose more frequently than usual, and ensuring that I take my medication before I go outside. Sometimes, when the air pollution alerts say that the air quality is particularly bad, I am forced to limit my outdoor activities. Houston's poor air quality also forces me and Medicare to spend more money on the medication and medical treatment that I need to control my asthma. I already use strong preventative asthma medication and have had to change medications in the past when they proved inadequate.

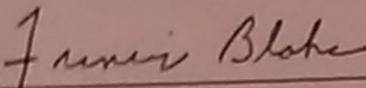
7. I understand that the transportation industry is a major cause of this dangerous pollution due to the diesel and gasoline combusted by vehicles. This pollution stems in part from fuel production at oil refineries, and I am aware that there are many refineries in Harris County. In addition, according to EPA, the transportation sector is one of the largest emitter of greenhouse gas pollution

that endangers our climate and causes more frequent and severe weather events every year, as well as worsens ozone pollution.

8. I am aware that EPA has issued a decision that the light-duty vehicle regulations issued during the Obama administration to reduce this pollution are no longer appropriate and are going to be rolled-back. I am extremely concerned that weakening these regulations will increase greenhouse gas emissions and ground-level ozone, which will make Houston's air quality worse. If that happens, I am concerned that my asthma will become aggravated with greater intensity and frequency. This will force me to further limit my outdoor activities and to spend more money on medication.
9. I support Sierra Club's lawsuit challenging the EPA's decision that the emission standards for light-duty vehicles issued during the Obama administration are no longer appropriate and need to be revised. I am worried that, if the standards are weakened, these EPA actions will allow the amount of ozone in the air to increase. If the amount of ozone in the air increases, my asthma symptoms will worsen and my well-being will deteriorate.

I declare, under penalty of perjury, that the foregoing is true and correct.

Dated: August 26, 2018.

  
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Francis Blake

XIV.

Declarations of Sierra Club

2. Dr. Dolores Leonard, Sierra Club member

**DECLARATION OF DR. DOLORES V. LEONARD**

I, Dr. Dolores V. Leonard, declare as follows:

1. I am a member of Sierra Club, which I joined in 2005 to help with their work on environmental justice. After joining, I volunteered for Sierra Club's Committee on Environmental Justice in its Detroit office, where I conducted research, edited a quarterly newsletter, and helped review permits and draft comments, among other things. As a result of this work, I am familiar with health, environmental, and equity issues in Detroit and the nation.
2. I live in Detroit in zip code 48217 in Wayne County, Michigan. I have lived at my current residence since 1957.
3. My house is surrounded by industrial facilities that emit high amounts of pollution. Wayne County is home to oil refineries, steel mills, and other industrial facilities. I live one mile from the Marathon Detroit HOUP oil refinery. Many of these facilities are located across the street from people's homes and are also close to public schools.
4. I also live close to major highways, including about a half-mile from the I-75, a major north to south interstate highway. Vehicles on these highways and the gas stations that distribute the fuel that power these cars emit soot, as well as other pollution that turns into soot and smog. The air around my house is highly polluted on a regular basis also as a result of high traffic levels in Wayne County.

5. I have asthma, for which I regularly use an inhaler and take medication when my symptoms worsen. I regularly check the news for ozone levels, and refrain from spending time outdoors when air quality is bad. Due to poor air quality, I rarely open the windows of my house. I have to use a central air system, which I do not like, to help with air circulation and to manage my respiratory problems. I have flower and vegetable gardens, but do not tend to them as much as I would like to because I am concerned about air pollution.

6. I also frequently smell foul odors in my neighborhood, which I believe are primarily due to all of the air pollution in the area that is caused by industry and cars on the highways. The smell of kerosene and rotten eggs discourages me from spending time outdoors. The odors are especially strong when driving on the I-75. The stench fills my car, even when the windows are closed, and can linger for days.

7. Zip code 48217—the most polluted zip code in Michigan—is a predominately African American community. Growing up in the Detroit area, I am well aware that communities of color and low-income communities are disproportionately harmed by the health effects of air pollution and emissions from the transportation sector, which is the largest emitter of greenhouse gases in the United States. Wayne County has the highest number of pediatric asthma cases in the state, as well as the highest population living in poverty.

8. I also understand that low-income communities and communities of color, like the community where I live, are disproportionately vulnerable to the threat of climate change. Scientists have estimated that climate change will have large impacts on the Great Lakes region, and there are several cities in this region, including Detroit, which will experience more extreme heat events that will cause myriad health effects, including premature deaths, from climate change. Due to a lack of economic resources and proper healthcare, these communities will be less prepared than others to adapt to climate-related impacts. As climate change worsens, these communities will also bear the burden of spending higher proportions of their income as a result of rising food prices, water scarcity, and increasingly prevalent health issues.

9. I understand that the transportation sector emits more of the country's greenhouse gas emissions than any other sector, making it the largest source of climate pollution. I understand that reducing greenhouse gas emissions will help curb climate change and climate change-related health risks.

10. I am also aware that vehicles and the process of producing fuel for vehicles emits substantial amounts of other harmful air pollution that have significant impacts on human health. I understand that sulfur dioxide and particulate matter pollution from refineries and vehicles can penetrate deep into the lungs and are linked to a range of respiratory problems, including bronchitis and asthma.

Sulfur dioxide can also aggravate existing heart disease, and lead to increased hospitalizations and premature deaths. Researchers have documented numerous deaths, heart attacks, asthma attacks, and other harmful effects from particulate matter pollution, including in my community. I also understand that nitrogen oxides and greenhouse gases contribute to formation of ozone, which also causes respiratory illnesses and premature deaths from heart and lung disease.

11. I understand that the Environmental Protection Agency's (EPA) decision that the emission standards for light-duty vehicles issued during the Obama administration are no longer appropriate will lead to weaker standards—and that will worsen air quality, both in my community and beyond. Because I am over the age of 65 and have asthma, I am more vulnerable to the harmful impacts of air pollution and emissions from vehicles that would result from this regulatory rollback.

12. I am aware that increasing temperatures from extreme heat events can prolong the allergy season and worsen asthma and other respiratory illnesses. I understand that children and the elderly are among the most vulnerable to these climate-related health effects. I am very concerned about the impacts of rolling back the light-duty vehicle standards on my health, the health of my great-grandson, and the health of my community.

13. I understand that sulfur dioxide, nitrogen oxide, and particulate matter pollution from refineries and from vehicles driving the roads, in addition to climate-related changes in air quality due to their greenhouse gas emissions, harm my health, and the health of my family and community. I worry about the negative impacts of continued exposure to poor air quality if the changes to the light-duty vehicle standards worsen air quality.

14. I support Sierra Club's lawsuit challenging the EPA's decision that the emission standards for light-duty vehicles issued during the Obama administration are no longer appropriate and need to be redone. With weaker standards, I worry that my asthma will worsen and my health will be adversely affected. Increased carbon emissions, as well as particulate matter, sulfur dioxide, and nitrogen oxides, will harm my health and wellbeing, as well as my family's health and wellbeing. On the other hand, if the Obama-era standards remain in place, I will benefit from reduced air pollution and improved health.

I declare, under penalty of perjury, that the foregoing is true and correct.

Executed on August 27 2018.

  
Dolores V. Leonard, Ed.D., NCC, LPC

XIV.

Declarations of Sierra Club

3. Andrew Linhardt, Deputy Advocacy Director of the Clean Transportation for All Campaign, Sierra Club

## DECLARATION OF ANDREW LINHARDT

I, Andrew Linhardt, declare as follows:

1. I am the Deputy Advocacy Director of the Sierra Club Clean Transportation for All Campaign. I previously held the positions of Legislative Director for Transportation and Associate Director for Legislative and Administrative Advocacy at Sierra Club.

2. In my current role, I manage and coordinate Sierra Club's policies and efforts on behalf of its members to advocate for greenhouse gas reductions and greater fuel efficiency from our nation's fleet. While at Sierra Club, I have worked on numerous matters involving the Environmental Protection Agency's (EPA) greenhouse gas regulations and the National Highway Traffic Safety Administration's (NHTSA) corporate average fuel (CAFE) standards for light-duty and heavy-duty vehicles. My position requires me to be familiar with Sierra Club's purpose and mission, its activities relating to motor vehicles and to air quality (among other things), and the nature and scope of its membership.

3. Sierra Club is a non-profit membership organization incorporated under the laws of the State of California, with its principal place of business in Oakland. Sierra Club's mission is to explore, enjoy and protect the wild places of the Earth; to practice and promote the responsible use of the Earth's resources and ecosystems; to educate and enlist humanity to protect and restore the quality of the

natural and human environment; and to use all lawful means to carry out these objectives.

4. Sierra Club has 784,231 members, according to data last updated in July, 2018. Sierra Club has members who reside in every state and the District of Columbia. These include members living in close proximity to heavily-traveled highways as well as refineries that process the oil powering the vehicles that drive these busy highways. They also include members in states and counties that have been designated non-attainment for ozone and particulate matter, pollution that is caused by vehicles, among other sources. These members have a strong interest in protecting human health and the environment from the air pollution emitted by the transportation sector.

5. As part of carrying out its mission, for decades the Sierra Club has used the traditional tools of advocacy--organizing, lobbying, litigation, and public outreach—to push for policies that decrease air and climate pollution and reduce our nation's dependence on fossil fuels. Sierra Club has a long history of involvement in vehicle regulations aimed at reducing pollution and lessening our dependence on oil as a transportation fuel.

6. Sierra Club has long advocated for climate regulations for vehicles. In 2002, Sierra Club and other organizations filed a lawsuit against EPA asking the agency to regulate greenhouse gases from motor vehicles. EPA settled that lawsuit

and denied the petition in 2003, on the grounds that the agency lacked authority to do so. Sierra Club and numerous states and environmental organizations challenged that denial, ultimately leading to the Supreme Court's decision in *Massachusetts v. EPA*, which held that greenhouse gases are air pollutants subject to regulation under the Clean Air Act. 549 U.S. 497 (2007).

7. The Supreme Court's ruling resulted in EPA's issuance of a finding that six greenhouse gases endanger the public health and welfare of current and future generations, which forms the basis of the agency's greenhouse gas regulations for light-duty and heavy-duty vehicles. *Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66,496 (Dec. 15, 2009).

8. In 2010, EPA and NHTSA jointly issued greenhouse gas emission standards and CAFE standards for light-duty vehicles. *Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards; Final Rule*, 75 Fed. Reg. 25,324 (May 7, 2010). Sierra Club and others submitted comments on the proposed rule and intervened in the industry's lawsuit challenging the standards. *Coalition for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102 (D.C. Cir. 2012), *rev'd on other grounds sub nom. Utility Air Regulatory Group v. EPA*, 134 S. Ct. 2427 (2014). NHTSA and EPA updated these standards in 2012. EPA established final, binding greenhouse gas standards for MY2017 to

MY2025 light-duty vehicles. *2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards*, 77 Fed. Reg. 62,624 (Oct. 15, 2012).

9. In 2011, NHTSA and EPA adopted CAFE and greenhouse gas standards for heavy-duty trucks, updating these standards in 2016. *Greenhouse Gas Emission Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles; Final Rule*, 76 Fed. Reg. 57,106 (Sep. 15, 2011); *Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles-Phase 2*, 81 Fed. Reg. 73,478 (Oct. 25, 2016). Sierra Club and others intervened to defend those rules against industry challenges. *Truck Trailer Manufacturers Association v. EPA*, Nos. 16-1430, 16-1447 (D.C. Cir. 2017). Recently, Sierra Club and its allies challenged EPA's final decision not to enforce its regulations of glider vehicles nationwide. *Environmental Defense Fund v. EPA*, No. 18-1190 (D.C. Cir. 2018).

10. Together with other organizations, Sierra Club has in the past challenged NHTSA's CAFE standards for light-duty vehicles for failure to comply with the relevant requirements under the Energy Policy and Conservation Act. *Center for Biological Diversity v. National Highway Traffic Safety Administration*, 538 F.3d 1172 (9th Cir. 2008). More recently, Sierra Club and its allies challenged NHTSA's indefinite delay of a prior rule that adjusted CAFE civil penalties for

inflation, a delay that violated the Federal Civil Penalties Inflation Adjustment Act Improvements Act. *Natural Resources Defense Council v. National Highway Traffic Safety Administration*, 894 F.3d 95 (2d. Cir. 2018).

11. In its 2012 final rule establishing greenhouse gas standards for MY2017-2025 light-duty vehicles, EPA adopted regulations requiring it to undertake a thorough mid-term evaluation of the MY2022-2025 standards before April 1, 2018, in order to determine whether they are still appropriate under Section 202(a) of the Clean Air Act. The mid-term evaluation regulations require EPA to consider the information available on the factors that EPA must consider in setting greenhouse gas standards under Section 202(a) as well as other factors set forth in the regulation. These regulations require EPA to provide an opportunity for public comment before finalizing the evaluation. EPA's determination must be based on a robust record that includes a draft Technical Assessment Report (TAR), public comment on the TAR, and public comment on whether the standards for MY 2022 through 2025 remain appropriate. 40 C.F.R. § 86.1818–12(h).

12. To comply with the mid-term evaluation requirements, in November 2016, then-EPA Administrator Gina McCarthy proposed to determine that the MY 2022-2025 standards remain appropriate and warrant no revision. This proposed determination was based on the TAR, input from the auto industry and other stakeholders, and analyses updated with 2016 data. After receiving over 100,000

public comments, on January 12, 2018, then-Administrator McCarthy finalized EPA's determination that these standards are appropriate, finding that they are feasible at reasonable cost. The agency explained that, based on compliance information collected between MY 2012 and 2015, the auto industry is meeting the standards more quickly than required. The agency also found that the standards will achieve significant carbon dioxide reductions and provide significant benefits to consumers and the public.

13. In March 2017, then-EPA Administrator Scott Pruitt announced that the agency would reconsider its final determination. 82 Fed. Reg. 14,671-72 (Mar. 22, 2017). In August 2017, EPA requested comment on whether the light-duty vehicle greenhouse gas standards are appropriate, but it did not reopen the TAR for public comment. 82 Fed. Reg. 39,551 (Aug. 21, 2017). In April 2018, EPA published a decision asserting that the current standards are based on "outdated" information and that more recent information suggests that the standards may be too stringent. 83 Fed. Reg. 16,077 (Apr. 13, 2018). In a drastic reversal from its findings under Administrator McCarthy, the agency now claims that several key assumptions on which EPA previously relied, such as its predictions about gas prices and consumer acceptance of advanced technology vehicles, were overly optimistic or have significantly changed; and thus the standards need to be revised. EPA's decision failed to follow the robust stakeholder and analytical process

required under the mid-term evaluation regulations and did not explain the agency's departure from the robust technical analyses and public comments that underlie the McCarthy's final determination.

14. As the April 2018 decision and other EPA public statements make clear, the intent of reversing the final determination is to weaken the 2012 standards. Sierra Club and allies oppose such weakening because it would injure Sierra Club members, threatening their health and welfare by increasing emissions of harmful air pollutants such as carbon dioxide, nitrogen oxides, and particulate matter.

I declare under penalty of perjury that the foregoing is true and correct to the best of my knowledge and belief. Executed on August 28, 2018.

  
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Andrew Linhardt

XV.

Declarations of Union of Concerned Scientists

1. Jean-Charles Ginestra, Union of Concerned Scientists member

**IN THE UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

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CENTER FOR BIOLOGICAL  
DIVERSITY; CONSERVATION  
LAW FOUNDATION;  
ENVIRONMENTAL  
DEFENSE FUND; NATURAL  
RESOURCES DEFENSE COUNCIL;  
PUBLIC CITIZEN, INC., SIERRA  
CLUB, UNION OF CONCERNED  
SCIENTISTS

*Petitioners,*

v.

UNITED STATES  
ENVIRONMENTAL PROTECTION  
AGENCY,

*Respondent.*

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No. 18-1139  
(consolidated with Nos.  
18-1114, 18-1118, &  
18-1162)

**DECLARATION OF JEAN-CHARLES GINESTRA**

I, Jean-Charles Ginestra, declare as follows:

1. I have lived in the greater Houston area since 1980. I have a master’s degree and a doctorate in chemical engineering from the University of Houston, and worked for Shell Oil Company in Houston from 1985 to 2015. I am a member of the Union of Concerned Scientists.

2. In 1995, I moved to my current residence in Richmond, Texas, located in Fort Bend County.

3. When I moved to Fort Bend County in 1995, flooding was unheard of, and there were no concerns of or requirements for protecting homes from flood damage. But over the next twenty years, violent storm events became more frequent and severe in Fort Bend County. As a result, flooding became a greater concern to me and my community, especially since our homes were not designed or equipped to handle floods.

4. The federal government also took note of the more frequent storm events and new potential for flooding in Fort Bend County. In 2014 the Federal Emergency Management Agency (“FEMA”) placed my home in the 100-year flood plain, which means that my house is deemed by FEMA to have a one percent risk of flooding every year. As a result, my mortgage company started requiring me to carry flood insurance. I have carried this insurance since 2014, yet this did not prepare me or my home for the destructive force of Hurricane Harvey.

5. In August 2017, Hurricane Harvey struck multiple counties in Texas, killing at least 82 citizens. This severe weather event flooded twenty houses in my subdivision, including my house, which flooded with nine inches of water on August 28, 2017. I had never experienced a flood event before, nor had my house ever been flooded.

6. I spent that night on the second floor of my flooded house with my family, including grandchildren aged six months and two years, two dogs, and two cats. We were evacuated by boat in the morning, since the flood water between my house and the street was two to three feet deep.

7. The total cost of damage to my home was \$150,000. I had to move to a temporary location for four months, and it took six months to rebuild my home. Some of my subdivision neighbors did not fare as well: they were hit with up to 32 inches of water, and have yet to move back into their homes. The emotional toll of Harvey disaster has also been devastating and traumatic.

8. I understand the scientific evidence showing that anthropogenic climate change is exacerbating extreme weather events like Hurricane Harvey, and that the area in which I live is likely to experience increases in extreme weather events – like flooding and hurricanes – that risk damaging my home and neighborhood, and that will continuously drive up my insurance costs. I have no plans to move from the Houston Area.

9. I also understand that we must have policies to help curb our greenhouse gas emissions, so that we can avoid future consequences of climate change. Doing so will help my family and future generations survive some of the financial and emotional costs that my family suffered because of Hurricane

Harvey, especially since even relatively small cuts to global emissions can make a difference in world of extreme weather patterns.

10. Motor vehicle emissions standards are one of the best ways to cut GHG emissions, as transportation is the largest single source of such emissions in the United States. Strong standards not only directly reduce GHG emissions from cars in the United States, but drive innovation world-wide.

11. Without strong standards, climate-destabilizing emissions will continue to increase, which will exacerbate the frequency and severity of extreme weather events and cause further economic and environmental harm to Fort Bend County and other communities. The emissions standards that the Environmental Protection Agency ("EPA") formally reviewed in 2017 and 2018 are among the most efficacious and important regulations the United States has ever adopted at reducing greenhouse gas emissions; EPA's decision to formally reexamine these standards makes it much more likely that the agency will ultimately relax the standards, directly environmental hazards to me and my community.

12. I declare under penalty of perjury that the foregoing is true and correct.

Executed in Richmond, Texas on August 28, 2018.



Jean-Charles Ginestra, Ph.D.

XV.

Declarations of Union of Concerned Scientists

2. Gregory Kempf, Union of Concerned Scientists member

**IN THE UNITED STATES COURT OF APPEALS  
FOR THE DISTRICT OF COLUMBIA CIRCUIT**

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CENTER FOR BIOLOGICAL  
DIVERSITY; CONSERVATION  
LAW FOUNDATION;  
ENVIRONMENTAL  
DEFENSE FUND; NATURAL  
RESOURCES DEFENSE COUNCIL;  
PUBLIC CITIZEN, INC., SIERRA  
CLUB, UNION OF CONCERNED  
SCIENTISTS

*Petitioners,*

v.

UNITED STATES  
ENVIRONMENTAL PROTECTION  
AGENCY,

*Respondent.*

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No. 18-1139  
(consolidated with Nos.  
18-1114, 18-1118, &  
18-1162)

**DECLARATION OF GREGORY KEMPF**

I, Gregory Kempf, declare as follows:

1. My name is Gregory Kempf. I am over eighteen years of age, of sound mind, and fully competent to make this declaration. I also have personal knowledge of the factual statements contained herein.

2. I have been a member of the Union of Concerned Scientists continuously since December 28, 2017.

3. I received a bachelor's degree in mechanical engineering from Ohio State University in 1980 and a master's degree in mechanical engineering from Purdue University in 1992. Between 1980 to 2017, I was employed by General Motors, where I designed automatic transmissions for all types of vehicles.

4. I live in Avon, Indiana, a town of approximately 13,000 people west of Indianapolis. Avon lacks well-developed mass transit options such as public busses or rail networks.

5. Driving a car is therefore my normal means of transportation. I drive about 15,000 miles a year for all manner of purposes, including medical and dental appointments, transporting my grandchildren, shopping, recreation, volunteering, voting, and miscellaneous errands. My wife doesn't like driving at night, so I regularly do the family driving. My daughter owns a small knitting and crocheting business, and I occasionally assist her by hauling supplies for special events and delivering orders to the post office. All told, I drive somewhere almost daily.

6. Regular occupants in my vehicle include my wife, my two grandchildren (both toddlers), and my son-in-law.

7. My wife and I have three vehicles: a 2014 Chevrolet Malibu, a 2010 Chevrolet Equinox, and a 2006 Pontiac Solstice. We drive all three vehicles regularly, choosing among them according to our needs for a given trip.

8. It is our intention to replace one of our current vehicles with a new vehicle between 2020 and 2025. We are most likely to replace the 2006 Solstice (a convertible), as it's the oldest and least adaptable to my errands.

9. Because of my wide range of driving activities and varying number of passengers, I will choose a replacement for the Solstice based upon the vehicle's safety record, reliability, passenger space, fuel economy, and initial cost.

10. Fuel economy is among the most important factors I will examine when purchasing a new car, and I am particularly interested in an electric vehicle. I spend almost \$1,800 annually on fuel. Better fuel economy means not only that I will spend less time and money refueling, but also that my car will contribute less to climate change.

11. The mitigation of climate change is vitally important to me, since humans and wildlife are at serious risk as the phenomenon worsens. World-wide, millions are dying prematurely due to the effects of climate change, and future generations will deal with an even more hostile environment.

12. I have followed climate science closely over the past decade, and especially since my retirement in May 2017. My interest in the subject has prompted me to more seriously pursue environmental advocacy, including the creation of a novel about climate change, testimony to the EPA concerning GHGs, and my membership in both UCS and the Citizens' Climate Lobby, both of which

spend significant resources to fight climate change. I've also joined the renewable energy program from my local utility (which raises my utility bills), and I've begun making my five-acre property more heavily wooded by planting about 200 trees.

13. Due to the ever-worsening effects of climate change, it's vital that low GHG emission vehicles are cost competitive with higher emission vehicles, so that low emissions vehicles are purchased in large enough numbers to significantly reduce emissions and mitigate climate change.

14. In short, it is of the utmost importance to me that, when I choose a new car, I have access to the widest array of low emissions technologies, at the lowest costs.

15. The current Corporate Average Fuel Economy Standards ("CAFE") and GHG Standards incentivize automakers to continue the electric vehicle developments that have so far led to relatively affordable cars like the Tesla Model 3, Chevy Bolt, and Nissan Leaf. As I evaluate replacement automobiles, I am interested in future iterations of these cars, and in entirely new models of electric vehicles that have yet to arrive on the market.

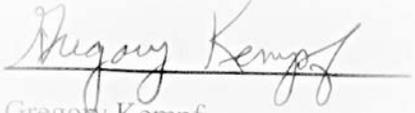
16. As the records undergirding EPA's 2017 and 2018 mid-term evaluations indicate, development of zero emission vehicles has accelerated in response to implementation of the now-operative GHG and CAFE standards. A

firm commitment to the current standards will generate higher demand for low emissions vehicles, increasing the variety of consumer options and driving down prices for those who, like me, value fuel economy or electric vehicles. Conversely, weakening CAFE and GHG standards will lower incentives for automakers to further innovate low emissions vehicles.

17. I am injured by any action that makes it more likely that replacement CAFE and GHG standards will be less stringent than those now in effect, and that would narrow my options for a new vehicle or make those options more expensive.

18. I declare under penalty of perjury that the foregoing is true and correct.

Executed in Sonoma County, California on August 28, 2018.



Gregory Kempf

XV.

Declarations of Union of Concerned Scientists

3. Michelle Robinson, Director, Clean Vehicles Program, Union of Concerned Scientists

IN THE UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

CENTER FOR BIOLOGICAL
DIVERSITY; CONSERVATION
LAW FOUNDATION;
ENVIRONMENTAL
DEFENSE FUND; NATURAL
RESOURCES DEFENSE COUNCIL;
PUBLIC CITIZEN, INC., SIERRA
CLUB, UNION OF CONCERNED
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UNITED STATES
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No. 18-1139
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18-1162)

DECLARATION OF MICHELLE ROBINSON

I, Michelle Robinson, declare as follows:

1. My name is Michelle Robinson. I am over eighteen years of age, of sound mind, and fully competent to make this declaration. I also have personal knowledge of the factual statements contained herein

2. I am the Director of the Union of Concerned Scientists' ("UCS") Clean Vehicles Program. I have served in this role since 2003, and have worked

for UCS since 1992. As a longtime member of the UCS leadership team, I am very familiar with the policies and practices of UCS.

3. UCS was founded in 1969 by scientists and students at the Massachusetts Institute of Technology to conduct scientific and technical analysis and research in the public interest, and to help scientists present their views to all branches of the United States government. Today, UCS works for scientific integrity, a healthy planet, and a more just and safer world. To that end, UCS staff develop and implement innovative, practical solutions to some of our planet's most pressing problems: UCS works to combat global warming; fight misinformation; advance racial equity; reduce the threat of nuclear war; and develop sustainable ways to feed, power, and transport the world's 7.6 billion people.

4. UCS' leadership and supporters number over 500,000 and include strong representation from the scientific community: a majority of UCS' Board members and a large share of the organization's National Advisory Board are scientists. The UCS Science Network – a membership organization within UCS – is made up of over 25,000 scientists who work to educate the public and policy makers about decisions that are critical to human health, global security, safety, and the environment. To be a member of the UCS Science Network, an individual must have or be working towards an advanced degree in the life, physical,

mathematical, or social sciences, medicine or public health, engineering, or otherwise have expertise in science history or science policy.

5. UCS is divided into several programs, including the Clean Vehicles Program. The mission of the UCS Clean Vehicles Program is to reduce oil consumption, greenhouse gas (“GHG”) emissions, and air pollution from the transportation sector, and to increase equitable access to clean, affordable transportation for communities across the nation.

6. UCS created the Clean Vehicles Program in 1990 to advance clean vehicle and fuels policies at the state and federal level, and has been instrumental in enacting legislation and regulation to drive down emissions and transform the way we move people and goods in this country. The Clean Vehicles Program is staffed by dozens of scientists and engineers, policy experts, and outreach and communication specialists in offices across the country.

7. The transportation sector emits almost a third of global greenhouse gases and is a major source of air pollution in the United States. As a result, any policy or rule that helps reduce GHG emissions from the transportation sector – or that lowers the costs or increases the availability of clean vehicles – is critical to the mission of UCS and the Clean Vehicles Program.

8. The UCS Clean Vehicles Program has invested considerable time and resources into legislative and regulatory measures to reduce oil use and

transportation-related global warming emissions. For example, UCS staff advocated for the Energy Independence and Security Act of 2007, which raised the fuel efficiency of America's cars, light trucks, and SUVs to a combined average of at least 35 miles per gallon by 2020, and which required fuel efficiency standards to be set at maximum feasible levels through 2030.<sup>1</sup> In support of these and other regulations, UCS Clean Vehicles staff has spent significant time meeting with agency officials at the Environmental Protection Agency, the National Highway Traffic Safety Administration, and the Office of Management and Budget over the last 25 years.

9. In collaboration with allies in its Clean Cars Coalition, UCS has participated in hundreds of in-person meetings with congressional representatives or their staff and has offered dozens of briefings to the public and Congress.

10. UCS analysts spent significant time quantifying the benefits of the EPA's GHG emissions standards for cars and light trucks through model year 2025. UCS staff found that this regulation, combined with NHTSA's fuel efficiency standards, would cut global warming emissions by 280 million metric

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<sup>1</sup> For example, UCS submitted expert comments to: NHTSA's Notice of Proposed Rulemaking Regarding Average Fuel Economy Standards for Passenger Cars and Light Trucks – Model Years 2011 – 2015, the Proposed Rulemaking for Light-duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy for Model Years 2012 – 2016, the Draft Technical Assessment Report for the Mid-term Evaluation of Model Year 2022-2025 Light-duty Vehicle Greenhouse Gas Emissions and Fuel Economy Standards, and testimony in response to NHTSA and EPA Proposed Phase 2 Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles.

tons a year, create an estimated 650,000 jobs in the United States, reduce American oil use by 2.4 million barrels per day, and save a new car buyer about \$6,000 over the lifetime of a new 2025 vehicle. No other federal policy will deliver greater oil savings, consumer benefits, and global warming emissions reductions.

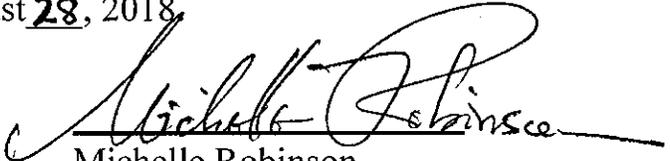
11. The EPA's 2018 mid-term evaluation – including the agency's decision to withdraw the 2017 mid-term evaluation – frustrates the mission of the UCS Clean Vehicles Program, since any weakening of the standard will reduce the planet's ability to curb global warming emissions and oil use, increase transportation-related costs by necessitating additional expenditures on fuel, and reduce accessibility to cleaner and more fuel-efficient vehicles.

12. The 2018 mid-term evaluation process has also injured UCS and the Clean Vehicles Program by truncating the notice-and-comment process contemplated by the Clean Air Act and its implementing regulations. By improperly issuing the 2018 determination without the information and analysis required by law, the Clean Cars program has been unable to fully apprehend EPA's rationale for the decision. In particular, EPA's failure to disseminate information undergirding the 2018 decision – both in the proposed and final determinations – has left UCS unable to share up-to-date information concerning the federal government's regulation of GHG emissions with its technical staff or with its membership. In an effort to better discern the information that EPA improperly

omitted from its 2018 finding – such as the voluminous technical analysis that would have been required to rebut and withdraw the findings of the 2017 finding – UCS has spent significant resources attempting to “reverse engineer” the finding, including by lodging requests under the Freedom of Information Act.

13. I declare under penalty of perjury that the foregoing is true and correct.

Executed in Washington, D.C. on August 28, 2018.



Michelle Robinson