**No. 18-1114 (consolidated with 18-1118, 18-1139, 18-1162)**

# United States Court of Appeals for the District of Columbia Circuit

STATE OF CALIFORNIA, et al.,
*Petitioners*,

v.

ENVIRONMENTAL PROTECTION AGENCY, et al.,
*Respondents.*

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT,
*Amicus Curiae for Petitioner*,

ALLIANCE OF AUTOMOBILE MANUFACTURERS; ASSOCIATION OF GLOBAL AUTOMAKERS, INC.,
*Movant-Intervenors.*

On Petition for Review of Agency Action by the United States Environmental Protection Agency, No. EPA-83FR16077

## PETITIONERS' RESPONSE TO RESPONDENTS' AND MOVANT-INTERVENORS' MOTIONS TO DISMISS

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# GLOSSARY

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|---|---|
| APA | Administrative Procedure Act, 5 U.S.C. § 551 *et seq* |
| CAA | Clean Air Act, 42 U.S.C. § 7401 *et seq* |
| CAFE | Corporate average fuel economy |
| EVs | Electric vehicles |
| EPA | United States Environmental Protection Agency |
| GHG | Greenhouse gas |
| MY | Model year |
| NHTSA | National Highway Traffic Safety Administration |

## INTRODUCTION AND SUMMARY

Petitioners National Coalition for Advanced Transportation ("NCAT"), Consolidated Edison Company of New York, Inc., National Grid USA, New York Power Authority, and the City of Seattle, by and through its City Light Department[1] (collectively "Petitioners") seek this Court's review of a nationally applicable final agency action by respondent United States Environmental Protection Agency ("EPA"). That action—entitled "Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles," 83 Fed. Reg. 16,077 (Apr. 13, 2018) ("Revised Final Determination")—marks the conclusion of an extensive notice-and-comment decisionmaking process mandated by EPA regulations, imposes binding legal requirements on EPA under those regulations, and has real and immediate adverse effects on Petitioners' economic interests.

In the Revised Final Determination, EPA determined that its existing greenhouse gas ("GHG") emissions standards for light-duty vehicle model years ("MY") 2022 to 2025 are "not appropriate" under the governing provision of the

[1] Consolidated Edison Company of New York, Inc., National Grid USA, New York Power Authority, and the City of Seattle, by and through its City Light Department filed a joint petition for review and are referred to collectively in this response as "Utility Petitioners." NCAT's membership also includes electric utilities.

Clean Air Act ("CAA"). In so doing, EPA reversed and withdrew its January 2017 final determination that the standards were appropriate and would remain in place. EPA regulations required EPA to make this determination by April 1, 2018, after notice and comment and based on specified information and procedures. Under those regulations, the Revised Final Determination requires EPA to revise its existing MY 2022-2025 regulations. Petitioners, whose economic interests are directly affected by the MY 2022-2025 standards and the Revised Final Determination, challenge EPA's determination on grounds that it is arbitrary and capricious and violates EPA regulations. Contrary to EPA's and Movant-Intervenors' arguments, this Court has jurisdiction to hear this case on the merits because the Revised Final Determination is a final agency action, the case is ripe, and Petitioners have demonstrated standing.

## FACTUAL AND PROCEDURAL BACKGROUND

### A. The Clean Air Act and Light-Duty Vehicle GHG Standards

CAA Section 202(a)(1) directs EPA to promulgate standards for emissions of air pollutants from new motor vehicles which cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. 42 U.S.C. § 7521(a)(1). EPA determined that GHG emissions from new motor vehicles meet this test, and the CAA accordingly requires the agency to set GHG standards for such vehicles. *See Massachusetts v. EPA*, 549 U.S. 497, 528-29 (2007) (holding

GHGs are within the CAA's definition of "air pollutant"); 74 Fed. Reg. 66,496, 66,499 (Dec. 15, 2009) (Endangerment Finding). The National Highway Traffic Safety Administration ("NHTSA") has separate authority to set corporate average fuel economy ("CAFE") standards for new vehicles under the Energy Policy and Conservation Act, 49 U.S.C. § 32902. EPA and NHTSA jointly promulgated two rules setting "harmonized" GHG and CAFE standards for light-duty vehicles: a 2010 rule covering MYs 2012-2016 and a 2012 rule covering MYs 2017-2025.[2]

EPA's MY 2017-2025 standards require manufacturers to demonstrate compliance with increasingly stringent fleet-wide GHG limits, declining from 243 grams $CO_2$/mile for MY 2017 to 163 grams $CO_2$/mile for MY 2025 on a fleet-wide basis. 77 Fed. Reg. at 62,641. The standards incorporate "averaging, banking and trading" mechanisms whereby manufacturers demonstrate compliance on a fleet-wide average basis using credits that can be traded between manufacturers. *Id.* at 62,648-49. Manufacturers that produce vehicles with lower fleet-wide average emissions than required for a MY earn credits that can be sold to other manufacturers and thus have monetary value. *Id.* at 62,649; EPA, *Greenhouse Gas Emission Standards for Light-Duty Vehicles: Manufacturers Performance Report for the 2016 Model Year* at 69-71 (Jan. 2018) ("EPA MY 2016 Manufacturers Report")

[2] 75 Fed. Reg. 25,324 (May 7, 2010); 77 Fed. Reg. 62,624 (Oct. 15, 2012).

(reporting credit sales and purchases).[3] These credits can be banked, meaning that credits earned in one MY can be used for compliance in later MYs. 77 Fed. Reg. at 62,648. Accordingly, changes to later-MY standards affect the market for and value of credits earned in an earlier MY.

The MY 2017-2025 standards provide substantial incentives to manufacture vehicles with lower GHG emissions, including electric vehicles ("EVs"). The MY 2017-2021 standards attribute zero emissions to EVs. *Id.* at 62,650-51. The MY 2022-2025 standards attribute some "upstream" emissions from electricity generation to EVs over certain manufacturer-specific production thresholds, but such vehicles would continue to be well below fleet-wide GHG targets and production would continue to generate compliance credits. *See id.* at 62,651.

As part of the MY 2017-2025 rulemaking, EPA promulgated regulations requiring the agency to complete a "mid-term evaluation" of the MY 2022-2025 standards. These regulations provide that "[n]o later than April 1, 2018, the [EPA] Administrator *shall determine* whether [the MY 2022-2025 standards] are appropriate under section 202(a) of the Clean Air Act, in light of the record then before the Administrator." 40 C.F.R. § 86.1818-12(h) (emphasis added). In making this determination, EPA must provide an opportunity for public comment and

[3] https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100TGIA.pdf (Exhibit 1 attached).

consider information on specified factors relevant to setting GHG standards under CAA Section 202(a). *Id.* § 86.1818-12(h)(1). The determination must be based on a record that includes prescribed information and analysis, including a draft Technical Assessment Report ("TAR"), and EPA must "set forth in detail the bases for the determination." *Id.* § 86.1818-12(h)(2)-(4). Finally, "[i]f the Administrator determines [the standards] are not appropriate, the Administrator *shall* initiate a rulemaking to revise the standards." *Id.* § 86.1818-12(h) (emphasis added).

When it finalized these regulations, EPA explained that it would be "legally bound to make a final decision, by April 1, 2018." 77 Fed. Reg. at 62,784. The agency further stated that it would make its determination "based on a comprehensive, integrated assessment of all of the results of the review" and that EPA's decisionmaking "is intended to be as robust and comprehensive as that in the original setting of the MY2017-2025 standards." *Id.*

### B. EPA's January 2017 Final Determination

In July 2016, EPA, NHTSA, and the California Air Resources Board issued a 1,217-page TAR, which received over 200,000 public comments.[4] In November 2016, EPA issued a proposed determination that the MY 2022-2025 standards

[4] EPA, Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation at 10 (Jan. 2017), https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ91.pdf ("Jan. 2017 Final Determination") (Exhibit 2 attached).

remain appropriate under the CAA, supported by the TAR and a 719-page draft Technical Support Document. EPA received over 100,000 public comments on that proposal. Jan. 2017 Final Determination at 11. On January 12, 2017, the agency finalized the mid-term evaluation, concluding that the MY 2022-2025 standards are appropriate and would be maintained. *Id.* at 1.

### C. EPA's April 2018 Revised Final Determination

In March 2017, shortly after the inauguration of President Trump, EPA announced that it would reconsider the January 2017 Final Determination. 82 Fed. Reg. 14,671, 14,671 (Mar. 22, 2017). EPA solicited comments, held a public hearing, and received more than 290,000 comments. 83 Fed. Reg. at 16,078. On April 13, 2018, EPA published the Revised Final Determination, concluding the MY 2022-2025 standards are not appropriate and reversing and withdrawing the January 2017 Final Determination. *Id*. at 16,077, 16,087. The Revised Final Determination does not purport to be based on the TAR and was not accompanied by any detailed technical analysis. Nevertheless, EPA concluded that the current standards are based on outdated information and should be revised. *Id.* at 16,077. After summarizing "concerns" relating to EVs, EPA concluded: "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." *Id.* at 16,081. EPA further found that "the

current GHG program for MY 2022-2025 vehicles presents difficult challenges for auto manufacturers and adverse impacts to consumers." *Id.* at 16,087. While EPA attempted to characterize its determination as non-final, it states clearly that "[t]his notice *concludes* EPA's [mid-term evaluation] under 40 C.F.R. 86.1818-12(h)," that "the Administrator *has determined* that the standards are not appropriate in light of the record before EPA," and that it would therefore initiate rulemaking to revise the standards. *Id.* (emphasis added).

EPA and NHTSA recently published a joint notice of proposed rulemaking that would revise the existing MY 2021-2025 GHG standards for light-duty vehicles and establish new standards for MY 2026. 83 Fed. Reg. 42,986, 42,986 (Aug. 24, 2018). The proposal states that EPA in the 2012 rule "bound itself through regulation to . . . develop new CO2 standards . . . if it concluded that the previously finalized standards were no longer appropriate." *Id.* at 42,987. The proposed rule would freeze GHG and CAFE standards at MY 2020 levels through 2026 and take actions intended to preempt the authority of California and other states to regulate vehicle GHG emissions or require sales of electric and other "zero emission" vehicles. *Id.* at 42,995, 42,999.

### D. Petitioners' Interests and this Litigation

NCAT is a coalition of companies and public utilities that support electric and other advanced vehicle technologies and related infrastructure. Its members include

businesses engaged in electric vehicle manufacturing; electricity supply, transmission and distribution; and EV charging infrastructure production, deployment and operation. NCAT advocates for government policies that support deployment of EV technologies and related infrastructure, including EPA's GHG standards for light-duty vehicles.[5] Two of NCAT's members are directly subject to regulation under EPA's MY 2017-2025 standards, which apply to electric vehicles. *See* 40 C.F.R. § 86.1818-12(a)(1) (applicability of standards). Tesla manufactures all-electric light-duty vehicles subject to the standards, Declaration of Joseph Mendelson, III ¶¶ 5, 7 ("Tesla Decl."), and Workhorse Group Inc. ("Workhorse") is scheduled to begin production, this calendar year and next, of two models of all electric trucks that will be subject to the standards, Declaration of O. Kevin Vincent ¶¶ 5-7 ("Workhorse Decl."). Utility Petitioners include investor-owned utilities, the nation's largest state power authority and one of the nation's largest municipal utilities. They have collectively committed to investing hundreds of millions of dollars of investments to build infrastructure that will support increased consumer

[5] Comments of the National Coalition for Advanced Transportation at 1, EPA Docket ID No. EPA-HQ-OAR-2015-0827-9101 (Oct. 5, 2017) ("NCAT Comments") (Exhibit 3 attached).

adoption of EVs and are establishing rate structures and programs to maximize the benefits and minimize the costs of integrating EV load to the grid.[6]

Petitioners participated in the proceedings leading to EPA's Revised Final Determination, including by filing comments. Declaration of Terrence Sobolewski ¶ 7 ("Nat'l Grid Decl."); Declaration of Caroline Choi ¶ 10 ("SCE Decl."); Declaration of Paul Lau ¶ 6 ("SMUD Decl."); Tesla Decl. ¶ 10. Petitioners have argued that EPA's existing MY 2017-2025 standards should be maintained because they are appropriate under CAA Section 202(a) and provide regulatory signals needed to support sustained investment in EVs and supporting infrastructure.[7]

Pursuant to CAA Section 307(b)(1), NCAT and Utility Petitioners timely filed petitions for review of EPA's Revised Final Determination.[8] 42 U.S.C. § 7607(b)(1). Petitioners' claims include that: the determination is arbitrary and capricious, in violation of CAA Section 307(d)(9) and Administrative Procedure Act ("APA") Section 706(2)(A), because it lacks factual support in the agency's record

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[6] Utility Petitioners Docketing Statement at 2, No. 18-1162 (D.C. Cir. filed July 16, 2018) ("Utility Petitioners Docketing Statement").

[7] NCAT Comments at 2; Joint Comments on Vehicle GHG Standards by Electric Power Companies and Utilities at 2, EPA Docket ID No. EPA-HQ-OAR-2015-0827-9175 (Oct. 5, 2017) (Exhibit 4 attached).

[8] NCAT Petition for Review, No. 18-1118 (D.C. Cir. filed May 4, 2018); Utilities Petition for Review, No. 18-1162 (D.C. Cir. filed June 12, 2018). This Court consolidated these petitions for review with those filed by a group of States and coalition of environmental groups.

and fails to provide the reasoned explanation required to justify reversal of EPA's January 2017 Final Determination; and the determination violates EPA regulations at 40 C.F.R. § 86.1818-12(h).

## ARGUMENT

### I. THE MID-TERM EVALUATION REVISED FINAL DETERMINATION IS A FINAL AGENCY ACTION

CAA Section 307(b)(1) gives this Court jurisdiction to review nationally applicable regulations promulgated, or final action taken, by EPA under the CAA. 42 U.S.C. § 7607(b)(1). Under *Bennett v. Spear*, final agency action (1) "mark[s] the 'consummation' of the agency's decisionmaking process" and (2) is action "by which 'rights or obligations have been determined,' or from which 'legal consequences will flow.'" 520 U.S. 154, 177-78 (1997) (citations omitted). There is "no self-implementing, bright-line rule" with regard to legal consequences, and "the finality inquiry is a 'pragmatic' and 'flexible' one." *Nat'l Ass'n of Home Builders v. U.S. Army Corps of Eng'rs*, 417 F.3d 1272, 1279 (D.C. Cir. 2005) (citations omitted). "Agency action is considered final to the extent that it imposes an obligation, denies a right, or fixes some legal relationship." *Reliable Automatic Sprinkler Co. v. Consumer Prod. Safety Comm'n*, 324 F.3d 726, 731 (D.C. Cir. 2003). The Revised Final Determination plainly satisfies both of *Bennett*'s conditions.

The Revised Final Determination is clearly the consummation of EPA's decisionmaking process with regard to the mid-term evaluation. *See Bennett*, 520 U.S. at 177-78. Under EPA's regulations, the agency is required to make a final, binary determination: whether the MY 2022-2025 standards are "appropriate" under CAA Section 202(a). The regulations require EPA to do so by a date certain, after notice-and-comment, and based on a defined administrative record. 40 C.F.R. § 86.1818-12(h). In adopting the mid-term evaluation regulation in 2012, EPA explained that the determination must be "based on a comprehensive, integrated assessment of all of the results of the review" and the decisionmaking process would "be as robust and comprehensive as that in the original setting of the MY2017-2025 standards." 77 Fed. Reg. at 62,784. EPA's Revised Final Determination was made after multiple rounds of public comments at various stages in the mid-term evaluation process, including responses to comments, and formal reconsideration of and then formal withdrawal of the January 2017 Final Determination. 83 Fed. Reg. at 16,077-78. The Federal Register notice states that "[t]his notice *concludes* EPA's MTE under 40 CFR 86.1818-12(h)." *Id*. at 16,087 (emphasis added). EPA made an unequivocal final determination on the binary question it was required to decide: "[I]n 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." *Id*.

The Revised Final Determination also unquestionably has binding legal consequences. *See Bennett*, 520 U.S. at 177-78; *Reliable Automatic Sprinkler*, 324 F.3d at 731. It is undisputed that under EPA's regulations, a determination that the MY 2022-2025 standards are not appropriate under Section 202(a) *legally requires* the agency to initiate a rulemaking to revise the standards. 40 C.F.R. § 86.1818-12(h). By making this determination, EPA "impose[d] an obligation" on itself and "fixe[d] [a] legal relationship," *see Reliable Automatic Sprinkler Co.*, 324 F.3d at 731, rendering the agency subject to suit to enforce that requirement. Further, the Revised Final Determination reverses and withdraws EPA's previous and legally binding January 2017 Final Determination that the standards are appropriate and thus would not be revised. *See* 83 Fed. Reg. at 16,087. EPA and Movant-Intervenors acknowledge that the January 2017 Final Determination is a final agency action. *See* EPA Mot. at 4; Intervenor Mot. at 6 n.7. Accordingly, the reversal and withdrawal of that 2017 Final Determination is also a final agency action; it has the opposite legal consequence of the prior final determination and therefore meets the second prong of the *Bennett* test. *See United States Army Corps of Eng'rs v. Hawkes Co.*, 136 S. Ct. 1807, 1814 (2016) (holding that, because a negative jurisdictional determination under the Clean Water Act was a final agency action with legal

consequences, a positive jurisdictional determination was likewise final agency action meeting the second prong of *Bennett*).

Finally, because the MY 2022-2025 standards were promulgated under CAA Section 202(a), EPA's formal determination that the standards are "not appropriate" under that provision has legal effects independent of EPA's mid-term evaluation regulations. It provides those who advocate weakening of the MY 2022-2025 standards with new and independent legal grounds to challenge the existing standards in court and/or to petition the agency for reconsideration or revision of the regulations, separate from the mid-term evaluation process. *See Weaver v. Fed. Motor Carrier Safety Admin.*, 744 F.3d 142, 145 (D.C. Cir. 2014) (parties may challenge application of rule, after deadline for facial challenge, on grounds that it "conflicts with the statute from which [the agency's] authority derives" (quoting *Nat'l Air Transp. Ass'n v. McArtor*, 866 F.2d 483, 487 (D.C. Cir. 1989)); 5 U.S.C. § 553(e) (right to petition for rulemaking); 42 U.S.C. § 7607(b)(1) (allowing petition for review of CAA rules "based solely on grounds arising after" otherwise applicable deadline).

## II. THE CHALLENGE TO EPA'S REVISED FINAL DETERMINATION IS RIPE

To determine whether an action is ripe this Court evaluates "(1) the fitness of the issues for judicial decision and (2) the hardship to the parties of withholding court consideration." *Nat'l Park Hosp. Ass'n v. Dep't of the Interior*, 538 U.S. 803,

808 (2003) (citing *Abbott Labs. v. Gardner*, 387 U.S. 136, 149 (1967)). The "fitness of an issue for judicial decision depends on whether it is purely legal, whether consideration of the issue would benefit from a more concrete setting, and whether the agency's action is sufficiently final." *Energy Future Coal. v. EPA*, 793 F.3d 141, 146 (D.C. Cir. 2015) (citations omitted). With respect to the second prong, "[i]f 'there are no significant agency or judicial interests militating in favor of delay,' a lack of hardship 'cannot tip the balance against judicial review.'" *Id.* (citation omitted).

Petitioners' challenge clearly is fit for this Court's review. It is "purely legal," as Petitioners allege the Revised Final Determination is arbitrary and capricious and contrary to EPA's regulations. *See Cement Kiln Recycling Coal. v. EPA*, 493 F.3d 207, 215 (D.C. Cir. 2007) ("It is well-established that '[c]laims that an agency's action is arbitrary and capricious or contrary to law present purely legal issues.'" *Id.* (alteration in original) (citations omitted)). Contrary to EPA's and Movant-Intervenors' characterizations, EPA Mot. at 10-11; Intervenor Mot. at 19, EPA has completed its consideration of the relevant issue: whether or not the MY 2022-2025 standards are "appropriate" under Section 202(a), such that they must be maintained or revised. *Supra* at 11.

The fact that EPA could later reverse the Revised Final Determination through a new notice-and-comment rulemaking does not render this suit unripe. *Cf. Nat'l*

*Ass'n of Home Builders*, 417 F.3d at 1282 (purely legal challenge ripe although agency retained measure of discretion with respect to challenged action). Similarly, the fact that Petitioners can raise arguments related to the Revised Final Determination in the pending MY 2021-2026 rulemaking, EPA Mot. at 13, is beside the point. EPA has an independent legal duty to make the final determination in a manner that complies with its regulations and is not arbitrary and capricious, and its failure to do so is subject to independent review. *See* 42 U.S.C. § 7607(b)(1); 40 C.F.R. § 86.1818-12(h). It cannot evade such review simply by moving on to the next rulemaking. For the same reasons, EPA's issuance of a notice of proposed rulemaking regarding the MY 2021-2026 standards does not moot the instant challenge to the Revised Final Determination.

Given the nature of the claims in this case, Petitioners need not demonstrate hardship to show ripeness. *See Cohen v. United States*, 650 F.3d 717, 735 (D.C. Cir. 2011) ("[I]n the context of APA challenges, we have previously said '[lack of] hardship cannot tip the balance against judicial review . . . ." *Id.* (alteration in original) (citations omitted)). Regardless, Petitioners have demonstrated they would suffer hardship if this Court withheld consideration. As discussed in Section III, *infra*, the Revised Final Determination has harmed and continues to harm Petitioners' economic interests. Petitioners seek prompt vacatur or remand of the Revised Final Determination, which would eliminate a legal predicate for revision

of the MY 2022-2025 standards and require EPA to make a new, reasoned, record-based determination that complies with the law. Such action would play a critical role in informing agency actions and public participation regarding whether to undertake further rulemaking on the MY 2022-2025 standards, and if so on what basis.

## III. NCAT AND UTILITY PETITIONERS HAVE STANDING TO CHALLENGE EPA'S MID-TERM EVALUATION FINAL DETERMINATION

A petitioner establishes Article III standing by demonstrating (i) a "concrete and particularized" injury that is "'actual or imminent,'" (ii) that this injury is "'fairly . . . trace[able]'" to the challenged conduct, and (iii) that the requested relief is likely to redress the injury. *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560-61 (1992) (alteration in original) (citations omitted); *Carpenters Indus. Council v. Zinke,* 854 F.3d 1, 5 (D.C. Cir. 2017).

An association has standing to sue on behalf of its members if (1) at least one member would have standing to sue in its own right, (2) "the interests the association seeks to protect are germane to its purpose," and (3) "neither the claim asserted nor the relief requested requires that an individual member of the association participate in the lawsuit." *Sierra Club v. EPA*, 292 F.3d 895, 898 (D.C. Cir. 2002) (citing *Hunt v. Washington State Apple Advert. Comm'n*, 432 U.S. 333, 343 (1977)). Petitioner NCAT satisfies this test because NCAT members would have standing to sue in their

own right, *infra* at 17-23, NCAT's challenge is germane to its purpose, *supra* at 8, and neither the claims asserted nor the relief requested requires that an individual member of NCAT participate in this suit. *See Sierra Club*, 292 F.3d at 898.

This Court has made clear that if a petitioner "is 'an object of the [agency] action (or forgone action) at issue'—as is the case usually in review of a rulemaking and nearly always in review of an adjudication—there should be 'little question,'" regarding the petitioner's standing. *Id.* at 900 (quoting *Lujan*, 504 U.S. at 561-62). Such is the case here. NCAT member Tesla is, and NCAT member Workhorse soon will be, directly regulated by the MY 2022-2025 standards. Tesla Decl. ¶ 7; Workhorse Decl. ¶¶ 5-7. They therefore are "objects" of the standards and of EPA's Revised Final Determination, and their standing is self-evident.

Petitioners filed these challenges seeking redress of actual and imminent injury to their businesses caused by the Revised Final Determination. Economic injury is a cognizable harm for purposes of constitutional standing. *See, e.g.*, *Clinton v. City of N.Y.*, 524 U.S. 417, 432-33 (1998). As this Court recently stated: "Economic harm to a business clearly constitutes an injury-in-fact. And the amount is irrelevant. A dollar of economic harm is still an injury-in-fact for standing purposes." *Carpenters Indus. Council*, 854 F.3d at 5. Further, "[f]or standing purposes, petitioners need not prove a cause-and-effect relationship with absolute certainty; substantial likelihood of the alleged causality meets the test." *Competitive*

*Enter. Inst. v. NHTSA*, 901 F.2d 107, 113 (D.C. Cir. 1990) ("This is true even in cases where the injury hinges on the reactions of the third parties, here the auto manufacturers, to the agency's conduct.").

Contrary to EPA's assertions (at 15-16), the Revised Final Determination already has had and continues to have adverse effects on Petitioners' economic interests, including impacts on compliance credit markets and investments and the imposition of additional planning and transaction costs.

Manufacturers of fully electric light-duty vehicles sold in the United States, including NCAT members, earn and sell tradable regulatory credits under the existing MY 2017-2025 standards from production of zero tailpipe emissions EVs. EPA MY 2016 Manufacturers Report at 23-25 (reporting credits earned by advanced technology vehicle manufacturers); *id.* at 69-71 (credit sales); Workhorse Decl. ¶¶ 9-10; *see also*, *e.g.*, Benjamin Leard & Virginia McConnell, Resources for the Future, *New Markets for Credit Trading under US Automobile Greenhouse Gas and Fuel Economy Standards* at 11-12 (May 2017) ("RFF Credit Market Report") (providing information on credit prices).[9] The Revised Final Determination harms such manufacturers by adversely affecting the market for credits already earned and to be earned under the existing standards. *See*, *e.g.*, Workhorse Decl. ¶ 12. Because

[9] http://www.rff.org/files/document/file/RFF-Rpt-AutoCreditTrading.pdf (Exhibit 5 attached).

credits are bankable, impacts on future MY standards affect markets for credits earned in earlier MYs.

Petitioners have demonstrated a "substantial likelihood" that the Revised Final Determination has caused and will continue to cause adverse effects on the credit markets. *See Competitive Enter. Inst.*, 901 F.2d at 113. The determination points to recent data showing an increasing need for manufacturers to rely on credits for compliance and a decreasing supply of credits. *See* 83 Fed. Reg. at 16,079. Credit demand and prices correlate positively to the stringency of the standards. Workhorse Decl. ¶ 9; RFF Credit Market Report at 11 ("Credit prices . . . reveal information about marginal costs" of meeting standards). And although EPA has yet to determine "the appropriate degree and form of changes to the program," 83 Fed. Reg. at 16,087, the Revised Final Determination makes clear the agency's intention to reduce the stringency of the standards. Indeed, EPA has now proposed to freeze the MY 2021-2026 standards at MY 2020 levels. 83 Fed. Reg. at 42,986. "Common sense and basic economics" support the conclusion, *Carpenters Indus. Council*, 854 F.3d at 6, that the Revised Final Determination has reduced interest in transactions and credit values.

In addition, EPA's Revised Final Determination adversely affects Petitioners' investments in development and manufacturing of EVs and deployment of charging infrastructure. EPA's MY 2022-2025 standards provide long-term incentives for

such investments. *See, e.g.*, Nat'l Grid Decl. ¶ 7; SCE Decl. ¶¶ 5, 14; SMUD Decl. ¶ 4. Petitioners collectively have invested, or are in the process of investing, billions of dollars in these activities. *See, e.g.*, SCE Decl. ¶ 8; SMUD Decl. ¶ 5; Tesla Decl. ¶ 8; Workhorse Decl. ¶ 8; Utility Petitioners Docketing Statement at 2.

EPA's Revised Final Determination eliminates the stability of the existing standards, creates uncertainty with regard to regulatory incentives for production and deployment of EVs under the MY 2022-2025 standards, and thus undermines the current and future value of investments in EV technologies and supporting infrastructure. *See*, *e.g.*, Nat'l Grid Decl. ¶ 8. As a result, the Revised Final Determination has imposed and continues to impose on Petitioners additional planning and transaction costs. *E.g.*, SCE Decl. ¶¶ 11-12; SMUD Decl. ¶¶ 8-9.

Further, EPA in the Revised Final Determination made inaccurate and unsupported findings with regard to EV technology costs, affordability and consumer acceptance. These findings adversely affect the views of consumers, investors, and state and local policymakers with regard to technologies and infrastructure in which Petitioners have invested and continue to invest—thus harming Petitioners' business interests. *See, e.g.*, SCE Decl. ¶¶ 11-12; Workhorse Decl. ¶ 12.

This Court has recognized informational and procedural injuries as injuries in fact. *See, e.g.*, *Friends of Animals v. Jewell*, 828 F.3d 989, 992 (D.C. Cir. 2016) ("A

plaintiff suffers sufficiently concrete and particularized informational injury where the plaintiff alleges that: (1) it has been deprived of information that, on its interpretation, a statute requires the government or a third party to disclose to it, and (2) it suffers, by being denied access to that information, the type of harm Congress sought to prevent by requiring disclosure."). Petitioners are harmed by EPA's failure to follow the mid-term evaluation regulations, which require the agency to explain in detail the basis for its final determination. *See* 40 C.F.R. § 86.1818-12(h). EPA's failure to provide this information in support of its Revised Final Determination, and its unsupported adverse findings with regard to EVs, adversely affects Tesla and Workhorse as regulated entities in the business of manufacturing EVs. Tesla Decl. ¶ 13; Workhorse Decl. ¶ 13.

Finally, Petitioners' injuries would be redressed by the relief they request: that the Court hold unlawful and set aside the Revised Final Determination. Petitioners have demonstrated "that a favorable decision will relieve a discrete injury," but "need not show that a favorable decision will relieve his or her *every* injury." *See Energy Future Coal.*, 793 F.3d at 144-45 (quoting *Massachusetts v. EPA*, 549 U.S. at 525). Vacatur or remand of the Revised Final Determination would eliminate a critical legal predicate for revising (and weakening) the MY 2022-2025 standards and reduce uncertainty with regard to those standards. This would mitigate adverse impacts on credit markets, investments and planning and transaction costs described

above. Further, a determination that the Revised Final Determination is arbitrary and capricious and/or violates EPA regulations would mitigate harms to consumer, investor, and state and local officials' perceptions of EVs. At minimum, a decision in Petitioners' favor would require EPA to revisit the mid-term evaluation and make a new final determination, in a manner that is reasoned, record-based, and adequately explained—thus mitigating the informational harms to Petitioners.

The cases EPA cites in support of its standing arguments are inapposite. EPA Mot. at 16-17. Unlike a settlement or consent decree under which the agency agrees to initiate a rulemaking, the Revised Final Determination is a legally mandated final agency action that has directly caused economic injury to Petitioners' businesses—as a result of the determination's specific findings, its failure to comply with the requirements of the mid-term evaluation regulations, and the fact that it legally requires EPA to revise its MY 2022-2025 standards. *Cf. Alternative Res. & Dev. Found. v. Veneman*, 262 F.3d 406, 410-11 (D.C. Cir. 2001) (holding movant-intervenor lacked standing to challenge settlement providing for initiation of a rulemaking); *Defenders of Wildlife v. Perciasepe*, 714 F.3d 1317, 1324-25 (D.C. Cir. 2013) (holding movant-intervenor lacked standing to challenge consent decree requiring an agency rulemaking on a specific timeline where the content of the rulemaking was "not in any way dictated by the consent decree").

Finally, Petitioners have prudential standing because the interests they seek to

protect are "arguably within the zone of interests to be protected or regulated by the statute" at issue. *See Sierra Club*, 292 F.3d at 902 (citation omitted). This "test forecloses suit only when a plaintiff's 'interests are so marginally related to or inconsistent with the purposes implicit in the statute that it cannot reasonably be assumed that Congress intended to permit the suit.'" *Match-E-Be-Nash-She-Wish Band of Pottawatomi Indians v. Patchak*, 567 U.S. 209, 225 (2012) (citation omitted). It is clear that where a petitioner is "itself the subject of the contested regulatory action," it necessarily satisfies the zone of interests test as a directly-regulated party. *See Clarke v. Sec. Indus. Ass'n*, 479 U.S. 388, 399-400 (1987). NCAT member Tesla is directly regulated by the MY 2022-2025 standards and NCAT member Workhorse will be subject to these regulations when it begins vehicle production within the coming year. Tesla Decl. ¶ 7; Workhorse Decl. ¶¶ 5-7. Furthermore, Members of NCAT and Utility Petitioners supply fuel and fueling infrastructure for vehicles regulated by the standards and thus are directly affected. *See, e.g.*, *Energy Future Coal.*, 793 F.3d at 145 (biofuel producers were within zone of interests of CAA fuel regulation directed at vehicle manufacturers).

## CONCLUSION

For the foregoing reasons, the Court should deny Respondents' and Movant-Intervenors' motions to dismiss.

August 29, 2018

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

I hereby certify that on August 29, 2018, I caused a copy of the foregoing to be served by electronic means through the Court's CM/ECF system on counsel for all parties, who are registered CM/ECF users.

*/s/ Robert A. Wyman, Jr.*
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*Counsel for Petitioner National Coalition for Advanced Transportation*

**CERTIFICATE OF COMPLIANCE WITH RULE 32**

1. I certify that this response complies with the type-volume limitations of Federal Rule of Appellate Procedure 27(d)(2)(A) because it contains 5,193 words, excluding the parts exempted by Federal Rule of Appellate Procedure 32(f).

2. I further certify that this brief complies with the typeface requirements of Federal Rule of Appellate Procedure 32(a)(5) and the type style requirements of Federal Rule of Appellate Procedure 32(a)(6) because it has been prepared in a proportionally-spaced typeface using Microsoft Office Word in Times New Roman 14-point font.

August 29, 2018

*/s/ Robert A. Wyman, Jr.*
Robert A. Wyman, Jr.

*Counsel for Petitioner National Coalition for Advanced Transportation*

# EXHIBITS

## EXHIBITS TABLE OF CONTENTS

# EXHIBIT 1

# Greenhouse Gas Emission Standards for Light-Duty Vehicles

## Manufacturer Performance Report for the 2016 Model Year

EPA United States Environmental Protection Agency
EPA-420-R-18-002 January 2018

# Greenhouse Gas Emission Standards for Light-Duty Vehicles

## Manufacturer Performance Report for the 2016 Model Year

*NOTICE:*

*This technical report does not necessarily represent final EPA decisions or positions. It is intended to present technical analysis of issues using data that are currently available. The purpose in the release of such reports is to facilitate the exchange of technical information and to inform the public of technical developments.*

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# LIST OF TABLES AND FIGURES

# EXECUTIVE SUMMARY

## Background

On May 7, 2010, the Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) issued a joint Final Rule to establish the first phase of a National Program with new standards for 2012 to 2016 model year light-duty vehicles that reduce greenhouse gas (GHG) emissions and improve fuel economy. These standards apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles. Subsequently, on October 15, 2012, EPA and NHTSA issued standards for GHG emissions and fuel economy of light-duty vehicles for model years 2017–2025, building on the first phase of the joint National Program.

EPA is releasing this report as part of our continuing commitment to provide the public with transparent and timely information about manufacturers' compliance with the GHG program.[1] This report supersedes previous reports and details manufacturers' performance towards meeting GHG standards in the 2016 model year, the fifth and final year of the first phase of the EPA GHG standards. This report includes data through the end of the 2016 model year. Some values from previous model years may have changed based on changes or corrections to the historical data.[2]

The following figure illustrates the process and the inputs that determine a manufacturer's compliance with the light-duty vehicle GHG emission standards. Every manufacturer starts at the same place: by measuring the $CO_2$ tailpipe emissions performance of their vehicles using EPA's City and Highway test procedures (referred to as the "2-cycle" tests). Then they may choose to apply a variety of optional technology-based credits to further reduce their fleet GHG emissions compliance value. The 2-cycle tailpipe $CO_2$ value, when reduced by the net grams per mile equivalent of the optional credits, determines a manufacturer's model year performance and whether credits or deficits are generated by a manufacturer's model year fleet.

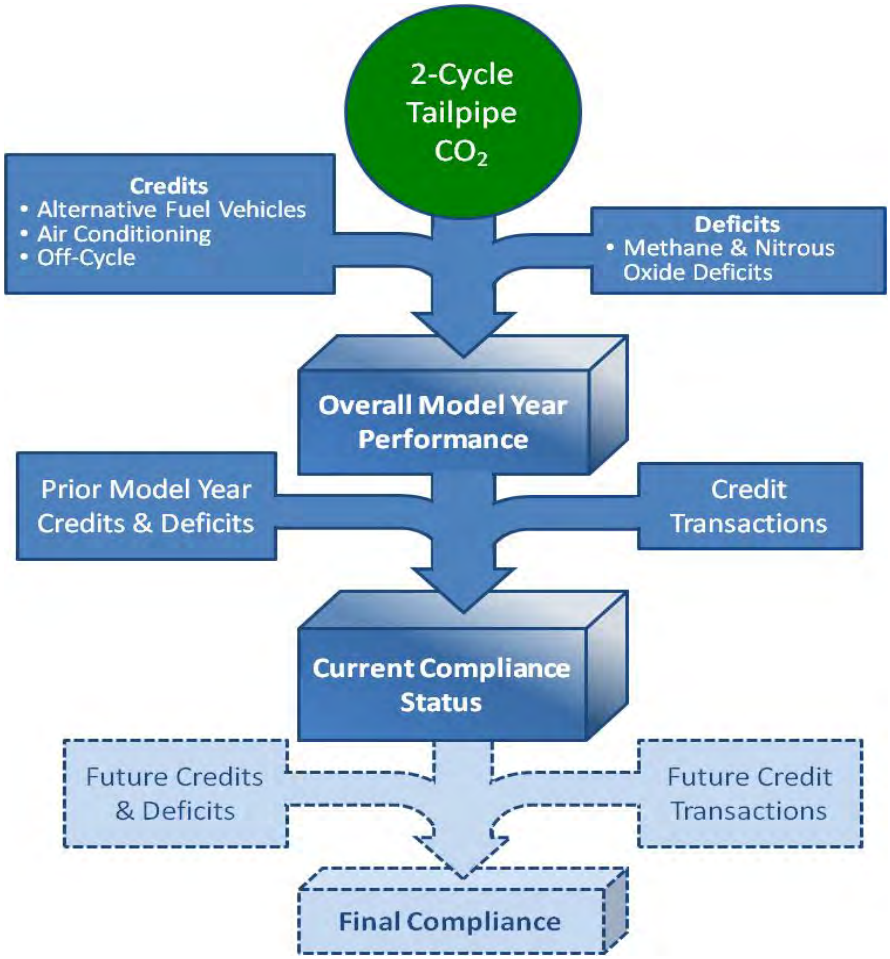
It is important to note that the Department of Justice, on behalf of EPA, alleged violations of the Clean Air Act by Fiat Chrysler Automobiles based on the sale of certain 2014 through 2016 model year vehicles equipped with devices that defeat the vehicles' emission control systems. In addition, the Department of Justice and EPA have reached a settlement with Volkswagen over the use of defeat devices for certain 2009 through 2016 model year vehicles. In this report, EPA uses the $CO_2$ emissions and fuel economy data from the initial certification of these vehicles. Should the investigation and corrective actions yield different $CO_2$ and fuel economy data, any relevant changes will be used in future reports. For more

[1] Relevant information on the CAFE program can be found on the NHTSA website at NHTSA's CAFE Public Information Center: http://www.nhtsa.gov/CAFE_PIC/CAFE_PIC_Home.htm.

[2] This report summarizes data as it was reported to EPA by the manufacturers and does not necessarily represent final EPA decisions or positions regarding the data or the compliance status of manufacturers.

information on actions to resolve these alleged violations, see www.epa.gov/vw and www.epa.gov/fca.

**Process for Determining a Manufacturer's Compliance Status**

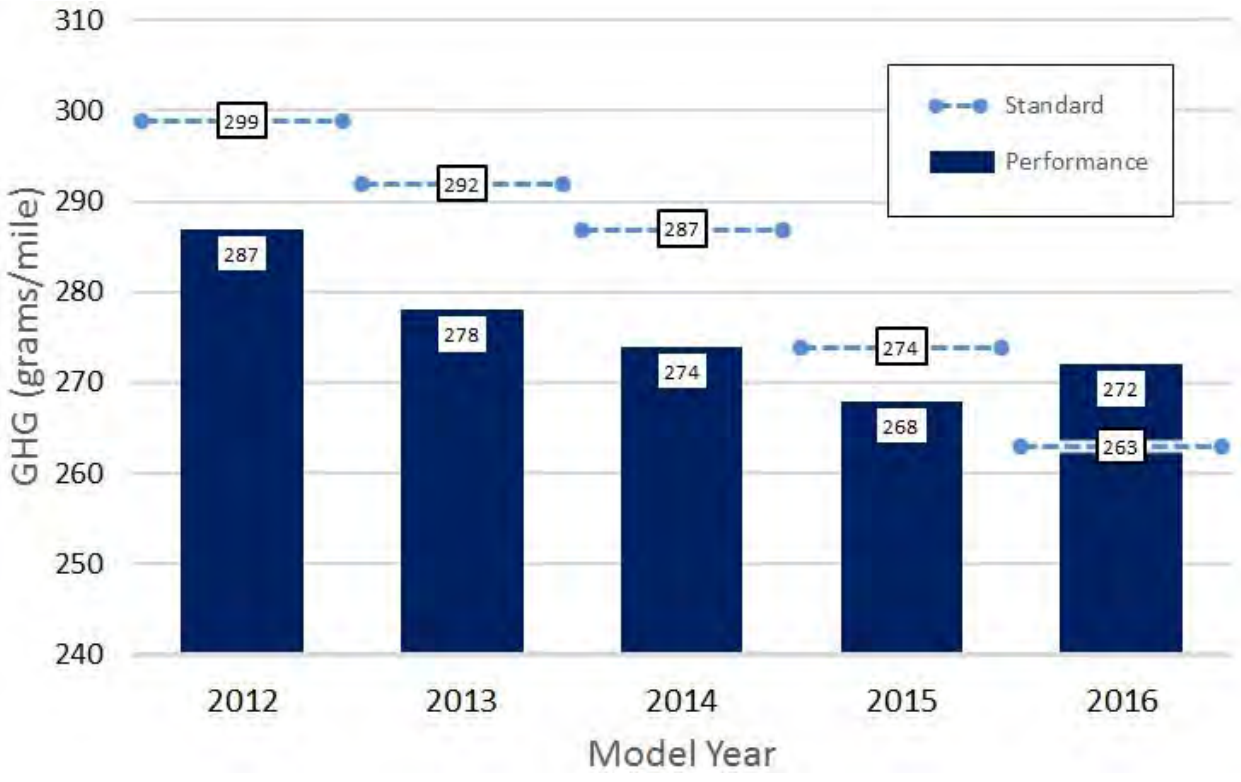



Individual model year performance, however, does not directly determine model year compliance or non-compliance. Manufacturers with deficits in a model year may use credits carried over from a previous model year to offset a deficit. They may also purchase credits from another manufacturer. Manufacturers with a deficit at the conclusion of a model year may also carry that deficit forward into the next model year. Manufacturers must, however, offset any deficit within three years after the model year in which it was generated to avoid enforcement action. After considering these additional credits and deficits, EPA determines a manufacturer's current compliance status. For example, a manufacturer with a deficit remaining from model year 2013 after the 2016 model year would be considered out of compliance with the 2013 model year standards. As this report will show, there are no manufacturers that ended 2016 in this position. No manufacturer is yet out of compliance with the GHG program in any of these first five model years; their performance in subsequent years, and whether deficits can be successfully offset using future credits (either generated or acquired) will ultimately determine final compliance.

## 1 *The auto industry generated a GHG deficit in the 2016 model year, but all major manufacturers comply with the 2016 standards, with some companies using credits from prior years.*

Overall industry performance in model year 2016 was 9 grams/mile higher than required by the 2016 GHG emissions standard. This makes 2016 the first model year in which the industry generated a GHG emissions deficit, after generating credits in each of the first four years of EPA's program. The increases in stringency in the standards in the 2015 and 2016 model years were the largest increases in the first phase of EPA's GHG program; since the 2014 model year the standards have decreased by 24 grams/mile. The standards were intentionally structured with this progression of increasing stringency, as explained in the rulemaking. A contributing factor to the 9 gram/mile industry-wide gap between performance and the standard in the 2016 model year was the expiration of flexible fuel vehicle credits. Due to the credits accumulated in the previous four years and early credits generated by some manufacturers in the 2009-2011 model years, some of which were used to offset the 2016 deficit, the industry as a whole does not face any non-compliance issues in the 2016 model year. See Section 3 for more detail on these values.

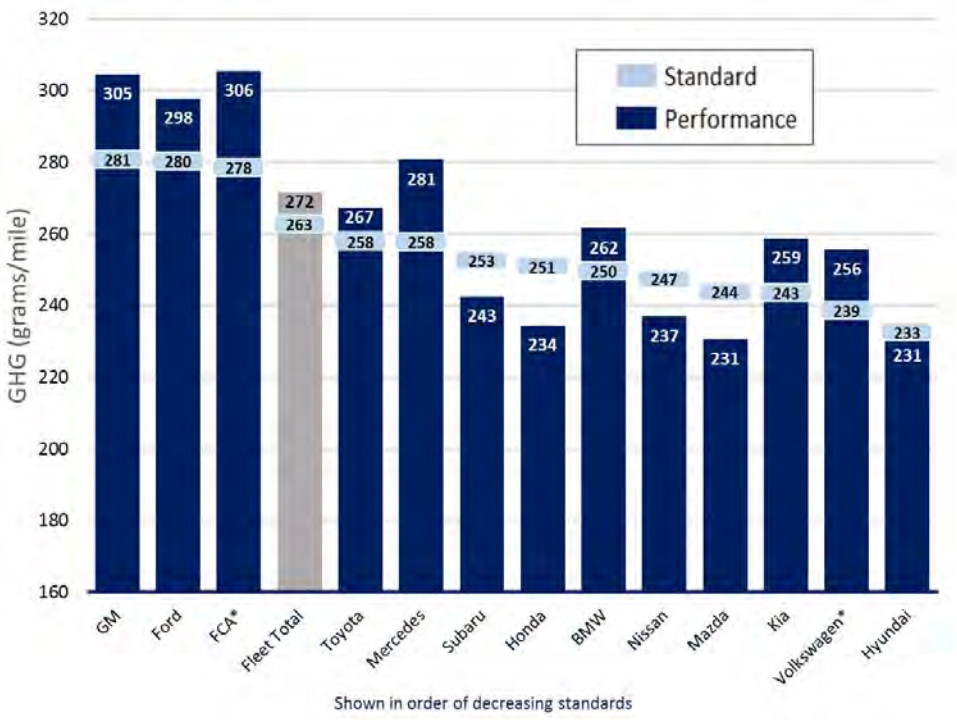
**Figure ES-1. Industry Performance versus Standards, 2012-2016 Model Years**



## 2 *Eight out of the thirteen largest manufacturers generated deficits relative to their 2016 model year standards, but used credits from previous model years to comply.*

Unlike the previous four years, in which generating credits was the norm, most large manufacturers (with sales greater than 150,000 vehicles) generated deficits in the 2016 model year. Five of the thirteen manufacturers reported beating their standard, with compliance margins ranging from 16 grams/mile (Honda) to 1 gram/mile (Hyundai). The remaining eight generated deficits against their standard due to fleet GHG emissions that were higher than the standard by amounts ranging from 10 grams/mile (Toyota) to 28 grams/mile (FCA). Note that the figure below does not include the impact of credit transfers reported from prior model years (within a company) or reported credit trades (transactions between companies), and thus does not portray whether or not a manufacturer has complied with the 2016 model year standards. In fact, the manufacturers that generated a 2016 model year GHG deficit have reported sufficient credits available from prior model years to be able to offset that deficit and thus achieve compliance with their respective 2016 model year standards. More detail about model year 2016 performance is provided in Section 3.

### Figure ES-2. Manufacturer Performance and Standards in the 2016 Model Year




* FCA and Volkswagen are subjects of an ongoing investigation and/or corrective actions. These data are based on initial certification data provided to EPA, and are included in industry-wide, "Fleet Total", or "All" values. Should the investigation and corrective actions yield different $CO_2$ data, any relevant changes will be used in future reports.
**Note**: Rounding may result in differences between charts and tables and the values reported in the text.

## 3 *All large manufacturers concluded Phase 1 of EPA's GHG standards meeting the standards and with substantial credits available to use through 2021.*

The majority of manufacturers, representing 99 percent of 2016 model year U.S. sales, have reported compliance with the standards for the 2012-2016 model years. In fact, 19 of 21 manufacturers are reporting a non-negative credit balance going into the 2017 model year, meaning that these manufacturers have met the standards in all of the 2012-2016 model years (credits cannot be carried forward if a deficit exists in a prior model year). Manufacturers are allowed to carry deficits forward for three model years. Thus, a manufacturer with a deficit from the 2016 model year (such as Volvo) must offset that deficit by the end of the 2019 model year, or be subject to possible enforcement action. All manufacturers that initially reported a deficit in the 2012-2013 model years have successfully offset that deficit, thus no manufacturer is in a position of non-compliance for any model year at the end of the 2016 model year. The makeup of these credit and deficit balances is tracked by model year "vintage" as explained in Section 5.

### Table ES-1. Credit Balances After the 2016 Model Year (Mg)[3] (including credit transfers & trades)[4]

| Manufacturer | Credits Carried to 2017 | Manufacturer | Credits Carried to 2017 |
|---|---|---|---|
| Toyota | 78,078,963 | Mercedes | 2,991,505 |
| Honda | 36,024,476 | Mitsubishi | 1,755,470 |
| Nissan | 26,682,834 | Suzuki* | 428,242 |
| Ford | 22,084,139 | Karma Automotive* | 58,852 |
| Hyundai | 20,583,544 | BYD Motors* | 4,824 |
| GM | 19,666,700 | Tesla | 576 |
| Subaru | 14,498,843 | Volvo | (9,218) |
| Mazda | 9,424,551 | Jaguar Land Rover | (1,387,781) |
| Kia | 6,011,615 | *FCA†* | *19,217,792* |
| BMW | 3,202,342 | *Volkswagen†* | *2,438,608* |
| **All Manufacturers** | | | **261,759,183** |

†FCA and Volkswagen are listed separately in this table due to an ongoing investigation and/or corrective actions. These data are based on initial certification data, and are included in industry-wide or "All" values. Should the investigation and corrective actions yield different $CO_2$ data, any relevant changes will be used in future reports.
*Although these companies produced no vehicles for the U.S. market in the most recent model year, the credits generated in previous model years continue to be available.

[3] The Megagram (Mg) is a unit of mass equal to 1000 kilograms. It is also referred to as the metric ton or tonne.
[4] This table does not include unused credits from the 2009 model year, which expired at the end of the 2014 model year. See Section 2 for more information.

## C. Credits Based on Alternative Fuel Vehicles

EPA's GHG program contains several credits and incentives for dedicated and dual fuel alternative fuel vehicles. Dedicated alternative fuel vehicles are vehicles that run exclusively on an alternative fuel (e.g., compressed natural gas, electricity). Dual fuel vehicles can run both on an alternative fuel and on a conventional fuel such as gasoline; the most common is the gasoline-ethanol flexible fuel vehicle, which is a dual fuel vehicle that can run on E85 (85 percent ethanol and 15 percent gasoline), or on conventional gasoline, or on a mixture of both E85 and gasoline in any proportion. Dual fuel vehicles also include vehicles that use compressed natural gas (CNG) and gasoline, or electricity and gasoline. This section separately describes three different and uniquely-treated categories of alternative fuel vehicles: advanced technology vehicles using electricity or hydrogen fuel cells; compressed natural gas vehicles; and gasoline-ethanol flexible fuel vehicles.

### *1. Advanced Technology Vehicles*

EPA's GHG program contains incentives for advanced technology vehicles. For the 2012-2016 model years, the incentive program allows electric vehicles and fuel cell vehicles to use a zero grams per mile compliance value, and plug-in hybrid electric vehicles may use a zero grams per mile value for the portion of operation attributed to the use of grid electricity (i.e., only emissions from the portion of operation attributed to gasoline engine operation are "counted" for the compliance value). Use of the zero grams per mile option is limited to the first 200,000 qualified vehicles produced by a manufacturer in the 2012-2016 model years. Electric vehicles, fuel cell vehicles, and plug-in hybrid electric vehicles that were included in a manufacturer's calculations of early credits also count against the production limits. As noted in Section 2, both GM and Mercedes selected an option in the early credit provisions by which they could choose to set aside their relatively small 2011 model year advanced technology vehicle production for inclusion in a future model year yet to be determined.

All manufacturers of advanced technology vehicles in the 2012-2016 model years are well below the cumulative 200,000 vehicle limit for the 2012-2016 model years, thus all manufacturers remain eligible to continue to use zero grams per mile. If a manufacturer were to reach the cumulative production limit before the 2017 model year, then advanced technology vehicles produced beyond the limit must account for the net "upstream" emissions associated with their vehicles' use of grid electricity relative to vehicles powered by gasoline. Based on vehicle electricity consumption data (which includes vehicle charging losses) and assumptions regarding GHG emissions from today's national average electricity generation and grid transmission losses, a midsize electric vehicle might have upstream GHG emissions of about 180 g/mi, compared to the upstream GHG emissions of a typical midsize gasoline car of about 60 g/mi. Thus, the electric vehicle would have a net upstream

emissions value of about 120 g/mi.[23] EPA regulations provide all the information necessary to calculate a unique net upstream value for each electric or plug-in hybrid electric vehicle.[24]

The nature of this incentive is such that it is reflected in the 2-cycle emissions values shown in Section 3.A. For example, the incentive allows Tesla to record zero grams per mile for their fleet (see Table 3-1) in the 2012-2016 model years. Without the incentive, however, the 2016 model year 2-cycle fleet average GHG emissions for Tesla would in fact be about 105 g/mi.[25] Use of the incentive in Tesla's case in the 2016 model year allowed them to generate almost 950,000 Mg of additional GHG credits relative to what they would generate by using the net upstream value of 105 g/mi. Nissan's passenger car fleet benefitted similarly from the ability of the electric Nissan Leaf to use zero grams per mile instead of the calculated net upstream value of 82 g/mi.[26] As a result, the overall impact on Nissan's passenger car fleet in the 2016 model year was an improvement of 1.1 g/mi, allowing them to generate about 210,000 Mg of credits more than if the incentive provisions were not in place. The net impact from Nissan and Tesla on the entire 2016 model year fleet of this incentive is thus about 1.1 million Mg of credits, or about 0.3 g/mi. While there are other electric vehicles and plug-in hybrid electric vehicles in the 2016 fleet, as shown in Table 3-4, Nissan and Tesla account for a substantial fraction of the 2016 model year volume of these vehicles. A few thousand of the remaining advanced technology vehicles are electric vehicles, but the majority of the remaining vehicles are plug-in hybrid electric vehicles, which will have a smaller overall impact than electric vehicles because of their use of gasoline in addition to electricity (the other companies with larger volumes of advanced technology vehicles – General Motors and Ford – produced far more plug-in hybrids than dedicated electric vehicles in the 2016 model year). Because it is unlikely that the total impact of this incentive exceeds 0.5 g/mi across the 2016 model year fleet, we have not carried out the analysis for all advanced technology vehicles. In the future, however, it may be more important, interesting, and useful to have a complete assessment of the impact of incentives for these vehicles. Table 3-4 shows the 2010-2016 production volumes of advanced technology vehicles that utilized the zero grams per mile incentive.

[23] Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, Final Rule, Federal Register 75 (7 May 2010): 25435.
[24] See 40 CFR 600.113-12(n).
[25] Using the calculations prescribed in the regulations, the sales-weighted upstream emissions for Tesla's 2016 passenger cars is 180 grams/mile and the upstream emissions associated with a comparable gasoline vehicle is 75 grams/mile. The difference, or the net upstream emissions of Tesla's 2016 passenger car fleet, is 105 grams/mile.
[26] The upstream GHG emission value for the 2016 Nissan Leaf is 144 grams/mile and the upstream emissions associated with a comparable gasoline vehicle is 62 grams/mile. The difference, or the net upstream emissions of the 2016 Leaf, is 82 grams/mile.

**Table 3-4. Production Volumes of Advanced Technology Vehicles Using Zero Grams/Mile Incentive, by Model Year**

| | Model Year | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Manufacturer** | **2010** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **Total** |
| BMW | - | - | - | - | 9,895 | 11,386 | 11,755 | 33,036 |
| BYD Motors | - | - | 11 | 32 | 50 | - | - | 93 |
| Coda | - | - | - | 37 | - | - | - | 37 |
| Ford | - | - | 653 | 18,654 | 18,826 | 17,384 | 22,343 | 77,860 |
| GM | - | 4,370 | 18,355 | 27,484 | 25,847 | 14,847 | 12,447 | 103,350 |
| Honda | - | - | - | 471 | 1,635 | - | - | 2,106 |
| Hyundai | - | - | - | - | - | 72 | 1,432 | 1,504 |
| Karma | - | - | 1,415 | - | - | - | - | 1,415 |
| Kia | - | - | - | - | - | 926 | 2,788 | 3,714 |
| Mercedes | - | 546 | 25 | 880 | 3,610 | 3,125 | 2,365 | 10,551 |
| Mitsubishi | - | - | 1,435 | - | 219 | - | 130 | 1,784 |
| Nissan | - | 8,495 | 11,460 | 26,167 | 10,339 | 33,242 | 13,128 | 102,831 |
| Tesla | 599 | 269 | 2,952 | 17,813 | 17,791 | 24,322 | 46,058 | 109,804 |
| Toyota | - | - | 452 | 829 | 1,218 | 5,838 | - | 8,337 |
| Volvo | - | - | - | - | - | - | 2,183 | 2,183 |
| *FCA†* | *-* | *-* | *-* | *2,353* | *3,404* | *7,825* | *4,639* | *18,221* |
| *Volkswagen†* | *-* | *-* | *-* | *-* | *755* | *4,869* | *12,776* | *18,400* |
| **Total** | **599** | **13,680** | **36,758** | **94,720** | **93,589** | **123,836** | **132,044** | **495,226** |

†FCA and Volkswagen are listed separately in this table due to an ongoing investigation and/or corrective actions. These data are based on initial certification data, and are included in industry-wide "Total" or "All" values. Should the investigation and corrective actions yield different $CO_2$ data, any relevant changes will be used in future reports.

### *2. Compressed Natural Gas Vehicles*

There were no compressed natural gas vehicles (CNG) subject to the GHG standards in the 2016 model year. The Honda Civic CNG was the only CNG vehicle produced for general purchase by consumers during the first phase of EPA's GHG program, and it was only available in the 2012-2014 model years, and is a dedicated alternative fuel vehicle. In the 2015 and 2016 model years, Quantum Technologies offered a dual fuel (CNG and gasoline) version of GM's Chevrolet Impala through an agreement with GM. Quantum Technologies is exempt from GHG standards under the small business provisions (although they could opt in if they chose), and as a result these vehicles were not subject to 2015-2016 model year GHG standards and thus won't be accounted for in this report.

### *3. Gasoline-Ethanol Flexible Fuel Vehicles*

For the 2012 to 2015 model years, EPA provided GHG credits for flexible fuel vehicles (FFVs) that corresponded to the statutory fuel economy credits under CAFE. As with the CAFE program, the GHG program based FFV credits in these years on the assumption that FFVs operate 50% of the time on the alternative fuel and 50% of the time on conventional

# 4. CREDIT TRANSACTIONS

Credits may be traded among manufacturers with a great deal of flexibility (with the exception of 2009 model year credits and credits generated by manufacturers using the TLAAS program, which are restricted to use only within a manufacturer's own fleets). There are only a few regulatory requirements that relate to credit transactions between manufacturers (other than the restrictions just noted), and these are generally designed to protect those involved in these transactions. While it may seem obvious, it is worth stating that a manufacturer may not trade credits that it does not have. Credits that are available for trade are only those available (1) at the conclusion of a model year when all the data is available with which to calculate the number of credits generated by a manufacturer, and not before; and (2) after a manufacturer has offset any deficits they might have. Credit transactions that result in a negative credit balance for the selling manufacturer are not allowed and can result in severe punitive actions. Although a third party may facilitate transactions, EPA's regulations allow only the automobile manufacturers to engage in credit transactions and hold credits.

Since the 1990's, many of EPA's vehicle emissions regulatory programs have included the flexibilities of averaging, banking, and trading (ABT). The incorporation of ABT provisions in EPA emissions regulations has been generally supported by a wide range of stakeholders: by manufacturers for the increased flexibility that ABT offers and by environmental groups because ABT enhances EPA's ability to introduce standards of greater stringency in an earlier time frame than might otherwise be achieved. Historically, manufacturers tended to make use of the ability to average emissions and bank emissions credits for use in subsequent years, but until recently there has been almost no credit trading activity between companies. The use of trading provisions in EPA's light-duty GHG program is a historic development, and one that EPA welcomes because we believe it will allow greater GHG reductions, lower compliance costs, and greater consumer choice.

The credit transactions reported by manufacturers through the 2016 model year are shown in Table 4-1. Note that manufacturers do not report transactions to EPA as they occur. Thus there may be additional credit transactions that have occurred that are not reported here, but because of the timing of those transactions (after the manufacturers submitted their 2014 model year data) those transactions will be reported in the 2015 model year reports of the manufacturers involved, and thus will be included in EPA's performance report regarding the 2015 model year. As of the close of the 2016 model year, more than 30 million Megagrams of $CO_2$ credits had changed hands. Credit distributions are shown as negative values, in that a disbursement represents a deduction of credits from the specified model year for the selling manufacturer. Credit acquisitions are indicated as positive values because acquiring credits represents an increase in credits for the purchasing manufacturer. The model year represents the "vintage" of the credits that were sold, i.e., the model year from which the credits originated. The vintage always travels with the credits, regardless of when a transaction takes place and in what model year the credits are ultimately used. A manufacturer with 2010 model year credits can hold them until 2021, meaning, for

example, that a sale of 2010 credits could potentially be reported to EPA as late as the reporting deadline for the 2021 model year, and those 2010 credits traded in model year 2021 could be used by the buyer to offset deficits from the 2018-2021 model years. The overall impact of these credit transactions on the compliance position of each manufacturer is discussed in Section 5, which pulls together all the credits and deficits, including early credits, discussed in the preceding sections. Note that each value in the table is simply an indication of the quantity of credits from a given model year that has been acquired or disbursed by a manufacturer, and thus may represent multiple transactions with multiple buyers or sellers.

## Table 4-1. Cumulative Reported Credit Sales and Purchases (Mg)

| | Manufacturer | Model Year "Vintage" | | | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|
| | | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | |
| Credits Disbursed | Coda | - | - | 5,524 | 1,727 | - | - | - | 7,251 |
| | Honda | 14,182,329 | 6,590,901 | - | - | - | - | - | 20,773,230 |
| | Nissan | 950,000 | 1,345,570 | 250,000 | 1,000,000 | - | - | - | 3,545,570 |
| | Tesla | 35,580 | 14,192 | 177,941 | 1,049,384 | 1,020,296 | 1,337,853 | 2,452,519 | 3,635,246 |
| | Toyota | 2,507,000 | - | - | - | 831,358 | - | - | 3,338,358 |
| Credits Acquired | BMW | 2,000,000 | - | - | - | - | - | - | 2,000,000 |
| | Ferrari | 265,000 | | | | | | | 265,000 |
| | FCA | 11,424,329 | 7,090,901 | - | 1,049,384 | 1,020,296 | 1,337,853 | 2,452,519 | 21,922,763 |
| | GM | - | - | 5,524 | 1,727 | - | - | - | 7,251 |
| | Jaguar Land Rover | - | 39,063 | - | - | 831,358 | - | - | 870,421 |
| | McLaren | | 6,507 | | | | | | 6,507 |
| | Mercedes | 3,985,580 | 814,192 | 427,941 | 1,000,000 | - | - | - | 6,227,713 |

# EXHIBIT 2

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

EPA United States Environmental Protection Agency

# 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

EPA United States Environmental Protection Agency

EPA-420-R-17-001
January 2017

**Table of Contents**

## 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.[1] 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[2]

[1] 40 CFR 86.1818-12(h).

[2] 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.[3]

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."[4]

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

[3] 40 CFR 86.1818-12(h)(1).
[4] 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.[5] 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[6] 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

[5] 40 CFR 86.1818-12(h) (final sentence).

[6] 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.[7]

**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)** [1]

| | 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[2] (%) | 93% | 92 - 94% |
| Mass reduction (%) | 9% | 2 - 10% |

[7] 77 FR 62853, October 15, 2012; Draft Technical Assessment Report, Table 12.44.

| | | |
|---|---|---|
| Off-cycle technology[3] | 26% | 13 - 51% |
| Stop-start (%) | 15% | 12 - 39% |
| Mild Hybrid (%) | 18% | 16 - 27% |
| Strong Hybrid (%) | 2% | 2 - 3% |
| Plug-in hybrid electric vehicle[4] (%) | 2% | 2% |
| Electric vehicle[4] (%) | 3% | 2 - 4% |
| **Per vehicle cost (2015$)** | **$875** | **$800 - $1,115** |

Notes:
[1] Percentages shown are absolute rather than incremental. Values based on AEO 2016 reference case.
[2] Including continuously variable transmissions (CVT).
[3] 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 $CO_2$ emissions by either 1.5 g/mi or 3 g/mi. See Proposed Determination Appendix C.1.1.1.3,
[4] Electric vehicle penetrations include the California Zero Emission Vehicle (ZEV) program.

*The Standards Will Achieve Significant $CO_2$ 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 ($CO_2$) target of 173 grams/mile (g/mi) in MY2025 (Table ES-2). The projected fleet average $CO_2$ 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).[8] 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.[9]

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 $CO_2$ targets and MPG-e levels projected for MY2025. These estimated $CO_2$ 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

[8] 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.
[9] 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.

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, $CO_2$ Target Levels, and MPG-equivalent[1]**

| | 2012 Final Rule | Final Determination | | |
|---|---|---|---|---|
| | AEO 2011 Reference | **AEO 2016 Reference** | AEO 2016 Low | AEO 2016 High |
| Fuel Price in 2025 ($/gallon)[2] | $3.87 | **$2.97** | $1.97 | $4.94 |
| Car/truck mix | 67/33% | **53/47%** | 44/56% | 63/37% |
| $CO_2$ (g/mi) | 163 | **173** | 178 | 167 |
| MPG-e[3] | 54.5 | **51.4** | 49.9 | 53.3 |

Notes:
[1] The $CO_2$ 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 $CO_2$ emissions performance would be 233 g/mi and real-world fuel economy would be about 36 mpg.
[2] AEO 2011 fuel price is 2010$ (equivalent to $4.21 in 2015$); AEO 2016 fuel prices are 2015$.
[3] Mile per gallon equivalent (MPG-e) is the corresponding fleet average fuel economy value if the entire fleet were to meet the $CO_2$ standard compliance level through tailpipe $CO_2$ 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[1] |
|---|---|
| GHG reduction (million metric tons, MMT $CO_2e$) | 540 |
| Oil reduction (billion barrels) | 1.2 |

Note:
[1] 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)[1] (Billions of $)**

| | Final Determination[2] | |
|---|---|---|
| | 3 Percent Discount Rate | 7 Percent Discount Rate |
| Vehicle Program | -$33 | -$24 |
| Maintenance | -$3 | -$2 |
| Fuel | $92 | $52 |
| Benefits[1] | $42 | $32 |
| Net Benefits | $98 | $59 |

Notes:
[1]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.
[2] 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[1] |
|---|---|
| Payback period – 5-year loan purchase[2] (years) | <1 |
| Payback period – Cash purchase (years) | 5 |
| Net Lifetime Consumer Savings ($, discounted at 3%) | $1,650 |

Notes:
[1] Values based on AEO 2016 reference case and 2015$
[2] 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.[10] Further, concurrently with out-performing 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,[11] 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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[10] "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.

[11] 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).

# 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.[12] The agencies finalized the first set of National Program standards covering model years (MYs) 2012-2016 in May 2010[13] and the second set of standards, covering MY2017-2025, in October 2012.[14] 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.[15] 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.[16] 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 ($CO_2$) 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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[12] 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.

[13] 75 FR 25324, May 7, 2010.

[14] 77 FR 62624, October 15, 2012.

[15] 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.

[16] 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.[17] For the EPA, the Draft TAR was the first formal step in the MTE process as required under EPA's regulations.[18] 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,

[17] 81 FR 49217, July 27, 2016.
[18] 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.[19]

On November 30, 2016, EPA Administrator issued a proposed adjudicatory determination[20] 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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[19] 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.

[20] 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.[21]

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.[22]

- 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.[23]

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).[24] All of these technologies were available at the time of the

[21] 40 CFR 86.1818-12(h).
[22] 76 FR 48673 (Aug. 9, 2011) and 77 FR 62784, October 15, 2012.
[23] 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.
[24] 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.[25] 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.[26] 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

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

[26] "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.[27] 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.[28]

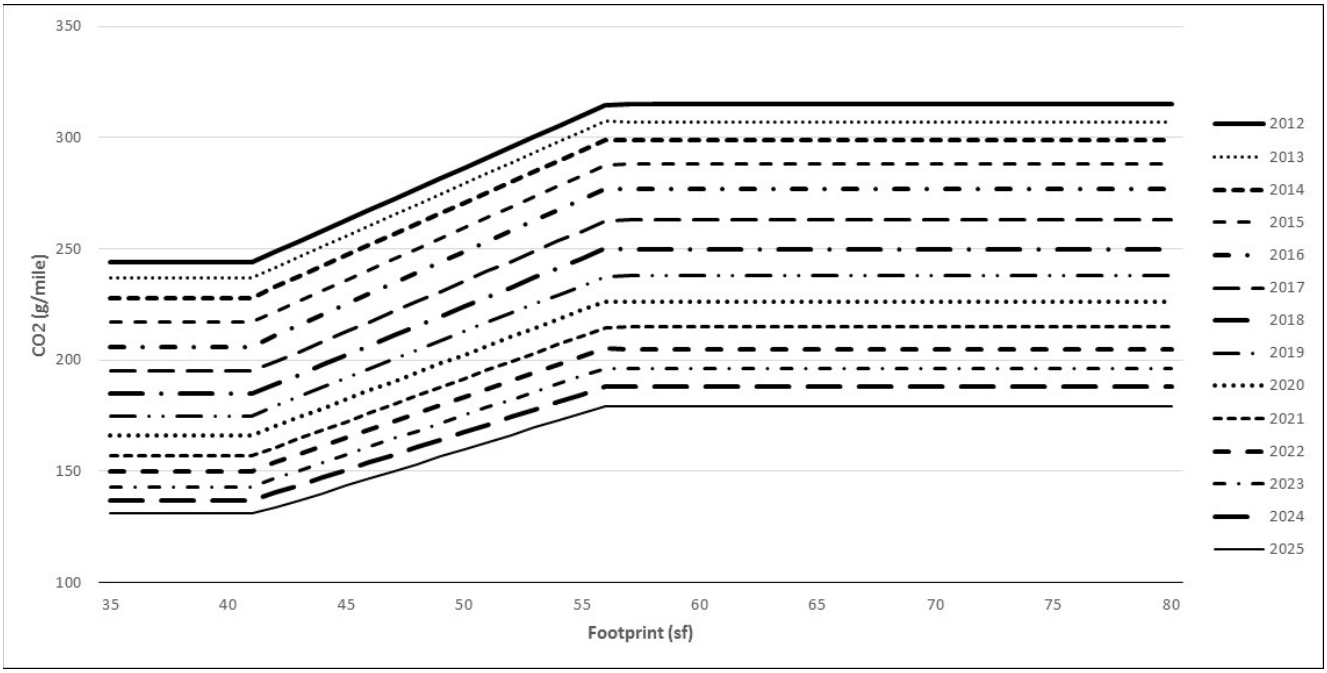


**Figure I.1 $CO_2$ (g/mile) Passenger Car Standards Curves**

[27] 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.

[28] See 40 CFR 86.1818-12(c).

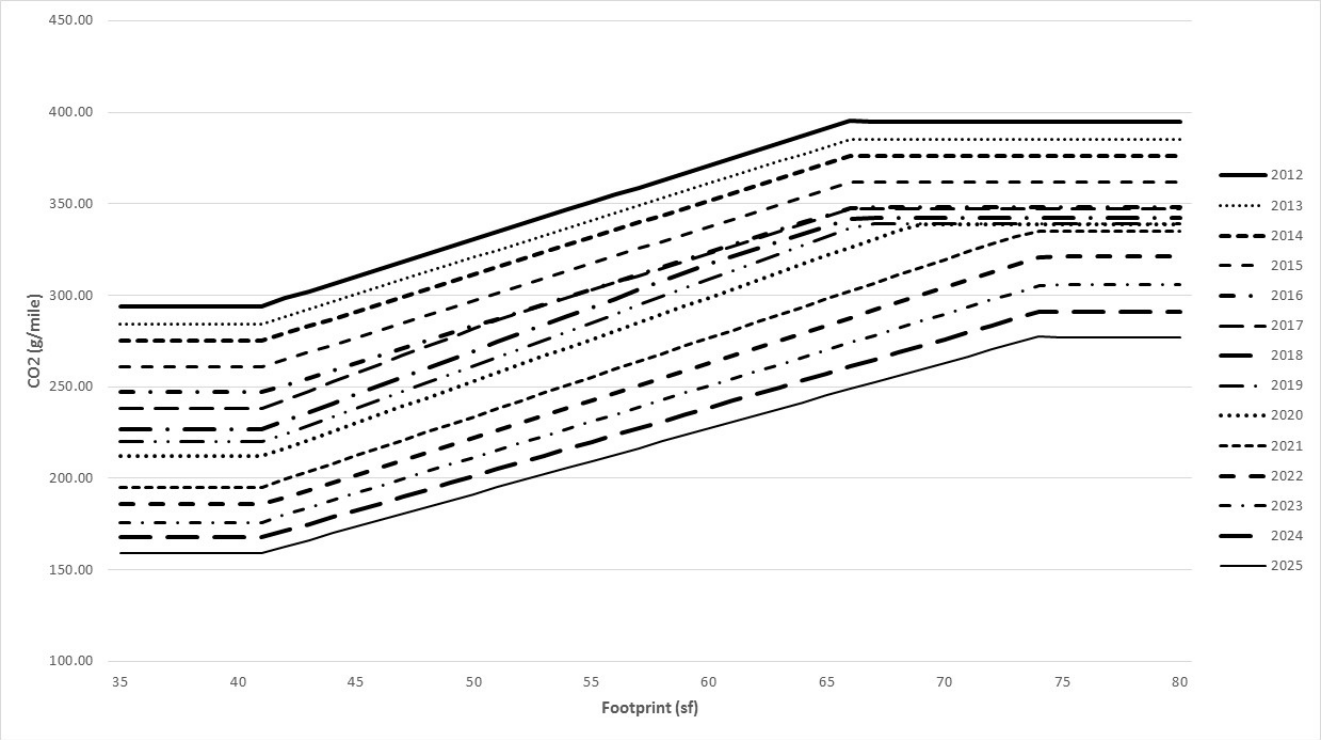


**Figure I.2 $CO_2$ (g/mile) Light Truck Standards Curves**

## 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, $CO_2$ 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.[29] 2016 was the

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

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. [30] 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.[31] 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[32] 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.[33]

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[30] See 40 CFR 86.1818-12(h).
[31] 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.
[32] See 40 CFR 86.1818-12(h)(1)(i) through (viii).
[33] 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.[34] 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)."[35] 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

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

[35] 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).[36] 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

[36] 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.[37] 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).[38]

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.[39] 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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[37] 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/eerm.nsf/vwAN/EE-0575.pdf/$file/EE-0575.pdf including its literature review, Chapter 1.1.

[38] 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.

[39] 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."[40] 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 $CO_2$ 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,

[40] 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.[41] 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.[42]

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 $CO_2$ 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 $CO_2$ 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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[41] EPA 2016 $CO_2$ and Fuel Economy Trends Report, Figures 6.2, 6.3 and 6.5.

[42] 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.[43] 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

[43] 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).[44] Consequently, the EPA does believe that the evidence supports the claim of the comments on this point.

[44] "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[45] 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

[45] 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.[46] 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.[47] That statute requires the Secretary of Transportation to consult with the EPA Administrator in establishing fuel economy standards.[48] 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."[49] 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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[46] "Cost, Effectiveness and Deployment of Fuel Economy Technologies for Light-Duty Vehicles," National Research Council of the National Academies, June 2015, Finding 10.2.
[47] 42 U.S.C. 32902(a).
[48] 42 U.S.C. 32902(b)(1).
[49] 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.[50]

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.[51] 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.

[50] 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.

[51] "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.

# EXHIBIT 3


# Comments of the National Coalition for Advanced Transportation

**On EPA's 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. 39,551**

**EPA Docket No. EPA–HQ–OAR–2015–0827**

**October 5, 2017**

**Submitted via Regulations.gov**

**Introduction and Executive Summary**

The National Coalition for Advanced Transportation ("NCAT" or "Coalition") submits these comments in response to the Environmental Protection Agency's ("EPA") and National Highway Traffic Safety Administration's ("NHTSA") 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, Docket No. EPA–HQ–OAR–2015–0827, 82 Fed. Reg. 39,551 (Aug. 21, 2017) ("Request for Comments").

NCAT is a coalition of companies that support electric vehicle and other advanced transportation technologies and related infrastructure, including business leaders engaged in energy supply, transmission and distribution; vehicle and component design and manufacturing; and charging infrastructure, battery and other energy-storage technology design, production and implementation, among other activities. Electric and other advanced vehicles and related technologies and infrastructure provide major economic and energy security benefits, and U.S. leadership in this space is critical to our economic health, global competitiveness and environmental quality. NCAT supports government initiatives that provide regulatory, financial and other support for emerging electric and other clean vehicle technologies, as well as related infrastructure, to compete in the marketplace—including but not limited to federal and state vehicle standards. The Coalition recognizes the critical role that States play in adopting and implementing vehicle standards that support advanced technologies, and supports an approach that provides regulatory certainty and stable, long-term signals to guide investment by many different stakeholders.

NCAT's key comments, set forth in detail below, are as follows:

- NCAT strongly urges EPA not to consider or undertake revision of the Model Year ("MY") 2021 standards. Revision to the MY 2021 standards is unwarranted, could not be justified under the Clean Air Act ("CAA"), would create needless and harmful regulatory uncertainty, and would undermine the effectiveness of EPA's and NHTSA's policy and stakeholder engagement process with regard to the MY 2022-2025 standards.

- If EPA wishes to reach a determination that the MY 2021 and/or MY 2022-2025 standards are no longer appropriate, such determination constitutes a rulemaking under CAA Section 202(a) that must meet all applicable requirements of the CAA and/or the Administrative Procedure Act ("APA") and EPA regulations and other applicable statutes and Executive Orders. Among other requirements, the agency would have to issue a new proposed determination and provide an opportunity for public notice and comment and public hearing before it is finalized. A determination that the standards are no longer appropriate, especially to the extent it relies on any new information, analysis or reasoning not previously offered for public comment, would not be a "logical outgrowth" of EPA's original proposal and would violate the notice-and-comment and public hearing requirements of CAA Section 307(d), the APA to the extent independently applicable, and/or EPA's 2012 regulations specific to the mid-term evaluation. In addition, if EPA wishes to reverse course with regard to the

November 2016 Mid-Term Evaluation Proposed Determination and the January 2017 Final Determination, it would be required to provide "a more detailed justification than what would suffice for a new policy created on a blank slate," especially to the extent that "its new policy rests upon factual findings that contradict those which underlay its prior policy" and given that its "prior policy has engendered serious reliance interests that must be taken into account." *See FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 515 (2009).

- The MY 2022-2025 standards remain appropriate under CAA Section 202(a). NCAT recognizes the procedural concerns that auto manufacturers and other stakeholders have raised with regard to the January 2017 Mid-Term Evaluation Final Determination. While EPA's reconsideration process affords the agency with the opportunity to receive additional information, undertake further analysis, and ensure more rigorous and complete engagement and coordination with NHTSA, the record before EPA supports the conclusion that the current MY 2022-2025 standards remain appropriate under Section 202(a). New information and analysis available since the rule was adopted in 2012 further strengthens the basis of this conclusion, including but not limited to substantial advances in technology, cost reductions and consumer options for electric and other advanced technology vehicles, and additional information on the economic, energy security and environmental benefits of such vehicles.

- To the extent EPA opts to reconsider the MY 2022-2025 standards, NCAT strongly urges the agency to ensure that any proposed revisions fully recognize and support the role of electric vehicles ("EVs") and other advanced technology vehicles; preserve the overall stringency and benefits of the harmonized National Program; and recognize and support the critical continuing role of state vehicle standards. Incentives for electric and advanced technology vehicles are affected by the overall stringency and structure of the standards, and by the specific provisions they include to address such vehicles—including how such vehicles are credited and whether and how upstream emissions are attributed to such vehicles. If EPA decides to reopen the standards, NCAT encourages the agency to focus on targeted changes and innovative policy approaches that will preserve and enhance program benefits to the greatest extent possible, including with regard to electric and advanced technology vehicles, while improving regulatory flexibility and reducing costs. Further, NCAT underscores the critical role that state standards play in supporting electric and advanced technology vehicles and related infrastructure investments. NCAT supports the continuation of the harmonized National Program and urges EPA to avoid undermining state authority or existing state standards—both in order to maintain their effectiveness and to avoid divergence in regulatory requirements, conflict or litigation that could create regulatory uncertainty for businesses and weaken market signals for investors. NCAT stands ready to dialogue with other stakeholders and to assist EPA and the Administration in the development of policy approaches that support these outcomes.

# I. APPLICABLE LEGAL FRAMEWORK

## A. Clean Air Act Section 202(a)

CAA Section 202(a)(1) directs EPA to promulgate standards for emissions of air pollutants from any class or classes of new motor vehicles or new motor vehicle engines which cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. 42 U.S.C. § 7521(a)(1). Following the Supreme Court's decision in *Massachusetts v. EPA*, 549 U.S. 497 (2007), holding that greenhouse gases ("GHGs") are within the CAA's definition of "air pollutant", *id.* at 528-29, EPA in 2009 issued an Endangerment Finding for GHGs.[1] This finding obligated EPA to set GHG emissions standards for motor vehicles,[2] which EPA promulgated for light-duty vehicles in rulemakings in 2010 for MY 2012-2016 and in 2012 for MY 2017-2025 ("2012 Rule").[3]

EPA considers several factors when setting vehicle emission standards under CAA Section 202(a). The vehicle emissions standards set by EPA are technology-based and are premised on a finding of technological feasibility. *Natural Res. Def. Council, Inc. v. EPA*, 655 F.2d 318, 322 (D.C. Cir. 1981). Relatedly, EPA considers the lead time for the standards. *See* 42 U.S.C. § 7521(a)(2) (standards must take effect after the period EPA "finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period."). EPA has interpreted Section 202(a) to allow the agency to set technology-forcing standards. *E.g.*, 77 Fed. Reg. at 62,673 (2012 Rule). EPA must also consider the cost to entities directly subject to the standards. *See, e.g., Motor & Equip. Mfrs. Ass'n Inc. v. EPA*, 627 F.2d 1095, 1118 (D.C. Cir. 1979). EPA considers safety in setting standards, and CAA Section 202(a)(4) prohibits use of emissions controls to comply with the standards if they "will cause or contribute to an unreasonable risk to public health, welfare, or safety in its operation or function." 42 U.S.C. § 7521(a)(4).

## B. Regulatory Requirements Applicable to the MTE

In the 2012 Rule that set MY 2017-2025 standards, EPA promulgated regulations providing for a mid-term evaluation ("MTE") through which EPA, before April 1, 2018, would determine whether the vehicle GHG emissions standards established for MY 2022-2025 are appropriate in light of the record before the EPA at that time. 40 CFR § 86.1818-12(h). The MTE process includes an opportunity for public comment before EPA makes this determination. In the event that EPA determines the MY 2022-2025 standards are not appropriate, EPA must initiate a rulemaking to revise the standards, to be either more or less stringent as appropriate. *Id.*

EPA must consider the information available on the factors relevant to setting GHG emission standards under CAA Section 202(a), including but not limited to:

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[1] EPA, Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act, 74 Fed. Reg. 66,496, 66,499 (Dec. 15, 2009).

[2] *See* 42 U.S.C. § 7521(a)(1).

[3] EPA & NHTSA, 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).

(i) the availability and effectiveness of technology, and appropriate lead time for introduction of technology;

(ii) the cost on the producers or purchasers of new motor vehicles/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 GHG emission standards on CAFE standards and a national harmonized program; and

(viii) the impact of the standards on other relevant factors. 40 CFR § 86.1818-12(h)(1).

EPA must make the MTE determination based on a record that includes the Draft Technical Assessment Report ("TAR"), and public comments on the TAR and appropriateness of the standards. 40 CFR § 86.1818-12(h)(2). EPA, NHTSA and the California Air Resources Board ("CARB") issued the TAR in July 2016.[4] In November 2016, based on the TAR, public comments, and the record before the agency, EPA issued a proposed determination that the MY 2022-2025 standards remained appropriate under CAA Section 202(a).[5] In January 2017, EPA issued a final determination ("2017 MTE Final Determination") confirming the MY 2022-2025 are appropriate and will be maintained going forward.[6]

In its Request for Comments, EPA requested comments and information on the following additional areas for MY 2022-2025:

"The impact of the standards on compliance with other air quality standards;

The extent to which consumers value fuel savings from greater efficiency of vehicles;

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[4] 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 (July 2016), *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF ("TAR").

[5] EPA, Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation (Nov. 2016) at 35-55, *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100Q3DO.pdf ("Nov. 2016 MTE Proposed Determination").

[6] 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), *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ91.pdf ("Jan. 2017 MTE Final Determination").

The ability for OEMs to incorporate fuel saving technologies, including those with 'negative costs,' absent the standards;

The distributional consequences on households;

The appropriate reference fleet;

The impact of the standards on advanced fuels technology, including but not limited to the potential for high-octane blends;

The availability of realistic technological concepts for improving efficiency in automobiles that consumers demand, as well as any indirect impacts on emissions;

The advantages or deficiencies in EPA's past approaches to forecasting and projecting automobile technologies, including but not limited to baseline projections for compliance costs, technology penetration rates, technology performance, etc.;

The impact of the standards on consumer behavior, including but not limited to consumer purchasing behavior and consumer automobile usage behavior (*e.g.* impacts on rebound, fleet turnover, consumer welfare effects, etc.); and

Any relevant information in light of newly available information."

82 Fed. Reg. at 39,553.

### C. Administrative Procedure Act and CAA Section 307

The Administrative Procedure Act ("APA") provides that a reviewing court will set aside an agency action if it is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with the law." 5 U.S.C. § 706(2)(A). Under CAA Section 307(d), the arbitrary and capricious standard of review applies to a court's review of a rulemaking under CAA Section 202(a). 42 U.S.C. § 7607(d); *see also, e.g., Natural Res. Def. Council, Inc. v. EPA*, 655 F. 2d at 328. As explained in Section I.D, *infra*, the MTE determination is a rulemaking under Section 202(a) and is subject to all procedural requirements for such a rulemaking. Even if EPA were instead to frame its determination as an adjudication (as it did in the 2016 MTE Proposed Determination and 2017 MTE Final Determination now being reconsidered), and that position were ultimately upheld, the determination would be subject to the arbitrary and capricious/not in accordance with law standard of review.

Under this standard, "the agency must examine the relevant data and articulate a satisfactory explanation for its action including 'a rational connection between the facts found and the decision made.'" *Motor Vehicle Mfrs. Ass'n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (internal citations omitted). The U.S. Court of Appeals for the D.C. Circuit has recognized in the CAA Section 202(a) standards context that their "examination of the record must be searching, for the necessity to review agency decisions, if it is to be more than a meaningless exercise, requires enough steeping in technical matters to determine whether the agency has exercised a reasoned discretion." *Natural Res. Def. Council, Inc. v. EPA*, 655 F. 2d at 328 (internal citations and quotations omitted). While a court will not substitute its own judgment

for that of the agency, the reviewing court has a "duty to consider whether the decision was based on a consideration of the relevant factors and whether there has been a clear error of judgment." *Id.* Importantly, a "permissible statutory construction under *Chevron* [*U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837 (1984)] is not always reasonable under *State Farm*: [a court] might determine that although not barred by statute, an agency's action is arbitrary and capricious because the agency has not considered certain relevant factors or articulated any rationale for its choice.'" *Republican Nat'l Comm. v. FEC*, 76 F.3d 400, 407 (D.C. Cir. 1996) (internal citations omitted).

Of particular significance in EPA's reconsideration of the 2017 MTE Final Determination and evaluation of the MY 2021 standards, an agency must provide a "reasoned analysis" when making a change in policy. *See State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29 at 57. As the Supreme Court has explained, "the agency need not always provide a more detailed justification than what would suffice for a new policy created on a blank slate," but "[s]ometimes it must – when, for example, its new policy rests upon factual findings that contradict those which underlay its prior policy; or when its prior policy has engendered serious reliance interests that must be taken into account." *FCC v. Fox Television Stations, Inc.*, 556 U.S. at 515-16 ("In such cases it is not that further justification is demanded by the mere fact of policy change; but that a reasoned explanation is needed for disregarding facts and circumstances that underlay or were engendered by the prior policy.") (internal citations omitted). Such would be the case for any EPA decision to reverse course with regard to the MTE determination for MY 2022-2025 and *a fortiori* with regard to the MY 2021 standards.

### D. Procedural Requirements for MTE Final Determination and Any Additional Rulemakings

EPA's regulations governing the mid-term evaluation process require EPA to determine whether the MY 2022-2025 standards are appropriate under Section 202(a) and the regulations specify that "[a]n opportunity for public comment shall be provided before making such determination." 40 CFR § 86.1818-12(h). Further, NCAT takes the position, consistent with those taken by the Alliance of Automobile Manufacturers and certain other stakeholders in comments on the November 2016 Proposed Determination, that EPA's MTE determination is a rulemaking subject to applicable requirements under the CAA and APA.[7] EPA took the position in the Proposed Determination and Final Determination that its action constituted an adjudication because it was not proposing to change the MY 2022-2025 standards, no new "policy-type rules or standards" would result and the "current regulatory status quo" would be "unchanged and unaltered."[8] Even if EPA were correct that the January 2017 MTE Final Determination was an

[7] *See* Comments of Alliance of Automobile Manufacturers on EPA Proposed Determination, Docket No. EPA-HQ-OAR-2015-0827-6156 (Dec. 30, 2016) at 11-13, *available at* https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6156; Comments of Global Automakers on EPA Proposed Determination, Docket No. EPA-HQ-OAR-2015-0827-6194 (posted to docket Jan. 4, 2017) at 8-12, *available at* https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6194.

[8] EPA, Nov. 2016 MTE Proposed Determination at 2-3 n.14; *see also* EPA, Jan. 2017 MTE Final Determination at 11 n.20; EPA, Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation Response to Comments (Jan. 2017) at 8-11, *available at* https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ9Y.pdf ("Jan. 2017 MTE Final Determination Response to Comments").

adjudication, those arguments would not apply if EPA instead determines to reach a MTE determination to revise the MY 2022-2025 standards. Under EPA's own regulations, any such determination would have prospective legal and policy consequences, obligating the agency to revise currently binding agency regulations and requiring the initiation of a new notice-and-comment rulemaking process. If EPA wishes to reach a determination that the MY 2022-2025 standards are no longer appropriate under CAA Section 202(a), this would require a reopening, augmentation and reassessment of the record underpinning the existing rule as well as the application of the law to that record, and would have the legal consequence of obligating the agency to make changes. There is no question that any such determination would constitute a "rule," which the APA defines as "an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy."[9]

EPA has made clear that its authority for the MTE determination is CAA Section 202(a),[10] such that the determination constitutes "the promulgation or revision of [a] regulatio[n] under section [202]" and is covered by the requirements of CAA Section 307(d).[11] Accordingly, EPA must meet all of the procedural requirements for a rulemaking under the CAA Section 307(d), including conducting a public hearing allowing interested persons to comment on a new proposed determination, and to submit "rebuttal and supplementary information" to the record for 30 days after the hearing.[12] The public hearing held on September 6, 2017, does not satisfy this requirement, as this hearing focused on EPA's request for comment on its reconsideration (announced on August 10, 2017 and published in the Federal Register on August 21, 2017), rather than on a proposed determination that the MY 2022-2025 standards are no longer appropriate.

Regardless of the legal status of EPA's MTE determination or the September 6, 2017 public hearing, if EPA wishes to reach a final determination that the MY 2022-2025 standards are no longer appropriate under Section 202(a), the agency must issue a new proposed determination to that effect and provide an opportunity for public comment and public hearing before it is finalized. A determination that the standards are no longer appropriate, especially to the extent it relies on any new information, analysis or reasoning not previously offered for public comment, would not be a "logical outgrowth" of EPA's original proposal and would violate the notice-and-comment requirements of CAA Section 307(d), the APA to the extent independently applicable, and EPA's 2012 regulations specific to the MTE. EPA's November 2016 Proposed Determination supported only a determination that the MY 2022-2025 standards should be maintained or made more stringent. To the extent EPA wishes to change course at this juncture, it must provide the public with a full and fair opportunity for meaningful comment on relevant new information, legal interpretations or policy reasoning or approaches on which it proposes to rely.[13]

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[9] 5 U.S.C. § 551(4).

[10] *See* 77 Fed. Reg. at 62,786 (2012 Rule).

[11] 42 U.S.C. § 7607(d)(1)(K).

[12] *Id.* § 7607(d)(5).

[13] *See, e.g., Conn. Light & Power Co. v. NRC*, 673 F.2d 525, 530-31 (D.C. Cir. 1982) ("If the notice of proposed rule-making fails to provide an accurate picture of the reasoning that has led the agency to the proposed rule, interested parties will not be able to comment meaningfully upon the agency's proposals. . . . In order to allow for useful criticism, it is especially important for the agency to identify and make available technical studies and data that it has employed in reaching the decisions to propose particular rules. . . . An agency commits serious procedural

As provided in EPA's regulations and as required by the CAA and APA, if EPA makes a final determination that the current MY 2021 and/or MY 2022-2025 standards are not appropriate, EPA must then initiate one or more new notice-and-comment rulemakings to revise the existing standards. Such rulemaking(s) must provide adequate time for stakeholder involvement and notice and comment and must provide adequate lead time for any changes to the existing standards. Such rulemaking(s) must comply with all relevant legal requirements, including those established by the CAA, the Small Business Regulatory Enforcement Fairness Act, the Environmental Research and Development Demonstration Act (which requires EPA to make any proposed regulation and relevant scientific and technical information available to the Science Advisory Board so that the Board can provide advice and comments on the adequacy of the scientific and technical basis for the proposal), and the Endangered Species Act (which requires consultation with the U.S. Fish and Wildlife Service and National Marine Fisheries Service for actions that "may affect" federally listed endangered or threatened species or result in the destruction or adverse modification of designated critical habitat of such species). The requirements of applicable Executive Orders must also be satisfied, including those for economic analysis under Executive Order 12866 and consultation with State and local officials under Executive Order 13132.

## II. EPA SHOULD NOT RECONSIDER THE MY 2021 STANDARDS

In its Request for Comments, EPA asks for comment on the continued appropriateness of the MY 2021 light-duty vehicle GHG standards based on the application of the factors described in its notice for evaluation of the MY 2022-2025 standards, or any other factors that commenters believe are appropriate. 82 Fed. Reg. at 39,553. NCAT strongly urges EPA not to consider or undertake revision of the MY 2021 standards. Revision to the MY 2021 standards is unwarranted, could not be justified under the CAA, would create needless and harmful regulatory uncertainty, and would undermine the effectiveness of the rulemaking process for the MY 2022-2025 standards.

First, for the same reasons set forth in Section III below with regard to the MY 2022-2025 standards (but *a fortiori*), the MY 2021 standards are amply supported by a well-developed record. There is no reasoned basis for concluding that the standards are no longer appropriate under CAA Section 202(a). For the same reasons set forth below with regard to the MY 2022-2025 standards, if anything, more recent information and analysis support making the MY 2021 standards more stringent, not less.

Second, reconsidering the MY 2021 standards would create uncertainty and impose resulting costs on manufacturers and others in industry that are relying on the standards. One of the significant benefits of the 2012 Rule was the substantial lead time that it provided, to support long-term planning, research and development and investments in development and commercialization of technologies to meet the standards. EPA has never revised an already-adopted vehicle standard under Section 202(a) for a particular model year. To do so now would be an unprecedented and severely damaging step for businesses in the near term. Further, it would

error when it fails to reveal portions of the technical basis for a proposed rule in time to allow for meaningful commentary."); *Ass'n of Private Sector Colls. & Univs. v. Duncan*, 681 F.3d 427, 461 (D.C. Cir. 2012) ("[A] final rule fails the logical outgrowth test and thus violates the APA's notice requirement where 'interested parties would have had to divine [the agency's] unspoken thoughts, because the final rule was surprisingly distant from the proposed rule.") (internal citations omitted).

create a negative precedent, seriously undermining regulatory certainty and businesses' ability to make investments in reliance on the stability of EPA standard-setting going forward. Finally, any change to the MY 2021 standards is certain to be challenged in court, further increasing uncertainty for businesses affected by the standards.

Third, reconsideration of the MY 2021 standards presents the prospect for needless divergence from and conflict with existing state standards. EPA has stated repeatedly its support for a "harmonized" national program that does not require manufacturers to meet different standards at the federal and state levels. Separate from EPA's MTE process, California has already completed its Midterm Review of its MY 2022-2025 standards under California state law—including the Low-Emission Vehicle ("LEV") III and Zero-Emission Vehicle ("ZEV") standards that have been adopted by a group of States accounting for nearly a third of the U.S. market for new vehicles—and has concluded that these standards remain appropriate and should be maintained.[14] California plainly has no intention of reconsidering its MY 2021 standards, so any revision of federal standards presents the prospect of needless divergence in federal and state standards—creating inefficiencies and adverse consequences for consumers and manufacturers.

Changing the existing MY 2021 standards would be a wasteful expenditure of agency and stakeholder resources. As noted above, revision of the standards would of course require a notice and comment rulemaking and clear record-based justification for departure from well-documented prior findings—taking account of the broad array of new record information on improved technologies, reduced costs, increased benefits of the standards, and so on. Changing the MY 2021 standards would require completion of the rulemaking on a very tight time frame. To the extent EPA seeks to undertake any such rulemaking in tandem with a NHTSA revision to the MY 2021 CAFE standards, the Energy Policy and Conservation Act ("EPCA") would require completion of the rulemaking (at least for MY 2021) one year earlier than would otherwise be required for MY 2022 and later years (*i.e.*, by April 2019, instead of April 2020).[15] EPCA's 18-month lead-time requirement applies equally to the initial promulgation of standards and to the promulgation of revised standards. Based on past experience with the pace of past annual CAFE rulemakings at NHTSA, this would effectively require proposal of the MY 2021 standards at least a year (if not more) in advance, just months from now. EPA and NHTSA would have to undertake the full regime of intensive analysis and consultation required to support such a rulemaking in an extraordinarily expedited time frame—including National Environmental Policy Act analysis, economic analysis required under Executive Order 12866, the Endangered Species Act, analysis of small business impacts under the Regulatory Flexibility Act, and consultation with State and local officials under Executive Order 13132, among other requirements. Near-term focus on revising the MY 2021 standards would require EPA and NHTSA to rush through analysis and decision making for MY 2021 standards that have major effects on the auto industry and across the economy—increasing the likelihood of mistakes and increasing litigation risk. Diverting scarce analytical and other resources to this rushed effort would negatively impact EPA's and

[14] *See* CARB, Resolution 17-3, "Advanced Clean Cars Midterm Review" (Mar. 24, 2017) at 15-17, *available at* https://www.arb.ca.gov/msprog/acc/mtr/res17-3.pdf; *see also* CARB, "California's Advanced Clean Cars Midterm Review: Summary Report for the Technical Analysis of the Light Duty Vehicle Standards" (Jan. 18, 2017) at ES-3–ES-9, *available at* https://www.arb.ca.gov/msprog/acc/mtr/acc_mtr_finalreport_full.pdf ("MTR Technical Report").

[15] *See* 49 U.S.C. § 32902(a) (requiring NHTSA to set CAFE standards at least 18 months before the beginning of each model year).

NHTSA's ability to focus priority on the task before them—which for NHTSA includes timely adoption of MY 2022-2025 standards. All of this would undermine the agencies' ability to develop well-considered, fully-supported decisions and stakeholders' ability to effectively participate in and inform this process.

## III. THE MY 2022-2025 STANDARDS REMAIN APPROPRIATE UNDER CAA SECTION 202(A)

NCAT recognizes the procedural concerns that were raised by auto industry and other stakeholders with regard to the January 2017 MTE Final Determination—including concerns about the adequacy of time for public comment on the proposed determination and the level of coordination with NHTSA in relation to its process for setting MY 2022-2025 CAFE standards, which should be harmonized to the greatest degree possible with EPA's GHG standards. NCAT supports EPA's use of discretion to initiate the reconsideration process for the MTE Final Determination (MY 2022-2025), which affords EPA the opportunity to receive additional information, undertake further analysis, and ensure more rigorous and complete engagement and coordination with NHTSA. As detailed below, however, the record before EPA supports the conclusion that the current MY 2022-2025 standards remain appropriate under Section 202(a). Further, new information and analysis available since the rule was adopted in 2012 further strengthens the basis of this conclusion. This includes information on substantial advances in technology, cost reductions and consumer options for electric and other advanced technology vehicles, as well as economic and energy security benefits from such vehicles. NCAT accordingly urges EPA to maintain the existing standards. As argued in Section IV, *infra*, if EPA opts to reopen the standards, it should ensure that any changes are appropriately targeted, preserve the overall stringency and benefits of the standards, including for electric and other advanced technology vehicles, and do not undermine state vehicle standards.

### A. The Record Supports EPA's January 2017 MTE Final Determination that the MY 2022-2025 Standards Remain Appropriate Under CAA Section 202(a)

The record upon which EPA relied to reach the January 2017 MTE Final Determination—including the TAR, public comments on the TAR and appropriateness of the standards, the Technical Support Document, and other key information and studies such as the National Academy of Sciences' 2015 study of the cost, effectiveness and deployment of fuel economy technologies[16]—supports the agency's determination that the current MY 2022-2025 standards remain appropriate under CAA Section 202(a), and should therefore remain in force.

First, the MTE record shows that EPA's existing MY 2022-2025 standards are feasible at reasonable cost and that they provide adequate lead time to manufacturers. EPA's own analysis shows that compliance with these standards can be achieved through a number of different technology pathways predominantly reflecting the use of technologies already in commercial

[16] National Research Council of the National Academies, "Cost, Effectiveness and Deployment of Fuel Economy Technologies for Light Duty Vehicles" (June 2015), *available at* https://www.nap.edu/catalog/21744/cost-effectiveness-and-deployment-of-fuel-economy-technologies-for-light-duty-vehicles.

production.[17] In addition, in the Proposed and Final Determinations and Technical Support Document, EPA substantiated its expectations that technological innovation would continue, and considered future technological developments when there was reliable evidence in the record that those technologies could be implemented by 2025.[18]

For example, EPA's prior determination included the following findings, which are fully supported by the record before the agency:

- Compliance with the existing standards can be achieved through a number of different technology pathways primarily reflecting application of technologies already in commercial production.[19]

- The standards can be met largely through advances in gasoline vehicle technologies, requiring only very low levels (2-3 percent) of penetration of strong hybrids and EVs (plug-in and battery EVs) to meet the standards.[20]

- Estimated per vehicle costs for complying with the MY 2025 standards are in the range of $875, considerably lower than the $1,100 per vehicle costs EPA estimated and found reasonable at the time it adopted the standards in 2012.[21]

- Given the rapid pace of industry innovation, there are and will continue to be emerging technologies available in the MY 2022-2025 time frame that could perform appreciably better and at potentially lower cost than the technologies in EPA's assessment.[22]

- Lead time for the standards is adequate, given that EPA first established the standards in 2012—13 years before the MY 2025 standards—and the demonstrated pace of industry innovation in meeting and exceeding the standards.[23]

Second, the record supports EPA's conclusion that the existing standards will achieve significant reductions in GHG emissions and oil consumption, and result in significant net economic benefits to consumers and the public.

- In the January 2017 MTE Final Determination, EPA found that that over the vehicle lifetimes the MY 2022-2025 standards will reduce GHG emissions by an

[17] EPA, Jan. 2017 MTE Final Determination at 3-4, 18, 22.

[18] *Id.* at 4, 19-20.

[19] *Id.* at 3-4, 18.

[20] *Id.* at 3-5, 12, 18, 24, 25.

[21] *Id.* at 4, 24.

[22] *Id.* at 4, 23-24.

[23] *Id.* at 22-24.

estimated 540 million metric tons and reduce oil consumption by 1.2 billion barrels.[24]

- EPA projected that these standards will reduce oil consumption by 50 billion gallons and save consumers nearly $92 billion in fuel cost over the lifetime of MY 2022-2025 vehicles.[25]

- EPA found that the existing MY 2022-2025 standards will yield net benefits of nearly $100 billion (using a 3 percent discount rate), greatly outweighing the costs.[26]

- These benefits include substantial fuel savings for consumers. For instance, considering the payback of an average MY 2025 vehicle meeting the standards as compared to an average MY 2021 vehicle, EPA found that consumers who finance their vehicle with a 5-year loan would see a payback within the first year. (About 86 percent of new vehicles are acquired using financing, with an average loan term of less than 6 years.)[27] Consumers that pay cash would see a payback within 5 years. Overall, consumers would receive $1,650 in net savings over the lifetime of their vehicles.[28] *See also infra* Section III.F.

EPA further concluded that the current standards would not have an adverse impact on the auto industry, noting that, notwithstanding that fuel prices are lower than when the standards were adopted in 2012, manufacturers have over-complied with the standards for the first four years of GHG standards and at the same time have increased new vehicle sales for seven straight years and sold a record number of new vehicles in 2016.[29] EPA concluded that while the standards are likely to have some effect on employment, the effect (whether positive or negative) is likely to be small enough that it would not be possible to distinguish it from other factors, notably macroeconomic conditions and their effect on sales.[30] The agency also analyzed the impact of the standards on safety and found no evidence of adverse effects.[31]

Finally, EPA concluded that the current state of technology and pace of technology development and implementation could support adoption of *more stringent* standards for MY 2022-2025. However, in deciding to maintain the MY 2022-2025 standards at the current levels, EPA recognized the importance of regulatory certainty and stability, the industry's need for long-term planning as lead time is required to accomplish significant redesigns, and NHTSA's and

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[24] *Id.* at 6.

[25] *Id.* at 24.

[26] *Id.* at 6, 24, 30.

[27] *Id.* at 7. *See also* Melinda Zabritski, "State of the Automotive Finance Market: A look at loans and leases in Q2 2017," Experian, at 11, *available at* http://www.experian.com/assets/automotive/quarterly-webinars/2017-Q2-SAFM_recording.pdf.

[28] EPA, Jan. 2017 MTE Final Determination at 7, 24.

[29] *Id.* at 8, 25.

[30] *Id.* at 26.

[31] *Id.* at 27.

CARB's decision-making as part of the harmonized national program.[32] The importance of regulatory stability and harmonization with NHTSA and state standards continues to counsel in favor of maintaining the current MY 2022-2025 standards. As argued in Section IV below, these same considerations support limiting any changes to the standards to targeted fixes that enhance flexibility while preserving the overall stringency and benefits of the standards.

### B. There Have Been Substantial Technology Advances and Cost Reductions Since the Standards Were Adopted—Supporting the Achievability and Reasonableness of the MY 2022-2025 Standards

As summarized above, there have been substantial advances in non-EV engine and vehicle technologies since 2012, and available analysis supports EPA's prior conclusion that manufacturers will rely on advanced gasoline vehicles as the predominant technologies to meet the MY 2025 standards, without significant reliance on electrification.[33] However, there also have been substantial advances in EV and other advanced transportation technologies and corresponding decreases in costs since the existing MY 2022-2025 standards were adopted in 2012, particularly with regard to batteries.

Examples of information on advancing technologies and falling costs, for both conventional and advanced technologies, include the following:

- In March 2017, CARB completed its Mid-Term Review of its Advanced Clean Cars Program, determining that no adjustments to the stringency of the standards are warranted.[34] The technical report supporting CARB's review includes an exhaustive analysis of the feasibility, cost and impacts of the MY 2022-2025 standards. CARB concludes, *inter alia*, that:
    - Manufacturers are over-complying with the GHG standards and over 1300 conventional vehicle model configurations already meet 2020 or later GHG standards with a conventional gasoline powertrain.[35]
    - Current MY 2022-2025 standards can be readily met at the same or lower cost than originally projected when the standards were adopted in 2012, predominantly with gasoline engines and transmission technologies.[36]
    - Battery technology has improved and battery costs have fallen dramatically (due to reduced material costs, manufacturing improvements, and higher manufacturing volumes). "Manufacturers are announcing longer range, more capable BEVs [battery EVs] and PHEVs [plug-in hybrid EVs] on widely diverse platforms, and within segments with high overall sales (i.e., cross-overs, mid-size cars). The most expensive components are also developing quickly and

[32] *Id.* at 8, 27-28.

[33] *Id.* at 3, 13.

[34] CARB, Resolution 17-3, *supra* note 14; *see also* CARB, MTR Technical Report, *supra* note 14.

[35] CARB, MTR Technical Report, *supra* note 14 at ES-2.

[36] *Id.* at ES-5.

improving in most ways: they are safer, cheaper, and more energy dense resulting in higher energy content battery packs."[37]

- In addition to improvements in the battery, manufacturers are announcing battery EVs that will be equipped with higher powered fast charging, reducing charging times.[38]

- In comparison with the 25 EV models offered today, manufacturers have announced more than 70 unique models to be released in the next five model years.[39]

- For battery EVs, a step change is occurring with multiple vehicles expected with 200+ miles of range at prices closer to conventional vehicles (even before state and federal incentives), with the first of these being launched in the very near term.[40]

- Recent analysis by the International Council on Clean Transportation ("ICCT") concluded that conventional engine and vehicle technologies can cost-effectively provide 8-10 percent greater efficiency improvements than is reflected in the most recent EPA analysis, that conventional technologies (without substantial reliance on electrification) could achieve the current MY 2022-2025 standards, and that compliance costs for the existing MY 2025 standards will be 34-40 percent lower than projected by EPA in its most recent MTE analysis.[41]

- The average price of battery packs used in EVs, which currently account for about half the cost of EVs, fell 73 percent from 2010 to 2016, and are continuing to drop.[42]

- The same ICCT study cited above concluded that, primarily because of rapid developments in battery pack technologies, EV costs will be reduced by $4,300-$5,300 of dollars per vehicle by 2025 compared to EPA estimates in support of the MY 2017-2025 standards. ICCT concludes that battery costs of $140/kWh is a realistic estimated value by 2025, as compared with EPA estimates of $180-200/kWh.[43]

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[37] *Id.* at ES-3, 41.

[38] *Id.* at ES-41.

[39] *Id.* at ES-3.

[40] *Id.* at ES-6.

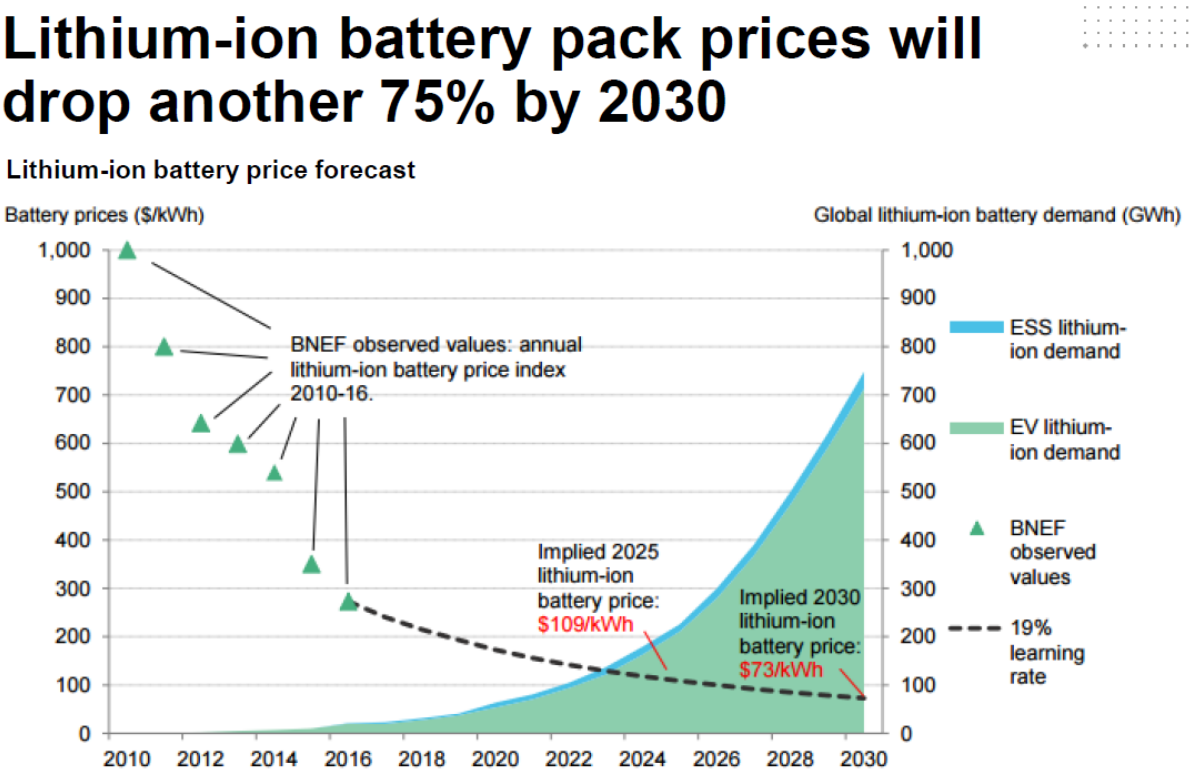
[41] ICCT, "Efficiency Technology and Cost Assessment for U.S. 2025-2030 Light-duty Vehicles" (Mar. 2017) at iv, *available at* http://www.theicct.org/US-2030-technology-cost-assessment.

[42] Michael Leibreich, Bloomberg New Energy Finance Summit (Apr. 25, 2017) at 53, *available at* https://data.bloomberglp.com/bnef/sites/14/2017/04/2017-04-25-Michael-Liebreich-BNEFSummit-Keynote.pdf; *see also* McKinsey & Company & Bloomberg New Energy Finance, "An Integrated Perspective on the Future of Mobility" (Oct. 2016) at 15-16, *available at* https://www.bbhub.io/bnef/sites/4/2016/10/BNEF_McKinsey_The-Future-of-Mobility_11-10-16.pdf.

[43] ICCT, Efficiency Technology and Cost Assessment, *supra* note 41 at 11, 15.

- GM has stated that its current battery costs for the Chevy Bolt at $145 per kWh and projects that it will achieve costs of approximately $100 per kWh by 2022.[44]

- A recent study by Bloomberg New Energy Finance projects that the cost of batteries will decrease by 77 percent between 2016 and 2030. As a result, this study concluded that EVs will be less expensive to buy than conventional gasoline vehicles by 2025 in the U.S. [45] This up-front cost parity point does not take into consideration the fuel savings over the lifetime of EV use as compared to gasoline vehicle use, which (as discussed *infra* at Section III.D) is substantial.




*Source*: Bloomberg New Energy Finance[46]

- As reflected in Tesla's comments on EPA's MTE, battery technologies are considerably more advanced and less costly than reflected in the July 2016 Draft Technical Assessment Report.[47] Tesla underscored that it is on track to achieve an additional 30

[44] Melissa Burden, "GM trims battery costs, aims to make profitable EVs," *Detroit News* (May 11, 2017), http://www.detroitnews.com/story/business/autos/general-motors/2017/05/11/profitable-evs/101531172/.

[45] Jess Shankleman, "Pretty Soon Electric Cars Will Cost Less Than Gasoline" (May 26, 2017), https://www.bloomberg.com/news/articles/2017-05-26/electric-cars-seen-cheaper-than-gasoline-models-within-a-decade; Jess Shankleman, "The Electric Car Revolution Is Accelerating" (July 6, 2017), https://www.bloomberg.com/news/articles/2017-07-06/the-electric-car-revolution-is-accelerating.

[46] Michael Leibreich, Bloomberg New Energy Finance Summit, *supra* note 42 at 54.

[47] Tesla, Comments on Draft Technical Assessment Report (Sept. 26, 2016) at 2-3, Docket No. EPA-HQ-OAR-2015-0827-4173, *available at* https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-4173.

percent reduction in battery costs as it ramps up large-scale battery production at its Gigafactory, that EPA's estimates of battery capacity required to achieve 200 miles of range are overstated, that Tesla's non-battery component costs are lower by double-digit percentages in comparison with figures considered in the draft TAR, and that warranty reserve costs in the TAR are overstated.[48] Tesla is separately filing comments in response to EPA's Request for Comments with updated information.

- An independent analysis commissioned by the Environmental Defense Fund found that, even without assuming increased penetration of EV technologies, a target of 30 grams per mile more stringent than EPA's MY 2025 target can be met cost effectively with the same advanced gasoline vehicle technologies projected to be used for the existing standards, and that lifetime fuel savings of $2700 from the more stringent standards would more than offset the $1579 per vehicle cost, without including society monetized benefits.[49] An updated version of this analysis, published in February 2017, confirmed these findings and concluded that a number of key conventional technologies are underutilized, that these technologies could achieve standards significantly more stringent than the existing standards, and that fuel savings would exceed increased average vehicle price by a factor of nearly three even for standards 90 grams per mile more stringent than the current standards for MY 2025.[50]

### C. Consumer Acceptance, Demand and Affordability Have Further Improved Since the Standards Were Adopted

The record before EPA supports the agency's earlier determination that the current standards would not have an adverse impact on the auto industry or vehicle sales. EPA observed that, notwithstanding that fuel prices are lower than when the standards were adopted in 2012, manufacturers have over-complied with the standards for the first four years of GHG standards and at the same time have increased new vehicle sales for seven straight years and sold a record number of new vehicles in 2016.[51] In addition to strong demand for conventional vehicles meeting increasing standards, demand for EVs and other advanced technology vehicles is strong and growing—particularly as manufacturers increasingly move towards broader vehicle offerings with improved range, and at costs closer to (and soon at parity with) those of comparable conventional vehicles.

Sales of EVs in the U.S. have continued to grow at a high rate, and demand for EVs is projected to increase substantially over the MY 2022-2025 period and into the future beyond then.

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[48] *Id.*

[49] *See* Comments by Environmental Defense Fund on EPA's Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emission Standards under the Midterm Evaluation (Dec. 30, 2016) at 12, Docket No. EPA-HQ-OAR-2015-0827-6201, *available at* https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6201.

[50] Tom Cackette & Rick Rykowski, "Technical Assessment of CO2 Emission Reductions for Passenger Vehicles in the Post-2025 Timeframe" (Feb. 2017), *available at* https://www.arb.ca.gov/lispub/comm/bccomdisp.php?listname=accmidterm2017&comment_num=39&virt_num=37

[51] EPA, Jan. 2017 MTE Final Determination at 8, 25.

Over the 2012 to 2016 period, plug-in EV sales tripled according to data compiled by Inside EVs.[52] In 2015, American consumers bought over 115,000 EVs, more than double the number purchased in 2012 notwithstanding lower gasoline prices. These sales included over 20 EV model types available from 15 different makers.[53] 2016 sales of EVs jumped by 37 percent year over year—to over 159,000 vehicles—and the number of offerings increasing to 30 different models.[54] Overall, U.S. EV sales have grown 32 percent annually on average from 2012-2016 and 45 percent over the year ending June 2017.[55] Projected U.S. sales of EVs vary widely, but virtually all market analysts predict substantial increases in consumer demand. The U.S. Energy Information Administration ("EIA") projects light-duty EV and hydrogen fuel cell vehicle sales will increase to about 1.5 million in 2025.[56] A recent study by the Edison Electric Institute and Institute for Electric Innovation projects that in the U.S. annual sales of plug-in electric vehicles ("PEVs") will exceed 1.2 million vehicles in 2025 and the total number of PEVs on the road will reach 7 million by 2025.[57] A July 2017 Bloomberg New Energy Finance global study "expect[s] an inflection point in adoption between 2025 and 2030, as EVs become economical on an unsubsidized total cost of ownership basis across mass-market vehicle classes."[58] A September 2017 study by Energy Innovation projects rapid growth in the EV market share with EVs projected to make up 65 percent of new U.S. light-duty vehicle sales by 2050.[59] Even lower end projections have recently been revised upwards.[60]

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[52] The total number of plug-in vehicles sold in the U.S. was 52,607 in 2012 and 158,614 in 2016. Inside EVs, "Monthly Plug-In Sales Scorecard," https://insideevs.com/monthly-plug-in-sales-scorecard/ (last visited Oct. 4, 2017).

[53] U.S. Dep't of Energy, "Revolution…Now: The Future Arrives for Five Clean Energy Technologies – 2016 Update" (Sept. 2016) at 10, *available at* https://energy.gov/sites/prod/files/2016/09/f33/Revolutiona%CC%82%E2%82%ACNow%202016%20Report_2.pdf

[54] Robert Rapier, "U.S. Electric Vehicle Sales Soared In 2016" (Feb. 5, 2017), *available at* https://www.forbes.com/sites/rrapier/2017/02/05/u-s-electric-vehicle-sales-soared-in-2016/#5cbf58be217f.

[55] Jeffery Rissman, Energy Innovation, "The Future of Electric Vehicles in the U.S." (Sept. 2017) at 1, *available at* http://energyinnovation.org/wp-content/uploads/2017/09/Future-of-EVs-Research-Note_FINAL.pdf?utm_source=newsletter&utm_medium=email&utm_campaign=newsletter_axiosgenerate&stream=politics.

[56] U.S. EIA, "Annual Energy Outlook 2017 with projections to 2050" (Jan. 5, 2017) at 97-98, *available at* https://www.eia.gov/outlooks/aeo/pdf/0383(2017).pdf.

[57] Adam Cooper & Kellen Schefter, Edison Electric Institute and the Institute for Electric Innovation, "Plug-in Electric Vehicle Sales Forecast Through 2025 and the Charging Infrastructure Required" (June 2017) at 1, http://www.edisonfoundation.net/iei/publications/Documents/IEI_EEI%20PEV%20Sales%20and%20Infrastructure%20thru%202025_FINAL%20(2).pdf.

[58] Bloomberg New Energy Finance, "Electric Vehicle Outlook 2017 – Executive Summary" (July 2017) at 2, *available at* https://data.bloomberglp.com/bnef/sites/14/2017/07/BNEF_EVO_2017_ExecutiveSummary.pdf.

[59] Jeffery Rissman, The Future of Electric Vehicles in the U.S., *supra* note 55 at 3.

[60] David Roberts, "The world's largest car market just announced an imminent end to gas and diesel cars," Vox (Sept. 13, 2017), https://www.vox.com/energy-and-environment/2017/9/13/16293258/ev-revolution.

As just one indicator of growing consumer awareness of and interest in EVs, Tesla recently announced that over 500,000 consumers had placed a $1000 deposit with the company for the company's recently released Model 3 EV sedan.[61]

Manufacturers are offering more types of EVs, with increasing range, making EVs increasingly attractive to consumers. In 2017, there were 27 electric vehicle options and 19 plug-in hybrid electric vehicle options available according to FuelEconomy.gov.[62] Most new battery electric vehicles ("BEVs") have ranges of about 100 miles on a fully charged battery, and an increasing number of models have ranges over 200 miles. (Ninety percent of all household vehicle trips in the U.S. cover less than 100 miles, according to the U.S. Department of Transportation.[63]) U.S. manufacturers Tesla and GM have begun delivery of new models—the Model 3 and Chevy Bolt, respectively—that offer over 200-mile range in an all-electric vehicle with starting retail prices in the range of $35,000 (Tesla Model 3) and $37,500 (Chevy Bolt EV) before application of tax credits.[64] The MY 2018 all-electric Nissan Leaf, scheduled for delivery starting in early 2018, will have a range of 150 miles, a range of new features and a starting retail price of under $30,000 before tax credits.[65] As a recent report by McKinsey & Company found significant increase in the estimated range for EVs since 2013: "For example, base models of the Nissan Leaf and Tesla Model S grew from 75 and 208 miles per charge in 2013 to about 107 and up to 249 miles in 2017, respectively."[66]

Several major global manufacturers have announced plans to scale up their offerings of EVs significantly in the coming years, including vehicles across a variety of price levels and with substantially increased range.

- GM announced on October 2, 2017 that in the next 18 months, it will introduce two new all-electric vehicles, which will be the first of at least 20 new all-electric vehicles that will launch by 2023. GM's Executive Vice President of Product Development, Purchasing and Supply Chain stated in connection with this announcement that "General Motors believes in an all-electric future."[67]

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[61] Fred Lambert, "Elon Musk confirms Model 3 reservations have surged to over half a million," electrek (July 29, 2017), https://electrek.co/2017/07/29/elon-musk-confirms-model-3-reservations-have-surged-to-over-half-a-million/.

[62] U.S. DOE & EPA, "Hybrids, Diesels, and Alternative Fuel Cars," https://www.fueleconomy.gov/feg/alternatives.shtml (last visited Sept. 25, 2017). For a few vehicle models there are several different options listed for a particular model.

[63] U.S. DOE, "Electric-Drive Vehicles" (Sept. 2017) at 2, *available at* https://www.afdc.energy.gov/uploads/publication/electric_vehicles.pdf.

[64] Tesla Model 3, https://www.tesla.com/model3 (last visited Sept. 25, 2017); Chevy Bolt EV, http://www.chevrolet.com/byo-vc/client/en/US/chevrolet/bolt-ev/2017/bolt-ev/trim (last visited Sept. 25, 2017).

[65] Nissan, "Nissan Leaf," https://www.nissanusa.com/electric-cars/2018-leaf/ (last visited Sept. 25, 2017).

[66] McKinsey & Company, "Electrifying insights: How automakers can drive electrified vehicle sales and profitability" (Jan. 2017) at 11, *available at* https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/electrifying-insights-how-automakers-can-drive-electrified-vehicle-sales-and-profitability (citing Department of Energy (www.FuelEconomy.gov), EPA).

[67] GM Corporate Newsroom, "GM Outlines All-Electric Path to Zero Emissions" (Oct. 2, 2017), http://media.gm.com/media/us/en/gm/news.detail.html/content/Pages/news/us/en/2017/oct/1002-electric.html. *See*

- Ford in 2015 announced plans to add 13 new electrified vehicles to its product portfolio by 2020, stating that more than 40 percent of Ford's nameplates globally would be electrified by then.[68] This year, Ford announced plans to launch seven new electrified vehicles in the next five years, including an F-150 hybrid and a Mustang hybrid as well as a new fully electric SUV with an estimated range of at least 300 miles.[69]

- Volkswagen has stated its intention to introduce two more all-electric vehicles to the U.S., in addition to several others planned for the U.S. market in the next few years,[70] and to build electric versions of all 300 of its brands' models.[71]

- Volvo recently announced that it will incorporate electric technology into *all* its vehicle model offerings by 2019.[72]

- BMW stated that 12 all-electric cars and 13 hybrids will be on the market by 2025, and Jaguar Land Rover has said that its entire fleet of new vehicles will be electric or hybrid-electric starting in 2020.[73]

As manufacturers offer more vehicles with better range, and invest more heavily in marketing these vehicles, there is reason to expect concomitant expansion in consumer demand. Independent studies show that consumer awareness of EVs remains low. A 2016 University of California Davis survey of new car buyers found that over 34 percent of respondents across the U.S. could not name a single battery EV available in the market.[74] That will change as deployment, options and marketing of EVs increase. Based on a survey of consumers in the U.S., Germany, Norway, and China, a recent McKinsey & Company report found that approximately 50 percent of all consumers today are not yet familiar with EVs and related technology. As a result, the report

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*also* Bill Vlasic & Neal E. Boudette, "G.M. and Ford Lay Out Plans to Expand Electric Models," *New York Times* (Oct. 2, 2017), https://www.nytimes.com/2017/10/02/business/general-motors-electric-cars.html.

[68] Ford Motor Company, "Ford Investing $4.5 Billion in Electrified Vehicle Solutions, Reimagining How to Create Future Vehicle User Experiences" (Dec. 10, 2015), https://media.ford.com/content/fordmedia/fna/us/en/news/2015/12/10/ford-investing-4-5-billion-in-electrified-vehicle-solutions.html.

[69] Ford Motor Company, "Ford Adding Electrified F-150, Mustang, Transit by 2020 in Major EV Push; Expanded U.S. Plant to Add 700 Jobs to Make EVs, Autonomous Cars" (Jan. 3, 2017), https://media.ford.com/content/fordmedia-mobile/fna/us/en/news/2017/01/03/ford-adding-electrified-f-150-mustang-transit-by-2020.html.

[70] Fred Lambert, "VW confirms two new upcoming electric cars for US market: I.D. Lounge and I.D. AEROe" (June 26, 2017), https://electrek.co/2017/06/26/vw-electric-cars-i-d-lounge-and-i-d-aeroe/.

[71] Christoph Rauwald, "VW to Build Electric Versions of All 300 Models by 2030" (Sept. 11, 2017), https://www.bloomberg.com/amp/news/articles/2017-09-11/vw-ceo-vows-to-offer-electric-version-of-all-300-models-by-2030.

[72] Jack Ewing, "Volvo, Betting on Electric, Moves to Phase Out Conventional Engines," *NY Times* (July 5, 2017), https://www.nytimes.com/2017/07/05/business/energy-environment/volvo-hybrid-electric-car.html.

[73] Russ Mitchell, "BMW plans 25 all-electric and hybrid vehicles by 2025; Jaguar shows off electric E-type (Sept. 7, 2017), http://www.latimes.com/business/autos/la-fi-hy-bmw-jaguar-ev-20170907-story.html. *See also* Adam Vaughan, "Jaguar Land Rover to make only electric or hybrid cars from 2020" (Sept. 7, 2017), https://www.theguardian.com/business/2017/sep/07/jaguar-land-rover-electric-hybrid-cars-2020.

[74] Kenneth S. Kurani, *et al*, "New Car buyers' valuation of zero-emission vehicles: California," Final Report for ARB Contract 12-332 (Mar. 31, 2016), *available at* https://www.arb.ca.gov/research/apr/past/12-332.pdf.

concluded that there is "substantial latent demand for EVs" as a large share of prospective new vehicle buyers in the U.S. (29 percent) consider purchasing an EV model.[75] Results of a survey by the Consumer Federation of America show that consumer interest in purchasing an EVs is increasing, and that this interest greatest among young adults.[76]

As discussed further at Section III.D, *infra*, utilities and others are investing in EV and other alternative fueling infrastructure, making charging/refueling more convenient for consumers. Based on data from the U.S. Department of Energy ("U.S. DOE") Alternative Fuels Data Center, there were approximately 13,400 EV charging outlets in 2012 whereas there are over 50,000 EV charging outlets today located at over 19,000 different stations across the U.S.[77] In California and the other nine States that have adopted the ZEV standards, over 17,000 Level 2 and 2,100 direct current fast charger connectors have been deployed for public use.[78] In addition, today the vast majority of vehicle charging is done at private residences.[79] As a another example of the expanding charging infrastructure for EVs, since 2012 Tesla has built over 5,400 Superchargers with the goal of enabling convenient long distance travel; in parallel, Tesla has built a network of more than 9,000 Destination Charging connectors that provide hotels, resorts, and restaurants with Tesla Wall Connectors, replicating the convenience of home charging.[80] NCAT anticipates a virtuous cycle of interaction between state and federal vehicle standards that help to incentivize EVs and advanced technology vehicles, commercial availability and deployment of such vehicles, and increasing investment in charging infrastructure.

Electric and other advanced technology vehicles save consumers money relative to conventional vehicles—putting more money in the pockets of families and individuals that choose such vehicles. Electricity is much cheaper than gasoline or diesel as a vehicle fuel, as shown in the figure below from the U.S. DOE Alternative Fuels Data Center.

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[75] McKinsey & Company, Electrifying insights, *supra* note 66 at 8 (citing Department of Energy (www.FuelEconomy.gov), EPA).

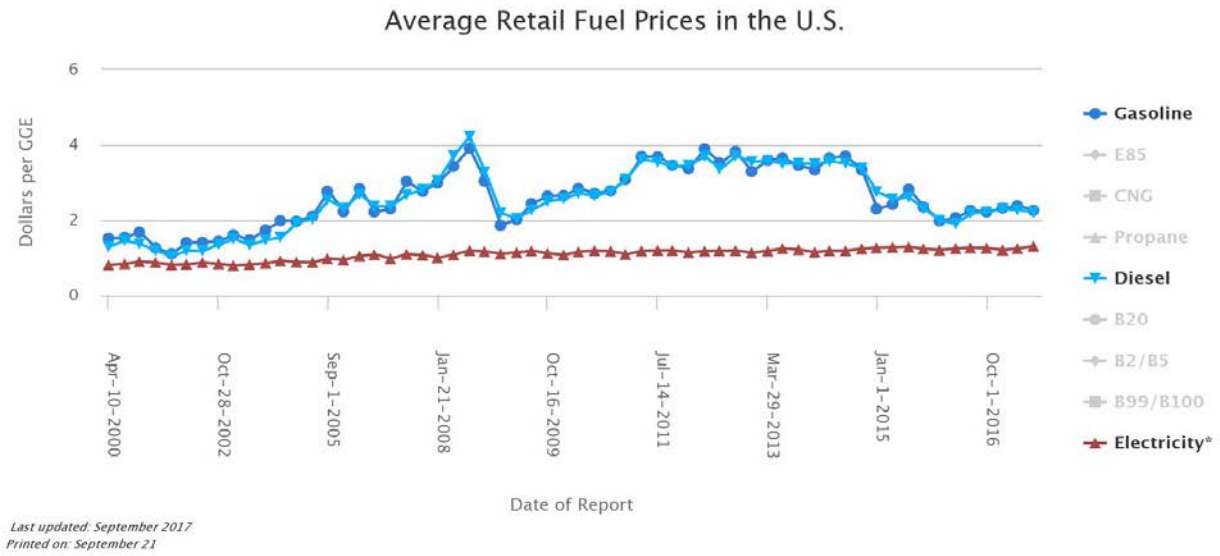
[76] Consumer Federation of America, "New Data Shows Consumer Interest in Electric Vehicles Is Growing" (Sept. 19, 2016), http://consumerfed.org/press_release/new-data-shows-consumer-interest-electric-vehicles-growing/.

[77] U.S. DOE Alternative Fuel Data Center, "Alternative Fueling Station Counts by States," https://www.afdc.energy.gov/fuels/stations_counts.html (last updated Oct. 5, 2017); U.S. DOE Alternative Fuel Data Center, "U.S. Alternative Fueling Stations by Fuel Type," https://www.afdc.energy.gov/data/10332 (last visited Sept. 25, 2017). These totals includes both public and private charging locations, but not residential electric charging infrastructure.

[78] CARB, MTR Technical Report, *supra* note 14 at ES-44.

[79] Adam Cooper & Kellen Schefter, Plug-in Electric Vehicle Sales Forecast Through 2025 and the Charging Infrastructure Required, *supra* note 57 at 7.

[80] Tesla, "Charging Is Our Priority" (Apr. 24, 2017), https://www.tesla.com/blog/charging-our-priority?redirect=no.




*Source*: U.S. DOE, Alternative Fuels Data Center[81] (This chart shows average monthly retail fuel prices in the United States from 2000 to 2017 in dollars per gasoline-gallon equivalents ("GGE").)

U.S. DOE estimates that electricity costs for a typical BEV range 2¢–4¢ per mile, as compared to conventional sedans for which the costs range about 10¢–15¢ per mile. For PHEVs, electricity costs range about 2¢–4¢ per mile and when running on gasoline, fuel costs range about 5¢–10¢ per mile.[82] Electric-drive vehicle owners can expect to save thousands of dollars in fuel costs over the life of the vehicle.[83] Furthermore, the price of electricity is less volatile than the price of gasoline and diesel fuels, so consumers can more reasonably forecast fuel costs over longer periods of time. Of additional benefit to consumers, BEVs typically require less maintenance than conventional vehicles and have far fewer moving parts and fewer fluids to change.[84] EVs typically had 20-40 percent lower five-year maintenance costs, based on a comparison of five EVs and comparable internal combustion engine counterparts from the same brand.[85] All in all, consumer savings on fuel can outweigh the additional upfront costs of EVs. For example, a recent study found that compared to a similar gasoline-powered vehicle, the average EV will save its owner more than $3,500 over the vehicle's lifetime even if gasoline prices remain in the range of $2.50 per gallon.[86]

In addition, as discussed above, upfront EV costs are declining considerably—primarily as a result of plummeting battery costs—making these vehicles increasingly affordable for

[81] U.S. DOE Alternative Fuel Data Center, "Fuel Prices" https://www.afdc.energy.gov/fuels/prices.html (last updated Sept. 11, 2017) (*Electric prices are reduced by a factor of 3.4 because electric motors are 3.4 times more efficient than internal combustion engines).

[82] U.S. DOE, Electric-Drive Vehicles, *supra* note 63 at 4.

[83] *Id.* at 3.

[84] *Id.* at 4.

[85] McKinsey & Company, Electrifying insights, *supra* note 66 at 15 (citing Edmunds).

[86] Frontier Group, "Drive Clean and Save: Electric Vehicles Are a Good Deal for California Consumers and the Environment" (July 2016) at 1-2, 6-7, *available at* http://environmentcaliforniacenter.org/sites/environment/files/reports/Drive%20Clean%20and%20Save%20June%202016.pdf

consumers. A recent Bloomberg New Energy Finance Report concluded that EVs and gasoline vehicles will reach cost parity in Europe and the U.S. by 2025, and that EVs will account for 54 percent of all light-duty vehicle sales globally by 2050.[87] A May 2017 report by UBS predicts that electric vehicles will be less expensive much sooner than expected, with EV prices in Europe comparable to traditionally-powered vehicles in 2018, with China expected to reach cost parity in 2023 and the U.S. in 2025. UBS also increased its forecasts for global electric car sales to 14 percent by 2025 (14.2 million vehicles).[88]

In addition to the new information discussed above in this section with respect to EV and other advanced vehicle technologies, new information about the financial benefits for consumers due to fuel savings from the existing MY 2022-2025 standards overall also supports a final determination keeping these standards in effect. For instance, a recent study by the ICCT estimates that the average new car fuel economy increase from 2021 to 2025 under EPA's currently adopted standards would save consumers on average $2,300–$2,600 in fuel costs over the lifetime of the vehicle. As presented in the figure immediately below, ICCT found that buyers of MY 2025 vehicles would fully recoup their investment in the third year of ownership for a cash purchase. Buyers who finance their vehicles (accounting for roughly 86 percent of new vehicle sales) would see a net positive cash flow starting immediately. ICCT concluded that the consumer benefits would be more than 3 times the costs of the standards under the reference fuel cost scenario, and fuel savings would be 2.4 times the costs if fuel prices stayed low.[89]

[87] Bloomberg New Energy Finance, "Electric Vehicles to Accelerate to 54% of New Car Sales by 2040" (July 6, 2017), https://about.bnef.com/blog/electric-vehicles-accelerate-54-new-car-sales-2040/; Jess Shankleman, Pretty Soon Electric Cars Will Cost Less Than Gasoline, *supra* note 45.

[88] Neil Winton, "Electric Car Price Parity Expected Next Year – Report" (May 22, 2017), https://www.forbes.com/sites/neilwinton/2017/05/22/electric-car-price-parity-expected-next-year-report/#13dff40a7922; UBS, "Q-Series UBS Evidence Lab Electric Car Teardown – Disruption Ahead?" (May 18, 2017), *available at* http://www.advantagelithium.com/_resources/pdf/UBS-Article.pdf.

[89] ICCT, "Consumer Benefits of Increased Efficiency in 2025-2030 Light-duty Vehicles in the U.S." (June 2017) at 10, *available at* http://www.theicct.org/sites/default/files/publications/US-LDV-Efficiency-Consumer-Benefits_ICCT_Briefing_21062017_vF.pdf.

**ICCT Analysis of Payback Period[90]**

| Scenario | Year of Ownership | Vehicle Technology | Vehicle Taxes | Insurance | Maintenance | Fuel Savings | Cumulative Operational Savings |
|---|---|---|---|---|---|---|---|
| U.S. EPA 2025 | 1 | -863 | -47 | -16 | -6 | 238 | -693 |
| | 2 | 0 | 0 | -15 | -6 | 232 | -483 |
| | 3 | 0 | 0 | -14 | -5 | 223 | -279 |
| | 4 | 0 | 0 | -13 | -5 | 213 | -85 |
| | 5 | 0 | 0 | -12 | -5 | 202 | 5th 100 |
| | 6 | 0 | 0 | -11 | -5 | 189 | 274 |
| | 7 | 0 | 0 | -10 | -4 | 178 | 437 |
| | 8 | 0 | 0 | -9 | -4 | 166 | 589 |
| ICCT 2025 | 1 | -543 | -30 | -10 | -7 | 238 | -351 |
| | 2 | 0 | 0 | -10 | -7 | 232 | -136 |
| | 3 | 0 | 0 | -9 | -7 | 223 | 3rd 72 |
| | 4 | 0 | 0 | -8 | -6 | 213 | 270 |
| | 5 | 0 | 0 | -8 | -6 | 202 | 459 |
| | 6 | 0 | 0 | -7 | -6 | 189 | 635 |
| | 7 | 0 | 0 | -6 | -5 | 178 | 801 |
| | 8 | 0 | 0 | -6 | -5 | 166 | 956 |

**Figure 1.** Technology costs, benefits, and payback period for the average model year 2025 vehicle purchased with cash.

Finally, increased fuel efficiency has positive distributional impacts for lower-income consumers. An in-depth recent study by David Greene and Jileah Welch concludes:

> "[F]uel economy improvements have produced greater benefits relative to income for the lower quintiles of the income distribution. The impact of increased fuel economy on the distribution of income has apparently been progressive. . . . Net benefits relative to income uniformly increase with decreasing income. In terms of total net savings, the greatest net benefits accrued to the three middle income quintiles. Estimation of the impacts of future improvements from 2015 to 2040 produces very similar results."[91]

In undertaking this analysis, the authors deliberately erred on the side of overestimating the impacts of fuel economy improvements on vehicle prices—making the conclusion with regard to distributional impacts robust.[92] Further, this analysis was based on costs from the 2015 National Academy of Sciences report, such that it does not reflect declining costs of compliance discussed above.

[90] *Id.* at 4.

[91] David L. Green & Jilleah G. Welch, "The Impact of Increased Fuel Economy for Light-Duty Vehicles on the Distribution of Income in the U.S.: A Retrospective and Prospective Analysis," Howard H. Baker Jr. Center for Public Policy White Paper 2:17 (Mar. 2017), at 5-6, *available at* http://bakercenter.utk.edu/wp-content/uploads/2017/03/WhitePaper2-2017.pdf.

[92] *Id.* at 12.

### D. The MY 2022-2025 Standards Support U.S. Investment, Infrastructure Development and Job Creation

Advanced technology vehicles and related infrastructure provide a major driver for economic activity and job creation across the country. Manufacturers are investing billions of dollars in advanced vehicle technologies in connection with the EV and advanced technology vehicle plans discussed in Section III.C, *supra*, and Section III.E, *infra*. And a U.S. DOE report concluded that the development and production of EVs is contributing to the economy as "the United States is the largest market for automotive lithium-ion batteries and lithium ion battery manufacturing has added about $400 million in value to the nation's economy in 2014."[93]

Utilities and others are also making substantial investments in infrastructure to support transportation electrification. A June 2017 study by the Edison Electric Institute and Institute for Electric Innovation provides an overview of the wide range of public and commercial funding that has supported plug-in electric vehicle charging infrastructure, including from automakers, electric companies, customers, state governments, and the federal government.[94] Across the U.S., electric utilities have already invested tens of millions of dollars in EV charging infrastructure programs.[95] And utilities are developing plans to invest billions of dollars in transportation electrification infrastructure in the near future.

For example, in California, PG&E, SCE, and SDG&E are currently implementing pilot programs to install EV-related infrastructure to support up to 12,500 charging stations with total budgets up to $197 million.[96] In January 2017, these three utilities requested California Public Utility Commission approval for over a billion dollars in transportation electrification investments.[97] In addition, the Southern California Association of Governments recently issued a 2016-2040 Regional Transportation Plan that relies in part (though not exclusively) on transportation electrification strategies. Overall, this plan is projected to require investments of

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[93] U.S. DOE, Revolution…Now: The Future Arrives for Five Clean Energy Technologies, *supra* note 53 at 10.

[94] Adam Cooper & Kellen Schefter, Plug-in Electric Vehicle Sales Forecast Through 2025 and the Charging Infrastructure Required, *supra* note 57 at 13 (Table A-1).

[95] M.J. Bradley & Associates, LLC, "Accelerating the Electric Vehicle Market Potential Roles of Electric Utilities in the Northeast and Mid-Atlantic States" (Mar. 2017) at Appendix A, *available at* http://www.mjbradley.com/sites/default/files/MJBA_Accelerating_the_Electric_Vehicle_Market_FINAL.pdf.

[96] California Public Utilities Commission ("CPUC"), "Zero-Emission Vehicles," http://www.cpuc.ca.gov/zev/ (last visited Sept. 25, 2017); CPUC, http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Infrastructure/RDD_and_Emerging_Programs/Alternative_Fuel_Vehicles/IOUInfrastructurePrograms.pdf (last visited Sept. 25, 2017).

[97] CPUC, "Transportation Electrification Activities Pursuant to Senate Bill 350," http://www.cpuc.ca.gov/sb350te/ (last visited Sept. 25, 2017); CPUC, http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy/Energy_Programs/Infrastructure/RDD_and_Emerging_Programs/Alternative_Fuel_Vehicles/SB350Applications.pdf (last visited Sept. 25, 2017).

$556 billion, including $246 billion in capital improvements; it would result in the creation of 351,000 additional jobs.[98]

Although California clearly leads the country in this area, these investments are an indicator of future opportunities across the country. EVs on the road in the U.S. today represent about 1 TWh of consumption, but according to one recent announcement this could grow to over 550 TWh by 2040[99]—providing opportunities for substantial new investments in grid modernization and associated economic activity and jobs.

With respect to the impacts of the existing EPA MY 2022-2025 standards on jobs, in the January 2017 MTE Final Determination EPA concluded 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."[100] EPA's conclusion in the January 2017 MTE Final Determination is well-supported in the existing record, including in the TAR Chapter 7, November 2016 MTE Proposed Determination Appendix at A-87–A-88, A-94–A-95, MTE Proposed Determination TSD Chapter 4.2.1, and January 2017 Response to Comments at 138-142.

However, more recent documentation of the employment benefits associated with EPA's existing MY 2022-2025 standards, including with respect to the growth in jobs relating to the expansion of EVs and other advanced technology vehicles, further bolsters this record and is summarized below. For example, in December 2016, U.S. DOE's National Renewable Energy Laboratory ("NREL") published its National Economic Value Assessment of Plug-in Electric Vehicles. NREL analyzed the impacts of the introduction of PEVs and electric vehicle supply equipment infrastructure on a variety of sectors within the U.S. economy under scenarios with different assumptions. Overall, the report concluded that "introduction of PEVs has positive impacts for nearly all economic indicators in each scenario."[101] NREL found that under its "Aggressive" and "Low Cost" scenarios, there would be an average (over 2015–2040) of approximately 51,500 to 108,400 additional jobs per year as well as an increase in GDP of $6.6 billion to $9.9 billion per year, respectively.[102]

In January 2017, CARB released the *California's Advanced Clean Cars Midterm Review Summary Report for the Technical Analysis of the Light Duty Vehicle Standards*, which presents

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[98] Southern California Association of Governments, "2016-2040 Regional Transportation Plan/Sustainable Communities Strategy" (Apr. 2016) at 8-9, *available at* http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS.pdf

[99] Smart Electric Power Alliance, "Utilities and Electric Vehicles: The Case for Managed Charging" (Apr. 2017) at 5, *available at* https://sepapower.org/resource/ev-managed-charging/ (citing Bloomberg New Energy Finance, EV sales forecast in the US 2010-2040 (May 2016)).

[100] EPA, Jan. 2017 MTE Final Determination at 26.

[101] U.S. DOE, NREL, "National Economic Value Assessment of Plug-in Electric Vehicles" (Dec. 2016) at xxiv, *available at* https://www.afdc.energy.gov/uploads/publication/value_assessment_pev_v1.pdf.

[102] *Id.* The main "Aggressive" scenario assumes approximately 73 million PEVs are deployed by 2035 (27 percent of the projected total light-duty vehicle fleet in that year), and the "Low Cost" variation on the Aggressive scenario assumes 79 million EVs by 2035 under low cost assumptions for vehicle technology and EV supply equipment. *Id.* at vii, 23, 66.

an overview of recent studies addressing the net job growth stimulated by further development of zero-emissions vehicles and plug-in electric vehicles.[103] CARB summarized the results of the review of existing literature: "[a]lthough the scenarios and assumptions behind each study vary, their results suggest that harmonized fuel economy and GHG standards will generate considerable employment benefits by 2030, ranging from 38,000 to 236,000 net jobs in California and 129,185 to 1.9 million net jobs in the U.S."[104]

In May 2017, the BlueGreen Alliance released an updated report concluding that "[m]ore than 1,200 U.S. factories and engineering facilities in 48 states—and 288,000 American workers—are building technology that improves fuel economy for today's innovative vehicles."[105]

Finally, NCAT notes that other jobs analyses that suggest negative impacts from EPA's current standards are flawed and accordingly should not be relied on. For example, as EPA is already aware, the agency recently analyzed employment modeling conducted by the U.S. Center for Automotive Research ("USCAR") and has documented how cost assumptions employed in the USCAR analysis were not supported and how, if EPA's assumptions about cost are instead used, USCAR's modeling results would instead show an *increase* in auto manufacturing jobs and total U.S. jobs as compared to the absence of the standards.[106]

### E. Strong MY 2022-2025 Standards Are Essential to Maintaining U.S. Competitiveness in Global Markets

The global market for electric vehicles and other advanced technology vehicles and supporting technologies is expanding rapidly and projected to grow dramatically in the coming decades—presenting a major market opportunity for U.S. companies. Strong U.S. standards will play a critical role in helping to ensure that U.S. companies are well positioned to compete in these rapidly expanding new markets.

According to the International Energy Agency ("IEA"), the global count of electric cars surpassed 2 million vehicles in 2016 after crossing the 1 million vehicle threshold in 2015.[107] The IEA now predicts that that the electric car stock will range between 9 million and 20 million by 2020 and between 40 million and 70 million by 2025.[108] As described above, analysts are increasingly projecting that EVs will reach cost parity with conventional vehicles in China, Europe and the U.S. in the 2018-2025 time frame and could account for an increasingly substantial

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[103] CARB, MTR Technical Report, *supra* note 14 at B-121–B-125.

[104] *Id.* at B-122; *see also id.* at B-122-25, Table 22 & 23.

[105] BlueGreen Alliance & NRDC, "Supplying Ingenuity II: U.S. Suppliers of Key Clean Fuel-Efficient Technologies" (May 2017) at 3, *available at* https://www.bluegreenalliance.org/resources/supplying-ingenuity-ii-u-s-suppliers-of-key-clean-fuel-efficient-vehicle-technologies/.

[106] *See* EPA Memorandum from Robin Moran to Docket EPA-HQ-OAR-2015-0827 regarding Meeting with Center for Automotive Research on April 17, 2017 (May 11, 2017), *available at* https://www.regulations.gov/document?D=EPA-HQ-OAR-2015-0827-6322.

[107] International Energy Agency, "Global EV Outlook 2017 Two Million and Counting" (2017) at 5, *available at* https://www.iea.org/publications/freepublications/publication/GlobalEVOutlook2017.pdf.

[108] *Id.* at 6.

proportion of global vehicle sales in that time frame and beyond (14 percent by 2025 and 54 percent by 2050). [109]

In tandem with these developments, other countries representing a large proportion of global vehicles markets are increasingly moving towards aggressive low- and zero-emission vehicle standards and policies, which will shape global markets in the coming decades:

- China—which represents around 30 percent of the global auto market for passenger vehicles—recently announced it is considering a ban on cars that run on fossil fuels, indicating the government wants tighter fuel consumption controls for engines and is considering more EV sales credits.[110]

- In July 2017, the United Kingdom and France committed to banning sales of new diesel- and gasoline-fueled cars by 2040.[111]

- In June 2017, India announced its intention to sell only electric cars by 2030.[112]

- Norway has announced it will ban the sale of all fossil fuel-based cars by 2025.[113]

Global auto manufacturers are making major commitment to advanced technology vehicles, *see* supra Section III.C, and there has been substantial investment in this area already. For instance, China plans to build more than 12,000 new charging stations by 2020 to meet the demands of over 5 million PEVs.[114] Volkswagen intends to spend 20 billion euros ($24 billion) by 2030 to roll out electric versions of all 300 models, and spend another 50 billion euros ($60

[109] Neil Winton, Electric Car Price Parity Expected Next Year, *supra* note 88; UBS, Q-Series UBS Evidence Lab Electric Car Teardown, *supra* note 88; Jess Shankleman, Pretty Soon Electric Cars Will Cost Less Than Gasoline, *supra* note 45.

[110] Kenneth Rapoza, "To Promote Electric Cars, China Considers Move To Ban Gas Guzzlers" (Sept. 11, 2017), https://www.forbes.com/sites/kenrapoza/2017/09/11/to-promote-electric-cars-china-considers-move-to-ban-gas-guzzlers/#2374490551b7; Bloomberg News, "China Fossil Fuel Deadline Shifts Focus to Electric Car Race" (Sept. 10, 2017), https://www.bloomberg.com/news/articles/2017-09-10/china-s-fossil-fuel-deadline-shifts-focus-to-electric-car-race-j7fktx9z; Russ Mitchell & Jessica Meyers, "China is banning traditional auto engines. Its aim: electric car domination" (Sept. 12, 2017), http://www.latimes.com/business/autos/la-fi-hy-china-vehicles-20170911-story.html; David Roberts, The world's largest car market just announced an imminent end to gas and diesel cars, *supra* note 60.

[111] Steven Castle, "Britain to Ban New Diesel and Gas Cars by 2040" (July 26, 2017), https://www.nytimes.com/2017/07/26/world/europe/uk-diesel-petrol-emissions.html; Jack Ewing, "France Plans to End Sales of Gas and Diesel Cars by 2040" (July 6, 2017), https://www.nytimes.com/2017/07/06/business/energy-environment/france-cars-ban-gas-diesel.html.

[112] Jackie Wattles, "India to sell only electric cars by 2030" (June 3, 2017), http://money.cnn.com/2017/06/03/technology/future/india-electric-cars/index.html.

[113] Jess Staufenberg, "Norway to 'completely ban petrol powered cars by 2025'" (June 6, 2016), http://www.independent.co.uk/environment/climate-change/norway-to-ban-the-sale-of-all-fossil-fuel-based-cars-by-2025-and-replace-with-electric-vehicles-a7065616.html.

[114] Kenneth Rapoza, To Promote Electric Cars, China Considers Move To Ban Gas Guzzlers, *supra* note 110.

billion) to buy the batteries for these vehicles.[115] Mercedes-Benz plans to invest 10 billion euros ($10.8 billion) to bring more than 10 new electric cars to market by 2022.[116] In the U.S., for example, Mercedes recently announced that it will spend $1 billion to upgrade production capabilities to manufacture electric vehicles and batteries in Alabama, which will create 600 new jobs.[117] Ford announced in 2015 that it would be investing $4.5 billion in EV technologies by 2020[118] and earlier this year announced plans to invest $700 million to expand a Michigan plant into a factory that will build high-tech autonomous and electric vehicles, creating 700 new jobs.[119] On October 2, 2017, Ford announced plans to shift capital investments, including to develop more electric and hybrid cars, on top of the $4.5 billion previously announced.[120]

U.S. companies must continue to invest in advanced vehicle technologies to keep up, and strong U.S. standards play a key role in ensuring U.S. companies' competitiveness. NCAT supports an approach that helps assure U.S. leadership and provides regulatory certainty and stable, long-term signals for investment, research and development, and commercialization.

### F. The Energy and Environmental Benefits of the MY 2022-2025 Standards Are Even Greater Than Projected When They Were Adopted

#### 1. Energy Security Benefits

Electric, natural gas and hydrogen vehicles have substantial benefits in moving the U.S. transportation system towards reliance on a diverse supply of U.S.-produced energy resources, reducing reliance on imported oil, and reducing overall energy use.

Transportation fuel makes up a large portion of U.S. energy consumption and energy imports. Although U.S. production of oil is increasing, we still rely on imported oil; net imports (imports minus exports) were equivalent to roughly 25 percent of U.S. petroleum consumption in

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[115] Christoph Rauwald, "VW to Build Electric Versions of All 300 Models by 2030" (Sept. 11, 2017), https://www.bloomberg.com/amp/news/articles/2017-09-11/vw-ceo-vows-to-offer-electric-version-of-all-300-models-by-2030.

[116] Reuters Staff, "Daimler accelerates electric car program" (Mar. 29, 2017), http://www.reuters.com/article/us-daimler-agm/daimler-accelerates-electric-car-program-idUSKBN1700N7.

[117] Ivana Kottasová, "Mercedes-Benz will spend $1 billion to upgrade its production capabilities in Alabama and jump-start its electric vehicle program in the U.S." (Sept. 22, 2017), http://money.cnn.com/2017/09/22/news/economy/mercedes-alabama-billion-investment-jobs/.

[118] Ford Motor Company, "Ford Investing $4.5 Billion in Electrified Vehicle Solutions, Reimagining How to Create Future Vehicle User Experiences (Dec. 10, 2015) , https://media.ford.com/content/fordmedia/fna/us/en/news/2015/12/10/ford-investing-4-5-billion-in-electrified-vehicle-solutions.html.

[119] Ford Motor Company, "Ford Adding Electrified F-150, Mustang, Transit by 2020 in Major EV Push; Expanded U.S. Plant to Add 700 Jobs to Make EVs, Autonomous Cars" (Jan. 3, 2017), https://media.ford.com/content/fordmedia-mobile/fna/us/en/news/2017/01/03/ford-adding-electrified-f-150-mustang-transit-by-2020.html.

[120] Joseph White, "Ford to cut costs $14 billion, invest in trucks, electric cars: CEO" (Oct. 3, 2017), https://www.reuters.com/article/us-ford-motor-ceo/ford-to-cut-costs-14-billion-invest-in-trucks-electric-cars-ceo-idUSKCN1C82NL.

2016, with over a third of U.S. imports coming from OPEC countries.[121] By increasing fuel economy of passenger cars and light trucks, the United States has the potential to achieve significant reductions in imported oil use, thus reducing dependence on foreign oil.

In the July 2016 TAR, based on modeling conducted by the agencies, EPA and NHTSA found that "on balance, each gallon of fuel saved as a consequence of the [Light-Duty Vehicle] GHG/fuel economy standards is anticipated to reduce total U.S. imports of petroleum by 0.9 gallons."[122] In the MTE Final Determination EPA issued in January 2017, EPA estimated that over the vehicle lifetimes the MY 2022-2025 standards will reduce oil consumption by 1.2 billion barrels (around 50 billion gallons).[123]

Large-scale expansion of advanced technology vehicles can substantially increase U.S. energy independence, while capitalizing on domestic energy resources. First, electric vehicles are far more energy efficient overall than conventional fuel vehicles. All-electric vehicles are approximately three times more efficient than internal combustion engine-powered vehicles, as most electric vehicles are rated as equivalent to more than 100 miles per gallon in terms of fuel efficiency.[124] Further, transportation electrification relies upon and supports U.S. energy production from a diverse set of fuels and sources, including natural gas, coal, nuclear and renewables. Based on data from the U.S. EIA, the top sources of electricity generation in the U.S. today are natural gas (34 percent of 2016 generation) and coal (30 percent of 2016 generation)—in which the U.S. is a leading global producer and net exporter. Nuclear power accounted for 20 percent of U.S. generation, and renewables (including hydropower, wind power, biomass, solar power, and geothermal power) accounted for 15 percent.[125] Natural gas- and hydrogen-fueled vehicles similarly capitalize on U.S. energy resources. Shifting transportation energy demand increasingly towards electricity, hydrogen and natural gas will support U.S. production of energy from this diverse and balanced set of fuel sources—increasing U.S. energy production and reducing reliance on imported oil, and price fluctuation risks.

### 2. Electric Grid Management Benefits

In addition to these general energy security and energy efficiency benefits, scaling up of EVs will provide substantial benefits for the management of the electric grid itself.

Importantly, by improving utilization of the existing power grid and spreading fixed costs over a larger base of sales, EV use can benefit not just EV owners, but other electricity consumers as well. For instance, as explained in Southern California Edison's recent testimony before the California Public Utilities Commission, transportation electrification can benefit all customers by spreading fixed costs across incremental load, therefore putting downward pressure on electricity

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[121] U.S. EIA, "Oil Imports and Exports" (May 8, 2017), https://www.eia.gov/energyexplained/index.cfm?page=oil_imports.

[122] EPA, NHTSA & CARB, TAR at 10-23.

[123] EPA, Jan. 2017 MTE Final Determination at 6, 24.

[124] U.S. DOE, National Renewable Energy Lab, "At A Glance: Electric-Drive Vehicles" (July 2016) at 2, *available at* https://www.afdc.energy.gov/uploads/publication/electric-drive_vehicles.pdf.

[125] U.S. EIA, "Electricity Explained" (May 10, 2017), https://www.eia.gov/energyexplained/index.cfm?page=electricity_in_the_united_states.

rates, integrating renewable energy (by charging EVs when renewable energy is more abundant and their load is less costly), and improving system utilization.[126] The Electric Power Research Institute further substantiates this point in a recent study.[127]

In addition, because consumers have some flexibility with regard to the time of day at which they charge EVs, charging can be managed to rely on baseload power generation or excess renewable generation rather than drawing electricity from the grid during peak times. A number of utilities across the country are utilizing time of use rates to encourage consumers to charge EVs at off-peak times. Managing charging times for EVs will provide multiple benefits, including reducing the amount of generating capacity that needs to be built, smoothing out demand, capitalizing on times when there is abundant availability of cleaner renewable power (thus reducing "curtailment" of such resources and reducing overall emissions from electricity generation), and reducing costs for all consumers across the system.[128] In the future, EVs are expected to provide a means of facilitating storage of energy and transfer back to the grid to assist utilities in meeting peak demand—an approach referred to as vehicle grid integration.[129]

The U.S. DOE's NREL recently conducted a simulation in which a utility generates half its electricity from renewable sources. The simulated results, based on three million EVs implementing 50 percent optimized charging, demonstrated substantial annual benefits to utilities using managed charging, including: generation of $310 million in grid savings; reduction of electricity costs by 1–3 percent; reduction in peak demand by 1.5 percent; reduction in grid-related carbon dioxide emissions by 1–4 percent; and reduction in renewable curtailment by 25 percent.[130]

### 3. Environmental Benefits

The current MY 2022-2025 standards have substantial environmental benefits, most notably with regard to GHGs. In the January 2017 MTE Final Determination, EPA projected 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."[131]

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[126] Southern California Edison, "Testimony of Southern California Edison Company in Support of its Application of Southern California Edison Company (U 338-E) For Approval of its 2017 Transportation Electrification Proposals" (Jan. 20, 2017), *available at* http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/F5582C9D0A9A3659882580AE007F74A4/$FILE/A1701XXX-SCE%20TE%20Testimony%201-20-17.pdf ("Transportation Electrification Proposals Testimony").

[127] Electric Power Research Institute, "The Value of Transportation Electrification Three Preliminary Case Studies of Impacts on Utility Stakeholders" (May 2016) at 1-4, 1-6, *available at* http://www.chargevc.org/wp-content/uploads/2016/10/6-EPRI%20-%20The%20Value%20of%20Transportation%20Electrification.pdf (describing transportation electrification net benefits to all customers).

[128] *See, e.g.*, CARB, MTR Technical Report, *supra* note 14 at D-25; Southern California Edison, Transportation Electrification Proposals Testimony, *supra* note 126 at 15-16; CalETC, "Evaluating Methods to Encourage Plug-in Electric Vehicle Adoption" (Oct. 2016) at 6, *available at* http://www.caletc.com/wp-content/uploads/2016/10/PIA-Incentive-Survey-Paper-CS5-final-cosmetic.pdf.

[129] *See, e.g.*, CARB, MTR Technical Report, *supra* note 14 at D-23–D-24; CalETC, Evaluating Methods to Encourage Plug-in Electric Vehicle Adoption, *supra* note 128 at 7.

[130] U.S. DOE, NREL, "Connecting Electric Vehicles to the Grid for Greater Infrastructure Resilience" (Apr. 20, 2017), https://www.nrel.gov/news/program/2017/connecting-electric-vehicles-to-the-grid-for-greater-infrastructure-resilience.html.

[131] EPA, Jan. 2017 MTE Final Determination at 24.

EPA determined that "[t]hese 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."[132]

With specific regard to EVs and advanced technology vehicles, any analysis conducted by EPA must recognize that increasingly clean power generation and natural gas production means that environmental benefits of advanced technology vehicles are even greater than projected at the time of the 2012 rulemaking. Projections of "upstream" emissions associated with electricity generation or natural gas generation must fully reflect current and projected shifts in the electricity generation portfolio towards lower-emitting resources—including the impacts of low natural gas prices, falling renewable generation costs, existing federal and state standards, and new local, state and regional policies (such as California's recent extension of its GHG cap-and-trade program, strengthening of renewable portfolio standards in many states including California and Oregon, decisions to increase the stringency of the Regional Greenhouse Gas Initiative, and others). Section IV.C, *infra*, addresses the important role that EVs play for States to meet their environmental obligations, including with respect to reductions in non-GHG air pollutants.

In estimating the environmental benefits or costs of any changes to the MY 2022-2025 standards, it will be important for the agency to utilize defensible estimates of the monetized benefits of greenhouse gas emissions reductions (or disbenefits of emissions increases), as well as appropriate quantification (including monetization where possible) of co-benefits (or disbenefits) from changes in conventional air pollutant emissions, including criteria pollutants and air toxics.

## IV. ANY PROPOSED REVISIONS TO THE MY 2022-2025 STANDARDS SHOULD FULLY RECOGNIZE AND SUPPORT ADVANCED TECHNOLOGY VEHICLES, PRESERVE OVERALL STRINGENCY AND BENEFITS, AND PRESERVE STATE REGULATORY AUTHORITY

As set forth above, NCAT's position is that the existing MY 2022-2025 standards remain appropriate and that revision of the standards at this time is not warranted. NCAT recognizes, however, that some auto manufacturers have raised concerns with the feasibility of the standards and have sought near-term adjustments to increase flexibility and improve harmonization between EPA and NHTSA standards and that EPA may decide to propose revisions to the standards to address these concerns. To the extent the agency opts to do so, NCAT strongly urges the agency to ensure that the proposed revisions fully recognize and support the role of EVs and other advanced technology vehicles; preserve the overall stringency and benefits of the harmonized National Program; and recognize and support the critical continuing role of state vehicle standards. NCAT stands ready to dialogue with other stakeholders and to assist the agency in the development of innovative policy approaches to support these outcomes.

### A. Any Proposed Revisions Should Recognize and Support EVs and Other Advanced Technology Vehicles

NCAT's members have a strong interest in ensuring that the federal vehicle standards provide sustained market signals for investment in, and development and deployment of, EVs and

[132] *Id.*

other advanced technology vehicles. The impact of federal standards is driven by two primary factors: the overall stringency and structure of the standards and the treatment of EVs and advanced technology vehicles through specific crediting and emissions attribution mechanisms.

With regard to the overall stringency and structure of the standards, it is critical that any new analysis undertaken by EPA reflect new information on advanced technology vehicles. First, as set forth above, the availability and cost of these technologies has improved much more quickly than was projected when the standards were adopted in 2012. Second, as these technologies' performance and affordability continue to improve, consumer demand and acceptance are increasing. For all these reasons, EVs and other advanced technology vehicles have the potential to play a substantially greater role shaping the feasibility and cost of the standards than was the case when the 2012 standards were finalized. As discussed above, the benefits of these technologies—in terms of emission reductions, energy savings and energy security, and broader economic benefits—have also improved and should be reflected in any new analysis undertaken by EPA.

As a general matter, the more stringent federal standards are, the greater the incentives for advanced technology vehicles. In addition, EPA included certain policy mechanisms in the MY 2022-2025 standards that relate specifically to these technologies—including crediting for EVs, fuel cell vehicles and compressed natural gas vehicles, as well as how emissions (including "upstream" emissions) are attributed to EVs and hydrogen-fueled fuel cell vehicles. NCAT strongly supports crediting mechanisms to incentivize these "game-changing" technologies and fully recognize their increasing emission reduction benefits vis-à-vis conventional engine technologies. Ultimately, achievement of the major economic, consumer, energy security and environmental benefits of these technologies will depend on a significant "scaling up" of their deployment. NCAT believes that the U.S. and global market stands at an inflection point. It is important for EPA to include robust incentives for these technologies to ensure that they break through and gain sustained momentum. Achievement of that momentum is critical to widespread availability and market penetration, which in turn will ensure their full benefits to consumers and the environment are achieved. The mechanisms in the existing MY 2022-2025 standards certainly should not be weakened in any way. Nevertheless, NCAT believes there are opportunities to further improve these mechanisms, and stands ready to assist EPA in the development of policy options should EPA decide to reconsider the standards.

### B. Any Proposed Revisions Should Maintain Overall Stringency and Benefits of the Standards to the Greatest Extent Possible

A number of the concerns raised by auto manufacturers with regard to the current standards relate to flexibility and harmonization with the NHTSA CAFE standards. Among other things, the manufacturers have separately petitioned both NHTSA and EPA to undertake rulemaking to make programmatic adjustments to increase flexibility and harmonization. NHTSA partially granted the petition, indicating that it will address the requested changes in the MY 2022-2025 rulemaking.[133] EPA has stated in response that it "intends to work with the Petitioners and other stakeholders in the future as we carefully consider the requests made in the June 2016 petition,"

[133] NHTSA, Grant of Petition for Rulemaking, 81 Fed. Reg. 95,553 (Dec. 28, 2016).

but has not publicly stated what process or timeframe it intends to use to do so.[134] Other manufacturer concerns may relate to the pace of technology improvement required by the standards and potential interactions with cost and consumer demand, with a particular focus on standards for light-duty trucks. To the extent EPA determines to address any of these concerns, NCAT encourages the agency to do so in a targeted manner that optimizes between preservation of the program's overall stringency and benefits and maximizing flexibility and cost-reduction. The broader and more aggressive the changes that are proposed, the more difficult they will be to sustain in light of governing legal standards and the record before the agency. Any substantial weakening of the standards could result in a divergence in federal and state standards and is likely to provoke conflict and litigation—which ultimately would detract from the broadly shared objectives of regulatory harmonization and certainty.

NCAT believes that further use of innovative policy mechanisms within the standards could help to increase flexibility while maintaining and enhancing program benefits to the greatest extent possible. These include, but are not limited to, crediting and emissions attribution mechanisms for advanced technology vehicles. It also includes treatment of these vehicles and crediting flexibilities under NHTSA's companion CAFE standards. Again, NCAT stands ready to assist EPA and the Administration more broadly in the development of policy options and supporting information should the agency decide to reconsider the standards.

### C. The Administration Should Recognize and Support State Authority and Existing State Standards

NCAT strongly supports California and the Section 177 States' existing GHG (LEV III) and ZEV standards, and the States' fundamental authority to adopt these and similar standards in the future. In granting California a waiver for its Advanced Clean Car Program regulations (including LEV III GHG and ZEV standards), EPA recognized clearly that California is legally entitled to the waiver.[135] As a legal, factual and record matter, there is no basis for undermining that determination or the underlying record or rationale.

As a practical, economic and policy matter, state vehicle standards play an essential role in driving the development and deployment of advanced technology vehicles. California and the other nine States that have adopted California's ZEV regulations account for nearly 30 percent of all new vehicle sales in the United States. These standards accordingly provide essential support for investment in development and deployment of EVs and other advanced technology vehicles, not just in the Section 177 States, but nationally as well. Any undermining of state authority, accordingly, could have a significant adverse impact on the prospects for transportation electrification and deployment of advanced vehicle technologies across the country—undermining business opportunities for utilities, manufacturers, and infrastructure companies.

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[134] EPA, Nov. 2016 MTE Proposed Determination at 34.

[135] EPA, California State Motor Vehicle Pollution Control Standards; Notice of Decision Granting a Waiver of Clean Air Act Preemption for California's Advanced Clean Car Program and a Within the Scope Confirmation for California's Zero Emission Vehicle Amendments for 2017 and Earlier Model Years, 78 Fed. Reg. 2112 (Jan. 9, 2013), *available at* https://www.gpo.gov/fdsys/pkg/FR-2013-01-09/pdf/2013-00181.pdf.

Further, for California and the Section 177 States in particular, the standards are critical to address local and regional air pollution problems, which in many cases are severe. Approximately 123 million Americans lived in counties with pollution levels above the primary national ambient air quality standards ("NAAQS") in 2016.[136] In many areas of the country, pollution from vehicles are the leading source of poor air quality. Electric and other zero emission vehicles are a critically important, cost-effective strategy to reduce such air pollution, particularly in areas with severe air quality problems. These vehicles—both light-duty and heavy duty—can reduce both conventional air pollution and carbon emissions by as much as 70 percent relative to gasoline-fueled vehicles.[137] On average across the United States, annual emissions per vehicle are substantially lower for all electric vehicles as compared to gasoline vehicles. The emissions reductions are even greater in geographic areas that use relatively low-polluting energy sources for electricity generation.[138]

State standards also play a key role in supporting major infrastructure and economic development plans in these States. NCAT's members and other businesses have made significant investments and are implementing long-term business strategies that depend upon continued implementation of the ZEV regulations, and on the continued vitality of the state authorities upon which the regulations are based.

NCAT urges EPA and the Administration to avoid any policy decisions that would in any way undermine California and other States' authority. Any such action would undermine the substantial economic and other benefits of state standards, and would also likely provoke conflict and litigation that increase regulatory uncertainty and business risk. NCAT encourages EPA and the Administration to engage the States in discussion of how best to harmonize federal and state standards, including optimizing flexibility and environmental performance, going forward. NCAT stands ready to participate constructively in any such engagement.

Finally, NCAT notes that as an analytical matter, California's and the Section 177 States' existing standards should be reflected in the baseline (reference case) for any analysis undertaken in connection with a new Proposed or Final Determination or any proposed revisions to the existing MY 2021-2025 standards. It is a fundamental tenet of sound analysis and a requirement of Office and Management and Budget and EPA guidelines that the potential effects of any proposed policies or policy changes should be analyzed in relation to existing policies that are in force and would apply in the absence of the proposed policy.[139] There can be no dispute that California's

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[136] U.S. EPA, "Air Quality - National Summary" (July 24, 2017), https://www.epa.gov/air-trends/air-quality-national-summary.

[137] *See, e.g.*, Southern California Edison, Transportation Electrification Proposals Testimony, *supra* note 128 at 9-10; Union of Concerned Scientists & The Greenlining Institute, "Delivering Opportunity: How Electric Buses and Trucks Can Create Jobs and Improve Public Health in California" (2016) at 2-3, *available at* http://www.ucsusa.org/sites/default/files/attach/2016/10/UCS-Electric-Buses-Report.pdf.

[138] U.S. DOE Alternative Fuels Data Center, "Emissions from Hybrid and Plug-In Electric Vehicles" https://www.afdc.energy.gov/vehicles/electric_emissions.php (last updated May 28, 2017) (see comparison of electricity sources and annual vehicle emissions, on a national average and state-by-state basis).

[139] *See, e.g.*, OMB Circular A-4, "Regulatory Analysis" (Sept. 17, 2003) at 15, *available at* https://www.whitehouse.gov/omb/memoranda_m03-21 ("This baseline should be the best assessment of the way the world would look absent the proposed action."); *see also* EPA, Guidelines for Preparing Economic Analyses, Chapter 5, "Baseline" (Dec. 2010), *available at* https://yosemite.epa.gov/ee/epa/eerm.nsf/vwAN/EE-0568-05.pdf/$file/EE-0568-05.pdf.

and the Section 177 States' standards (including the LEV III GHG standards and ZEV standards) are currently in effect and would otherwise apply. As EPA previously explained in response to comments from auto industry stakeholders, "because these ZEVs are already required by separate laws in California and nine other States, these vehicles will be part of the reference fleet by virtue of those requirements. The federal standards thus would not be imposing additional requirements or costs to these vehicles, nor would the federal standards result in benefits which would not otherwise occur. To avoid double counting, EPA thus considered these ZEV vehicles to be part of the reference fleet, and projected the number of electrified vehicles thus included."[140] This reasoning is correct and there is no defensible basis for excluding California and other States' existing ZEV and LEV III standards from the baseline of any additional analysis undertaken by EPA or NHTSA.

**Conclusion**

The National Coalition for Advanced Transportation appreciates the opportunity to submit these comments in response to EPA's Request for Comments, and looks forward to providing further input in the future.

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[140] EPA, Jan. 2017 MTE Final Determination Response to Comments at 99-100.

# EXHIBIT 4

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October 5, 2017

Docket ID No: EPA-HQ-OAR -2015-0827
Office of Transportation, Environmental Protection Agency
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National Highway Traffic Safety Administration
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(submitted via regulations.gov)

Re: Request for Comment on the Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emission Standards for Model Year 2022-2025 Light-Duty Vehicles; Request for Comment on Model Year 2021 Greenhouse Gas Emissions Standards

To Whom it May Concern:

On behalf of the listed companies,[1] we are submitting these comments in response to the request for comment on the Environmental Protection Agency's (EPA's) reconsideration of the Final Determination of the Greenhouse Gas (GHG) Standards for Model Year (MY) 2022-2025 Light-Duty Vehicles. Additionally, we are submitting comments on EPA's request for comment on the MY 2021 GHG Emission Standards for Light-Duty Vehicles.

Our companies operate and manage fossil-fuel, nuclear, hydro power, solar, wind and other renewable generation as well as electricity and natural gas transmission and distribution systems across the United States. We are committed to reducing GHG emissions and other air pollution consistent with federal, state, and regional programs and goals. We continue to support a consistent national program that meaningfully reduces GHG emissions and provides a long-term investment signal for clean energy technologies and infrastructure. Based on our experience, we can make investments in clean energy while improving electric system efficiency, increasing reliability, and maintaining quality of service to our customers.

However, achieving GHG emission and air pollution goals requires sustained action across many sectors of the economy, including the transportation sector.[2] As transportation currently accounts for 27% of gross United States GHG emissions,[3] the 2012 EPA and National Highway Traffic Safety Administration

[1] This letter is submitted on behalf of the following electric power companies and electric utilities: Austin Energy; Consolidated Edison Company of New York, Inc.; Exelon's six utilities: Atlantic City Electric, Baltimore Gas & Electric (BG&E), Commonwealth Edison (ComEd), Delmarva Power, PECO, and Pepco; Los Angeles Department of Water and Power (LADWP); National Grid; New York Power Authority (NYPA); Seattle City Light; and Sacramento Municipal Utility District (SMUD).
[2] U.S. Global Change Research Program, "U.S. National Climate Assessment," (2014) at http://nca2014.globalchange.gov/report/response-strategies/mitigation#narrative-page-17162.
White House Council on Environmental Quality, "U.S. Mid-century Strategy for Deep Decarbonization," (November 2016) at https://unfccc.int/files/focus/long-term_strategies/application/pdf/us_mid_century_strategy.pdf.
Intergovernmental Panel on Climate Change, "Climate Change 2014, Synthesis Report: Summary for Policymakers," (2014) at https://www.ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf.
[3] Environmental Protection Agency (EPA), "Inventory of U.S. Greenhouse Gases and Sinks: 1990-2015," (April 2017) at https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf.

(NHTSA) standards on light-duty vehicles for model years 2017-2025 are an appropriate, essential, and widely supported component of national efforts to reduce emissions. The standards are a reasoned response to the Endangerment Finding by EPA under Section 202(a) of the Clean Air Act that GHG emissions endanger public health and welfare of current and future generations of Americans. They are essential to maintain because they align regulatory requirements and provide the regulatory certainty needed to send long-term investment signals to promote low-carbon, low-emitting transportation.

Integration of electric vehicles (EVs) into the electricity grid also has useful economic and environmental benefits to vehicle owners, electric power companies, and electric utility customers. For example, the electric industry, including our companies, is working to build the charging infrastructure needed to support increased consumer adoption of EVs and establish rate structures and programs to maximize the benefits of EVs to the grid and minimize EV charging load integration costs.

Thus, we support the Final Determination made on January 12, 2017. We believe that the standards are consistent with EPA's obligations.[4] We urge EPA to maintain the GHG standards as they were established in the 2012 final rule for MY 2021 and MY 2022-2025.

**We Are Integrating Low-Carbon Vehicle Technology into the Electric Grid**

Electricity companies are already supplying power to the more than 500,000 electric vehicles on the road today in the United States. In the coming years, electric vehicle ownership is expected to continue to rise due to a greater number of models offered with ranges in excess of 200 miles, state and federal incentives, and increasing consumer awareness and demand. In the next two decades, our companies will provide power to millions of electric vehicles connected to the electric grid. We are already prepared for these changes and are investing in electric vehicle charging infrastructure. The investments that electric power companies and utilities have already made in preparing for transportation electrification should be among the considerations EPA weighs when evaluating how its standards may impact the broader economy.

Furthermore, integration of EVs into the electricity sector will provide economic and environmental benefits to vehicle owners, electric power companies, utilities, and their customers. When coupled with grid modernization, electric vehicles can help shift load to hours where the grid is underutilized and the cost of electricity is low. This can help mitigate increases in peak demand for electricity—the hours during the day when electricity demand is the highest—which is often when power is more expensive. Demand response and load shifting have the potential to reduce the need for investment in new peaking generation supply and electric transmission that would add costs to electric power companies, utilities, and their customers. Relatedly, electric vehicles have the potential to provide demand response and eventually ancillary services such as grid frequency response and regulation control and decrease the need for spinning reserves.[5] Electric vehicles can support greater integration of renewable energy resources, further reducing emissions from electricity generation. A study of the costs and benefits of electric vehicles in five Northeastern and Mid-Atlantic states found that electric vehicle ownership would provide a net present

[4] EPA, "EPA Determination Letter to Stakeholders Regarding Model Year 2022-2025 Light-Duty Greenhouse Gas Standards," (January 12, 2017) at https://www.epa.gov/sites/production/files/2017-01/documents/mte-stakeholder-letter-2017-01-12.pdf.

[5] White House Council of Economic Advisors, "Incorporating Renewables into the Electric Grid: Expanding Opportunities for Smart Markets and Energy Storage," (June 2016) at https://obamawhitehouse.archives.gov/sites/default/files/page/files/20160616_cea_renewables_electricgrid.pdf.

benefit of between $107-265 per plug-in vehicle when factoring in the fuel savings, GHG benefits, and decreased costs to customers.[6]

**We Support the January 12, 2017 Final Determination for the GHG Standards**

On January 12, 2017, EPA concluded that the model year 2022-2025 light-duty vehicle GHG standards adopted in the 2012 final rule are "appropriate" under section 202(a) of the Clean Air Act. EPA came to this conclusion after a review of the technological feasibility of the standards as well as the consumer and societal benefits. Our companies support this conclusion and urge EPA to not modify the MY2021 and MY2022-2025 standards for the following reasons:

***EPA must address greenhouse gas emissions from motor vehicles***

Courts have held that EPA has a requirement to regulate GHG emissions from motor vehicles (*Coalition for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102 (D.C. Cir. 2012), *Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007)). In its ruling on *Coalition for Responsible Regulation, Inc. v. EPA*, the D.C. Circuit Court of Appeals explained that "in the Endangerment Finding, EPA determined that motor-vehicle emissions contribute to greenhouse gas emissions that, in turn, endanger public health and welfare; the agency therefore was in no position to 'avoid taking further action,' by deferring promulgation of the Tailpipe Rule."[7]

This ruling found that EPA's interpretation of its responsibilities under the Clean Air Act to set emission standards for cars and light trucks as "unambiguously correct." Furthermore, in August 2017, the U.S. Court of Appeals for the District of Columbia Circuit, while granting EPA an abeyance to reconsider the Clean Power Plan, reminded the agency that "in 2009, EPA promulgated an endangerment finding, which we have sustained…That finding triggered an affirmative statutory obligation to regulate greenhouse gases."[8] Given the transportation sector's contribution to greenhouse gas emissions, EPA should not take any actions that would fail to reflect the emission reduction opportunities from motor vehicles.

***The standards will reduce GHG emissions***

In 2015, United States GHG emissions were 6,587 million metric tons of carbon dioxide equivalents with 27 percent coming from the transportation sector.[9] GHG emissions from the electric sector total 29 percent and we are committed to reducing emissions consistent with federal, state and local climate and clean energy programs and targets. In addition to our efforts, reductions of transportation emissions are necessary to address climate change. The standards finalized in 2012 and determined on January 12, 2017 to be appropriate address emissions from light-duty vehicles—such as passenger cars, sport utility vehicles, minivans and pickup trucks—that account for 60 percent of total transportation-related

[6] MJ Bradley and Associates, "Electric Vehicle Cost-Benefit Analyses," (March 2017), at http://www.mjbradley.com/reports/mjba-analyzes-state-wide-costs-and-benefits-plug-vehicles-five-northeast-and-mid-atlantic.

[7] U.S. Court of Appeals for the District of Columbia Circuit, *Coalition for Responsible Regulation, Inc. v. EPA*, 684 F.3d 102, (2012) at https://www.cadc.uscourts.gov/internet/opinions.nsf/52AC9DC9471D374685257A290052ACF6/$file/09-1322-1380690.pdf.

[8] Order, *West Virginia v. EPA*, No. 15-1363 (D.C. Cir. Aug. 8, 2017) ECF No. 1687838 (Tatel, Cir. J., and Millett, Cir. J., concurring in the order granting further abeyance)

[9] EPA, "Inventory of U.S. Greenhouse Gases and Sinks: 1990-2015," (2017).

GHG emissions.[10] By its own analysis, EPA concluded in the January 12, 2017 Final Determination that the MY2022-2025 standards will achieve lifetime cumulative reduction of 540 million metric tons of carbon dioxide equivalents.[11]

In addition to climate-related societal benefits, the current rule will provide substantial benefits to consumers. In 2016, the United States consumed 7.2 billion barrels of petroleum, with transportation accounting for 71 percent of total petroleum consumption.[12] EPA's standard will provide consumer and societal benefits by improving vehicle efficiency, which decreases gas consumption and lowers customers' fuel costs. In the January 2017 Final Determination, EPA projected that through fuel savings alone, the standards will provide net benefits of $56 billion dollars. When factoring the social GHG and non-GHG benefits, including improvements in air quality, this rises to $98 billion dollars.[13]

***The record of technological evidence supports the conclusion EPA made on January 12, 2017***

EPA's Technical Assessment Report (TAR) for the Midterm Evaluation of the standards updated and reviewed the technology assumptions included in the 2012 final rule. The TAR broadly affirmed that there are a broad suite of technologies available to allow auto manufacturers to meet the MY2022-2025 standards. Furthermore, the TAR found that "a wider range of technologies exist for manufacturers to use" to meet the standards "at costs that are similar or lower than those projected in the 2012 rule."[14] Further evidence suggests that technology costs will continue to decline ahead of pace, making compliance even more cost-effective. For example, the cost of lithium ion batteries produced in high volume has fallen by 73% since 2009.[15] With advances in battery technology, auto companies have announced even more ambitious battery cost reduction projections and EV ranges.[16] These declining prices and increased consumer demand are leading many organizations to raise their forecast for EVs. In 2017, the International Energy Agency increased the global forecasted EV fleet size in its reference technology scenario for 2030 from 23 million to 58 million vehicles.[17] While vehicle electrification is just one of many options for auto manufacturers to achieve the fleet-wide GHG standards (EPA concluded in the TAR that only limited vehicle electrification would be required to meet the

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[10] EPA, "Final Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions standards under the Midterm Evaluation," (January 2017) at https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ91.pdf.

[11] *Ibid.*

[12] Energy Information Administration (EIA), "Oil Crude and Petroleum Products Explained," (last updated May 30, 2017) at https://www.eia.gov/energyexplained/index.cfm?page=oil_home#tab3.
EIA, "Petroleum and Other Liquids Supply and Disposition," (September 29, 2017) at https://www.eia.gov/dnav/pet/pet_sum_snd_d_nus_mbblpd_a_cur.htm.

[13] EPA, "Final Determination on the Appropriateness of MY2022-2025" (January 2017).

[14] EPA, "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), at https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OYFR.PDF?Dockey=P100OYFR.PDF.

[15] Department of Energy, "Revolution Now: The Future Arrives for Five Clean Energy Technologies, 2016 Update," (September 2016), https://energy.gov/sites/prod/files/2016/09/f33/Revolutiona%CC%82%E2%82%ACNow%202016%20Report_2.pdf

[16] International Energy Agency (IEA), "Global EV Outlook 2016," (2016) at https://www.iea.org/publications/freepublications/publication/Global_EV_Outlook_2016.pdf.

[17] *Ibid.*,
IEA, "Global EV Outlook 2017," (2017) at https://www.iea.org/publications/freepublications/publication/GlobalEVOutlook2017.pdf.

standards[18]), this progress is representative of a trend where technological advancements and decreased costs allow for emission reductions to be more readily achievable.

***Modifying the rule would disrupt markets and business planning***

As companies and utilities in the electric industry, we understand the importance of business and market certainty to our operations. Given the lead time necessary for investment in research and development and eventual deployment of new technologies, we need regulatory certainty that allows us to anticipate future challenges and opportunities and invest in solutions to meet them. In 2012, EPA, working with NHTSA and the California Air Resources Board, sought to do just that—by aligning standards and creating consistency across the three agencies and by creating standards that extend over the investment horizon. Adjusting these standards would create company and investor challenges for those that have longer investment timeframes and who are already planning for compliance with, and supporting the compliance of, the MY2022-2025 standards.

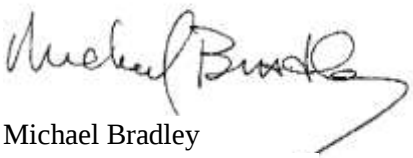
**We Support the MY2021 Standard Adopted in the 2012 Final Rule**

There is no basis to conclude that auto manufacturers would be unable to achieve the MY2021 standard. Given greater than projected technological advances and cost reductions, we urge EPA and NHTSA to refrain from revisiting the MY2021 standard.

**Conclusion**

In conclusion, we appreciate the opportunity to submit this letter and these comments on EPA's reconsideration of the passenger and light truck GHG Standards. We continue to urge EPA and NHTSA to maintain the standards as they were established in the 2012 final rule and validated in the January 2017 Final Determination. We are committed to reducing GHG emissions and prepared to support continued market penetration of low-carbon transportation technology such as electric vehicles.

Sincerely,



Michael Bradley
M.J. Bradley & Associates

[18] EPA, "Draft Technical Assessment Report," (July 2016).

# EXHIBIT 5

RFF REPORT

# New Markets for Credit Trading under US Automobile Greenhouse Gas and Fuel Economy Standards

Benjamin Leard and Virginia McConnell

MAY 2017

RESOURCES FOR THE FUTURE

# New Markets for Credit Trading under US Automobile Greenhouse Gas and Fuel Economy Standards

Benjamin Leard and Virginia McConnell*

## Abstract

Recent changes to the US Corporate Average Fuel Economy (CAFE) regulations that allow for credit banking and trading have created new opportunities for lowering the cost of meeting strict new standards. For the first time, automakers will be able to trade credits between their own car and truck fleets and across manufacturers, and they will be able to bank credits over longer time periods. The potential to lower the costs of the regulations could be large if well-functioning credit markets develop. A recent development is that new regulations starting in 2012 for greenhouse gas (GHG) emissions overlap with the CAFE standards, creating two separate regulations and two separate credit markets, one for fuel economy (regulated by the National Highway Traffic Safety Administration) and one for greenhouse gases (regulated by the Environmental Protection Agency). We find that although the two regulations are supposed to be harmonized, there are some important differences in how credits are defined and how they can be traded, creating added costs for manufacturers. We review evidence on how well the credit markets are working, including the extent of credit banking and the number and price of trades. We then assess the potential for the following to interfere with well-functioning markets: overlapping regulations, reductions that are not additional, thin markets, and use of monopoly power. We find that some features of robust trading are missing and discuss some possible ways to improve efficiency in these markets.

**Key Words:** credits, pollution markets, CAFE rules, GHG emissions reductions

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## Contents

## 1. Introduction

In the absence of a US national cap-and-trade market for greenhouse gas (GHG) emissions, industry and regional market-based policies are becoming increasingly important for achieving cost-effective carbon reduction and energy efficiency improvements (Burtraw et al. 2014). In the transportation sector, such market-based mechanisms have not been easy to implement because of the large number of sources and the challenge of measuring energy use or emissions from individual vehicles. However, recent changes to the joint Corporate Average Fuel Economy (CAFE) regulations for light-duty vehicles present new opportunities for credit trading, which could lower the costs of meeting the more stringent standards.

US fuel economy standards were constant for many years. However, under the new rules, implemented jointly by the National Highway Traffic Safety Administration (NHTSA) and the US Environmental Protection Agency (EPA), manufacturers face increasingly strict limits are on both fuel use and GHG emissions of the vehicles they produce for model years 2012 through 2025 (EPA.2012). To lower the costs of meeting the new standards, the new rules allow manufacturers the flexibility to bank, borrow and trade credits.

Although the standards have been set jointly by the two agencies, in practice, there are differences in how the standards can be met, including different credit programs and rules on trading. As we see below, restrictions in one program are likely to affect compliance strategies in the other program and to decrease the efficiency of meeting the programs' common goals of reducing fuel use and emissions.

This article examines the design and efficiency of the credit trading programs established as part of the new CAFE and GHG rules. We evaluate the efficiency of different provisions of the credit trading programs by comparing the expected costs and benefits of the standards to the costs and benefits in an ideal setting, where manufacturers have perfect information and no market power, and the credit trading programs have no distortions.

We begin with a detailed description of the new CAFE and GHG credit regulations, including summarizing how credits are defined and traded in the two markets, and identifying key similarities and differences between them. We then examine available evidence about these markets during the early years of the programs from 2012 to 2015, including information on trends in banking, in credit prices, and the amount of credit trading over time, to give a sense of how well the markets are working. This is followed by an assessment of both credit programs and the emerging markets for trading credits between manufacturers. We discuss the major factors that may prevent these markets from improving the efficiency of the standards, drawing on lessons from the literature about previous pollution trading programs. We present conclusions and the outlook for the future in the final section.

## 2. Background and Overview of the New CAFE and GHG Credit Markets

Manufacturers must comply with both the NHTSA and EPA rules, with each rule having its own credit program and market. Although the two agencies intended to harmonize the stringency of the rules, they are not the same because the provisions of the two credit programs are different. Here we first show the standards and then describe some of the key differences in the credit programs.

### *2.1. The CAFE and GHG Standards*

NHTSA sets CAFE standards requiring that each manufacturer's vehicle fleet achieve a minimum average miles per gallon (mpg). Cars and light trucks have separate standards,

with trucks facing lower sales-weighted average fuel efficiency requirements than cars. In 2008, NHTSA was required under the Energy Independence and Security Act (EISA) to set annual standards for vehicle fuel efficiency at "maximum feasible" levels through 20301. At about the same time, EPA was given authority under the Clean Air Act (CAA) to regulate GHG emissions from vehicles as a pollutant.2 Because of the direct relationship between a vehicle's gasoline consumption and its CO2 tailpipe emissions,3 these two regulations are closely related.

Although NHTSA and EPA have collaborated in a joint rulemaking to reduce fuel and GHG emissions from the light duty fleet, the agencies have separate legal mandates that they are required to meet (i.e., under the EISA and CAA, respectively), and automakers must meet separate standards for fuel economy and GHG emissions.4 Figure 1 shows the changes over time in both the NHTSA CAFE standards (left axis) and the EPA GHG standards (right axis), with the new standards, beginning with model year 2012, shown as dashed lines. By the 2025 model year, fuel consumption and GHG emissions are projected to fall by about half as a result of the stricter CAFE and GHG standards, respectively.

### *2.2. Flexibility in the Credit Markets*

For a program to be economically efficient, it must provide incentives for manufacturers to increase fuel economy and reduce GHG emissions in the least costly way—for each manufacturer and across manufacturers—and over time. Under both programs, manufacturers earn credits whenever they overcomply with the standard during a compliance period. In principle, both rules for the 2012–25 model years provide manufacturers with three options for flexibility to lower the costs of meeting the standards.

First, manufacturers can use credits from overcompliance in one fleet (e.g., cars) to achieve compliance in the other fleet (e.g., trucks). This is often referred to as averaging, and it is likely to lower costs, especially for manufacturers whose marginal costs differ across their car and truck fleets. Second, manufacturers can bank credits from overcompliance in one year to use for compliance in a future model year. These banked credits can be held and used for up to five years into the future, or used to cover shortfalls in the previous three years. These banking provisions help firms to smooth and therefore lower the cost of complying with increasingly strict regulations over time (Ellerman et al. 2005).

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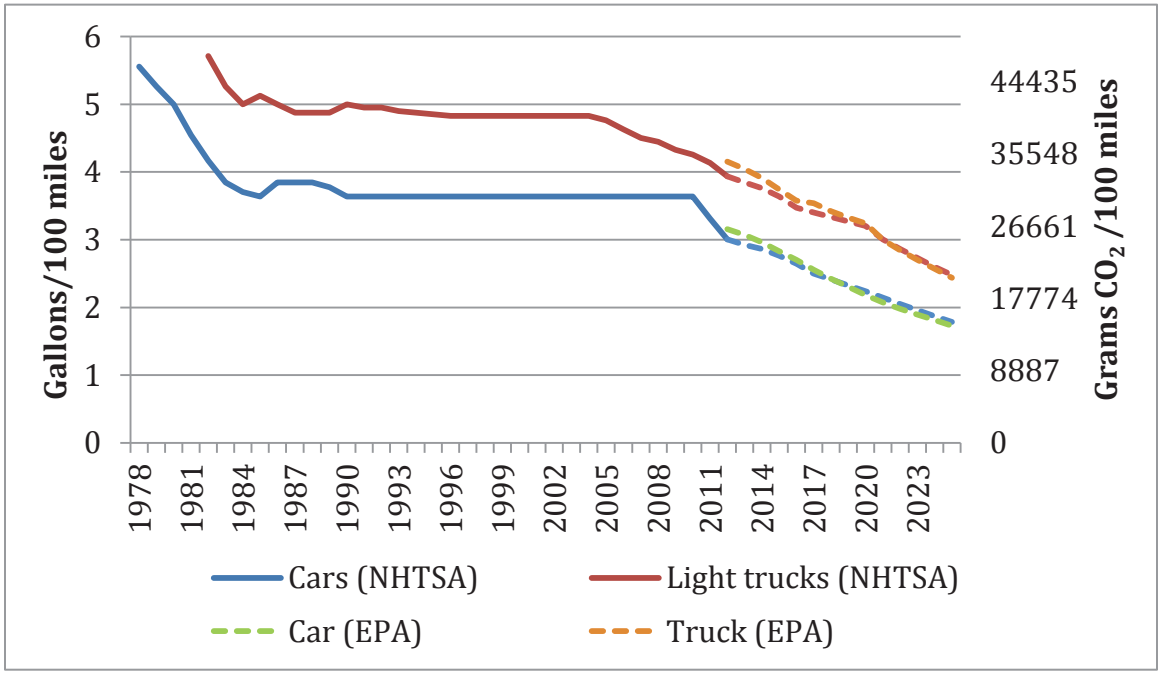
[1] See https://www.gpo.gov/fdsys/pkg/USCODE-2011-title49/pdf/USCODE-2011-title49-subtitleVI-partC-chap329-sec32902.pdf

[2] The US Supreme Court case was *Massachusetts v. Environmental Protection Agency*, 549 US 497 (2007).

[3] One gallon of gasoline contains 8.887 grams, or 0.008887 megagrams (Mg), of $CO_2$.

[4] 77 Fed. Reg. 62623 (Oct. 15, 2012).

**FIGURE 1. CAFE AND GHG STANDARDS (GALLONS PER 100 MILES), AND EPA GHG STANDARDS (GRAMS $CO_2$ PER 100 MILES)**




*Notes*: The NHTSA fuel economy standards are presented in gallons per mile for so they can be compared to the EPA GHG emission standards. The new joint standards started in 2012. Differences between the standards from 2012 to 2025 are due to differences in nontailpipe emissions, which EPA accounts for but NHTSA does not.
*Sources:* McConnell (2013); grams of $CO_2$ per mile forecasts from www.epa.gov/oms/climate/documents/420f12051.pdf

Third, for the first time, manufacturers can buy and sell credits among one another. This will lower the overall costs of reducing emissions and fuel use because it will encourage manufacturers with low costs to exceed the standards and sell earned credits to manufacturers that are below the standard (Montgomery 1972). The potential for savings depends on the heterogeneity of costs across companies (Newell and Stavins 2003) and how well credit markets function (Stavins 1995). Analyses of the earlier CAFE standards found that the standards resulted in significant variation in the marginal costs of reducing fuel economy across manufacturers,[5] suggesting that credit trading across firms could achieve substantial cost savings.

### *2.3. Differences in how Credits are Defined*

In both the NHTSA and EPA programs, credits are granted to manufacturers each year based on the extent to which their vehicles do

[5] For example, Jacobsen (2013) estimates that the marginal cost of increasing CAFE standards by one mile per gallon ranges from $0 (for unconstrained firms) to $438 per vehicle. Anderson and Sallee (2011) also find substantial variation in marginal costs of increasing the standards, although they find a much smaller variation.

better than the standards. Credit units are defined differently in the two programs.[6]

### 2.3.1. Definition of Credits in the NHTSA Program

Under NHTSA's CAFE program, a credit is earned for each one-tenth of a mile per gallon that each vehicle exceeds its miles per gallon standard. A manufacturer's total credits earned in a given period, therefore, are calculated as the product of 10 times the difference between the average fuel economy across its fleet and the fuel economy standard for its fleet.[7] Credit units are thus based on an emissions rate, and do not reflect how much fuel is actually saved given that vehicles are above the standard. Because vehicles are driven different miles over time, the amount of fuel reduced from the credits will differ depending on the mix of vehicles sold.

NHTSA makes the simplifying assumption that each car and each truck is driven the same number of miles over its lifetime (195,264 miles for cars and 225,000 miles for trucks). However, this assumption fails to account for differences in miles driven and the lifetime of vehicles within the car and truck category, which means the crediting system will tend to overcredit some vehicles and undercredit others. This is a potentially important source of inefficiency (Jacobsen et al. 2016).

In addition, because NHTSA credits are specified in rates (mpg), they cannot be traded one for one across car and truck fleets, either within a firm, or across firms. They must first be adjusted to account for the differences between car and truck miles driven. This way of designating credits seems to add unnecessarily complexity to potential markets for trading.

### 2.3.2. Definition of Credits in the EPA Program

The EPA program defines credits in terms of emissions reduced relative to the emissions allowed by the standard. To determine emissions, manufacturers much first convert emissions rates (in grams of $CO_2$ per mile) total emissions over the lifetime of their vehicles. They do this by using the same assumptions on total lifetime miles for cars and trucks as NHTSA (see above). Credits are then denoted in terms of the megagrams (Mg) of $CO_2$—i.e., the mass of $CO_2$—saved relative to the standard. As with the NHTSA rules, the simplifying assumption that all vehicles in a fleet are driven the same number of miles is a source of inefficiency.[8] But, because EPA credits are defined in terms of emissions saved, they have the advantage of being more directly tradable across car and truck fleets and between different manufacturers.

## *2.4. Differences in Banking Provisions*

Although both programs allow banking, they impose different expiration dates on earned credits (see Table 1). In a setting where each manufacturer's compliance requirement is binding, these expiration dates lower the efficiency of the programs because expiration dates reduce manufacturers' incentives to

[6] See Appendix A1 for an example of a representative manufacturer that earns credits under both programs during a compliance period.

[7] NHTSA requires manufacturers to use a sales-weighted harmonic average of their fleets to calculate the average mpg.

[8] A more efficient policy would give vehicle driver incentives to reduce fuel use and emissions whether by the type of car she drives, or the number of miles driven. This implies a different regulatory approach than CAFE, such as a gasoline or carbon tax.

smooth their abatement over time. As we discuss later, however, placing limits on how long credits last also protects the programs from the potential problem that the standards may not produce "additional" reductions for those manufacturers whose emissions or fuel use would have been less than the standards in any case. When banking is allowed for these firms' aggregate emissions and fuel use reductions from the rules will be lower than expected. Whether the banking expiration dates improve or reduce efficiency depends on the relative magnitudes of these two effects.

### 2.5. Differences in Emissions Averaging Between Car and Truck Fleets

The EPA rules provide more flexibility for manufacturers to average emissions between their car and truck fleets (see fourth row of Table 1), but there are differences in what the two agencies allow. EPA does not limit averaging within a manufacturer's own fleet, whereas the NHTSA rules limit how many credits can be transferred between a manufacturer's car and truck fleets. It is not clear why NHTSA limits these transfers, but the reduction in flexibility raises costs to the manufacturers of meeting the NHTSA standards if the car and truck standards are binding. And, the NHTSA limit on transfers also raises the costs of compliance with the more flexible EPA rules because manufacturers must comply with both rules.

### 2.6. Penalties for Noncompliance

Another key difference between the two programs is the penalty for noncompliance. Under NHTSA rules, manufacturers have always been allowed to pay penalties if they cannot meet the standard. If the rules turn out to be more expensive than anticipated or fall more heavily on some firms than others, the fine limits the cost of additional reductions. Under the EPA regulations, which are governed by the CAA, no fee in lieu of compliance is allowed. That is, if a manufacturer is found to be noncompliant, a decision about whether that manufacturer may sell vehicles and under what penalty would have to be negotiated on a case-by-case basis. If the noncompliance penalty under the EPA program exceeds the NHTSA fine, and the stringency of the standards is equivalent, then the NHTSA fine becomes irrelevant.[9] In a world with no uncertainty, removing any fines increases the efficiency of the programs, assuming firms can freely trade. But when demand and costs are uncertain, setting a fine or a bound on marginal costs can improve efficiency.[10] We discuss this issue in more detail below.

### 2.7. Credits for Alternative Fuel Vehicles

Another difference between the two programs concerns how credits are granted for alternative fuel vehicles, such as plug-in electric and all-electric vehicles. NHTSA grants no credits for these vehicles, whereas EPA has several provisions designed to increase the volume of electric vehicles. Manufacturers are allowed to count vehicles that run on electricity as having zero emissions of $CO_2$. However, actual $CO_2$ emissions from these vehicles depend on how the electricity that powers them is generated. Most studies of this issue have found that levels of $CO_2$ emissions vary significantly depending on where the power is generated (Holland et al 2015), but in most regions

[9] We discuss the issue of overlapping regulations in more detail later. Appendix A2 which can be found here (link) presents a graphical illustration of this issue.

[10] Pizer (2002) presents this result using a general model of GHG abatement with uncertain benefits and costs.

emissions are not zero under the current power infrastructure and regulatory requirements. Too many credits from electric vehicles are being generated, which reduces the stringency of the standards.

Another provision of the EPA rules is that beginning with the 2017 model year, a manufacturer is allowed to count each electric vehicle as being equivalent to more than one vehicle for the purposes of calculating its total credits. This so-called "credit multiplier" provides too many credits for electric vehicles and raises the cost of meeting the standards. It is also likely to increase emissions overall as the non-electric fleet will have to reduce less and the emissions of the electrics is counted as having zero emissions.

**TABLE 1. COMPARISON OF CREDIT PROVISIONS UNDER NHTSA AND EPA PROGRAMS**

| Regulation | NHTSA CAFE program | EPA GHG program |
|---|---|---|
| Definition of a credit | 1/10 mpg above manufacturer's required mpg standard for fleet | 1 Mg of $CO_2$ below the manufacturer's required standard* |
| Credit banking (carry forward) | 5-year banking period | From 2009 to 2011, companies banked credits through the Early Crediting Program; 5-year banking period, with the exception that credits earned between 2010 and 2016 can be carried forward through 2021 |
| Credit borrowing (carry back) | 3-year carry back period | 3-year carry back period |
| Limits on manufacturers' credit transfers between car and truck fleets | Limits on credits that can be transferred between cars and trucks:<br>MY 2011–2013, 1.0 mpg<br>MY 2014–2017, 1.5 mpg<br>MY 2018 on, 2.0 mpg | No limits on transfers between cars and trucks in each manufacturer's fleet |
| Monetary cost of noncompliance | Fee up until July, 2016 $5.50/tenth mile over standard, per vehicle; starting July, 2016, $14/tenth mile over standard | Unknown penalty, but could be as high as $37,500 per car for violation of the CAA |
| Provisions for alternative fuel vehicles | Credits for ethanol and methanol in fuels are being reduced. Electric, hybrid electric, or fuel cell vehicles are treated the same as conventional vehicles. | Allows manufacturers to count each alternative fuel vehicle as more than a single vehicle. Multipliers range from 2.0 to 1.3, depending on the extent of alternative fuel used and the MY. Emissions from battery electric vehicles assumed to be zero. |
| Exemptions | No exemptions for manufacturers with limited product lines; fines can be paid | Temporary Lead-time Allowance Alternative Standards (TLAAS) for manufacturers with limited product lines through 2015 |

*Vehicle and fleet average compliance for EPA's GHG program is based on a combination of $CO_2$, hydrocarbons, and carbon monoxide emissions which are the carbon containing exhaust constituents. These GHG emissions are referred to here as $CO_2$ emissions for shorthand.

EPA argues, however, that the overall long-run efficiency of the rules will be enhanced by the alternative vehicles policy. This is because the more rapid introduction of alternative fuel vehicles will result in knowledge spillovers and industry-wide cost reductions. This long-run effect remains to be seen, but in the short-run, the policy will grant too many credits for electrics, drive up the cost of meeting the regulations, and reduce the stringency of the standards.

### *2.8. Standards for Small Volume Producers*

Yet another difference between the two programs is that to address distributional concerns, the EPA program provides less stringent standards for small-volume producers—known as Temporary Lead-time Allowance Alternative Standards—while the NHTSA does not (see bottom of Table 1). These lower standards may be efficient because they allow small-volume manufacturers with very limited and specialized product lines and high costs to continue producing, at least in the short term.

## 3. Empirical Evidence on Market Outcomes

The evidence to date suggests that automakers are using the new credit banking and trading mechanisms in the CAFE and EPA GHG programs to reduce their compliance costs under both rules. Although the available data do not allow us to determine the exact number of credits that have been transferred between car and truck fleets, we are able to conclude that such transfers have been occurring. In addition, we observe significant banking behavior, as companies are overcomplying with current standards, either because the standards are not binding on some manufacturers or because they anticipate using the banked credits in later years when standards become more stringent. Finally, over the last several years, through 2015, there has been some trading of credits between manufacturers, and the volume appears to be increasing over time.[11] We show evidence of these trades, discuss trends in trading over time, and provide some information about prices paid for credits in these trades.

### *3.1. Credit Transfers between Cars and Trucks*

Table 2 shows net credits earned in the EPA GHG program, and total GHG emissions separately for cars and trucks across all manufacturers for each year. [12] Because net credits earned are positive in each year, the industry as a whole has been in compliance with the EPA standard, but by only a small amount: total industry-wide emissions were less than 1 percent lower than required between 2012 and 2014. Table 2 also shows that in the first several years of the EPA GHG program, manufacturers earned more credits from their passenger car fleets than from their light-duty truck fleets.

[11] Because EPA makes more data publicly available than NHTSA, including actual credit trades, we report EPA compliance information. However, neither agency reports information on the price of trades.

[12] NHTSA does not report data on credits earned by manufacturer. Although it does report NHTSA credits held in any period, it is not always possible to infer how many were earned in a given year (see NHTSA (2014).

TABLE 2. EPA GHG NET CREDITS AND TOTAL EMISSIONS, BY MODEL YEAR

| Model year | Passenger vehicles | | Light trucks | |
|---|---|---|---|---|
| | Net credits (million Mg) | Total emissions (million Mg) | Net credits (million Mg) | Total emissions (million Mg) |
| 2009* | 57.91 | 1,600.69 | 40.16 | 1,247.43 |
| 2010* | 50.54 | 1,716.27 | 45.16 | 1,666.98 |
| 2011* | 8.29 | 1,676.92 | 28.73 | 1,934.53 |
| 2012 | 29.57 | 2,204.51 | 0.67 | 1,699.37 |
| 2013 | 37.80 | 2,402.95 | 0.99 | 1,888.27 |
| 2014 | 28.86 | 2,258.11 | 11.43 | 2,113.08 |

*Notes*: Net credits are defined as the sum of credits earned (i.e., overcompliance) minus deficits (i.e., undercompliance). Both credits earned and total emissions are calculated over the life of the vehicles produced in a given model year. * denotes an early crediting year.
*Source*: Author calculations based on EPA (2015b).

In 2012, overcompliance for cars was 29 million Mg of $CO_2$, which is several orders of magnitude more than the overcompliance for trucks—net credits for trucks were just 0.67 million Mg of $CO_2$. The general picture is the same for 2013. In the 2014 model year, net credits are still higher for cars, but there is also a significant increase for trucks. Although the banking and borrowing provisions prevent us from using these data to directly determine firm behavior, the data do suggest that in the 2012–14 perioed, it was easier to overcomply for passenger cars than for trucks.

### 3.2. Banking

Overall, the data show that manufacturers accumulated credits in the early years of the program. Between the 2009 and 2011 model years, both NHTSA and EPA allowed early banking of credits in advance of the tightening of the standards in 2012. NHTSA had allowed banking in the CAFE program leading up to the new rules, and EPA also wanted to provide flexibility to manufacturers to meet the standards because compliance is likely to be lumpy, due to the fact that vehicles are redesigned roughly every four to seven years (Blonigen et al. 2013). Manufacturers as a whole have continued to accumulate credits since the regulations took effect in 2012. Total EPA credit holdings at the end of 2011 were about 226 million Mg and they were 285 million Mg by the end of 2015. We estimate that the magnitude of these EPA credit holdings at the end of 2015 would be sufficient to cover about 8-9 percent of the total reductions required by the regulations through 2025.

A substantial amount of early banking is what we would expect with lower costs before the standards begin and increasingly strict standards in the future. Indeed, many automakers argue that the most costly and difficult standards to meet will be those for the 2022–25 model years. This strategy of overcomplying early and using banked credits later is also consistent with observed banking behavior in other emissions trading programs.[13] Although this banking behavior relaxes the effective stringency of future standards, the impact is dampened by the fact

[13] In a study of the US acid rain program, Ellerman and Montero (2007) find that capped firms spent the first five years of the program banking permits before starting to draw down their banked supply of permits for compliance in later years, when the standards were tightened.

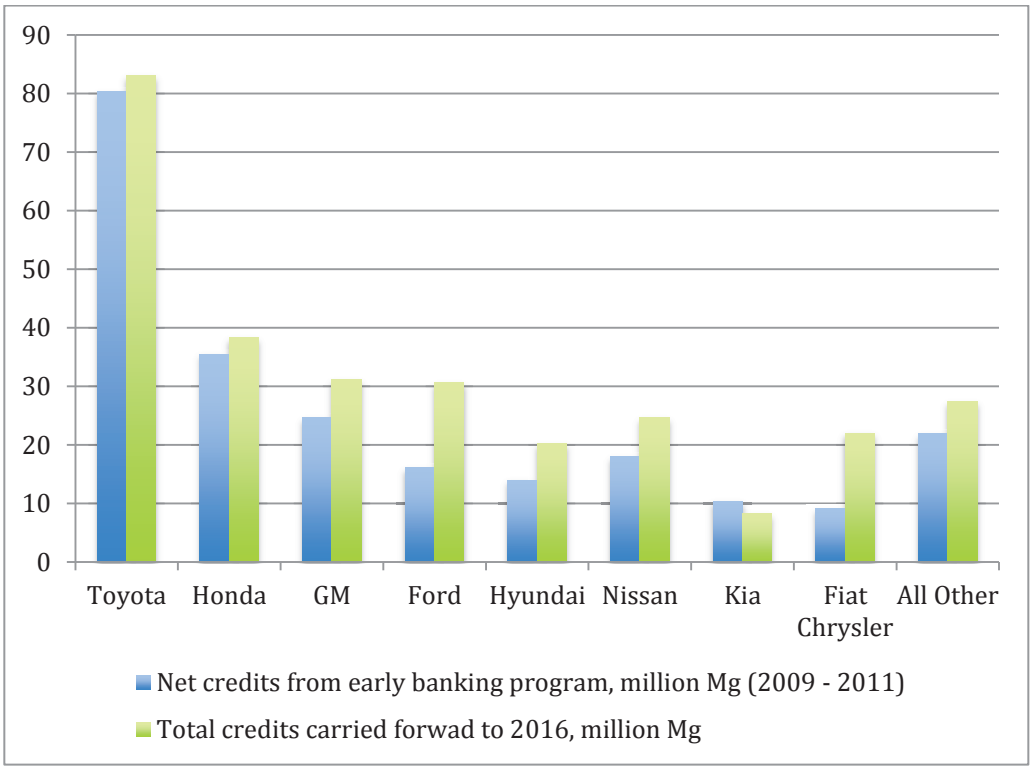
that credits can only be carried forward for five years (see Table 1).

The distribution of banked credits is different across individual automakers, however, with a small subset of manufacturers earning a majority of the credits. For example, between 2009 and 2011, Toyota and Honda banked about 56 percent of the total early GHG credits but sold only about 31 percent of passenger cars and light trucks. The big three US automakers, Ford, GM, and Chrysler, sold about 44 percent of all passenger cars and light trucks during this period but earned only about 23 percent of all GHG credits. The first bar in The first bar in Figure 2 shows credits earned between 2009 and 2011 for many of the manufacturers, and the second bar shows their credit holdings as of the start of 2016. Since 2011, most firms have increased their credit holdings, though for most, the majority of credit holdings were earned from 2009 to 2011, before the new standards came into effect.

### 3.3. Trading Across Manufacturers

Table 3 presents data on EPA GHG credit trades (shown as credit sales in Mg) that occurred from 2012 to 2015. The first column shows the year of the trade, and the second column shows the vintage of the traded credit. For example, in 2012 Nissan sold 500,000 of their credits earned in 2011 to Chrysler. Because credits expire, after 2021 in the EPA market, we expect credits earned in earlier years to be sold first. All of the credits sold through 2015 were earned between 2010 and 2012, except for those sold by Tesla which, because it sells only electric vehicles, has less incentive than other companies to bank credits for future compliance.

**FIGURE 2. EARLY CREDITS AND CREDITS CARRIED FORWARD TO 2016, BY MANUFACTURER, DENOTED IN MILLION MG GHG EMISSIONS**




*Source*: EPA (2016).

The total volume of trades as shown in Table 3 is about 20 million Mgs, which is roughly 7 percent of total credits holdings in 2015. But it is important to note that the market for trades in the first few years, from 2012 to 2013 was very thin: total trades were about 2.6 million Mg credits which was just over 1 percent of total credits earned by the end of 2013. However, the volume of trades was close to three times higher in 2014 than in the previous two years, at 7.2 million Mg. Then volume increased again in 2015 by about 4 million Mgs. Further, some of the largest companies, including Toyota and GM, have just recently made single trades for the first time.

Trading activity may increase in the future, both because banked credits will expire and both the car and truck standards will continue to increase in stringency, making it more difficult for some companies to rely solely on averaging their car and truck fleet credits or using banked credits to meet each standard. In summary, the volume of trades is growing and is likely to continue to do so as the standards tighten.

**TABLE 3. EPA GHG CREDIT TRADES THROUGH 2015**

| *Transaction Year* | *Credit Vintage* | *Buyer* | *Seller* | *Credit Sales (Mg)* | *Sales Per Year (Mg)* |
|---|---|---|---|---|---|
| 2012 | 2011 | FCA/Chrysler | Nissan | 500,000 | 1,067,713 |
| 2012 | 2010 | Ferrari | Honda | 90,000 | |
| 2012 | 2010 | Mercedes-Benz | Tesla | 35,580 | |
| 2012 | 2011 | Mercedes-Benz | Tesla | 14,192 | |
| 2012 | 2012 | Mercedes-Benz | Tesla | 177,941 | |
| 2012 | 2012 | Mercedes-Benz | Nissan | 250,000 | |
| 2013 | 2010 | FCA/Chrysler | Honda | 144,383 | 1,593,072 |
| 2013 | 2013 | FCA/Chrysler | Tesla | 1,048,689 | |
| 2013 | 2010 | Mercedes-Benz | Nissan | 200,000 | |
| 2013 | 2010 | Mercedes-Benz | Honda | 200,000 | |
| 2014 | 2011 | Mercedes-Benz | Nissan | 500,000 | 7,201,602 |
| 2014 | 2014 | FCA/Chrysler | Tesla | 1,019,602 | |
| 2014 | 2010 | FCA/Chrysler | Toyota | 2,507,000 | |
| 2014 | 2010 | FCA/Chrysler | Honda | 3,000,000 | |
| 2014 | 2010 | Ferrari | Honda | 175,000 | |
| 2015 | 2015 | FCA/Chrysler | Tesla | 1,337,853 | 11,215,577 |
| 2015 | 2014 | FCA/Chrysler | Tesla | 694 | |
| 2015 | 2013 | FCA/Chrysler | Tesla | 695 | |
| 2015 | 2010 | FCA/Chrysler | Honda | 5,680,851 | |
| 2015 | 2012 | GM | Coda | 5,524 | |
| 2015 | 2013 | GM | Coda | 1,727 | |
| 2015 | 2014 | Jaguar Land Rover | Toyota | 831,358 | |
| 2015 | 2011 | Jaguar Land Rover | Nissan | 39,063 | |
| 2015 | 2013 | Mercedes-Benz | Nissan | 1,000,000 | |
| 2015 | 2011 | Mercedes-Benz | Nissan | 314,192 | |
| 2015 | 2011 | McLaren | Nissan | 3,620 | |
| 2015 | 2010 | BMW | Honda | 2,000,000 | |

*Sources*: Author calculations based on the Greenhouse Gas Emission Standards for Light-Duty Vehicles 2012, 2013, 2014, and 2015 Reports.

### *3.4. Information on Credit Prices*

Information about the prices paid for credits is important for several reasons. Price information helps potential market participants to make profit-maximizing decisions. If manufacturers cannot identify the typical market price for a GHG credit, it will be more costly for them to decide whether to hold or sell credits.[14] Credit prices also reveal information about marginal costs, which is useful for estimating the overall costs of the standards. In a competitive market for credits, the marginal credit price would equal the equilibrium marginal cost of meeting the standard. However, transaction prices may not reflect marginal costs if multiple regulations overlap, markets are thin, or other market distortions exist.

Neither NHTSA nor EPA requires manufacturers to report credit prices. [15] Thus, there is virtually no public information available about transactions prices. In order to shed light on these prices, we identify two approaches for calculating transaction prices based on the data that are currently publicly available. Because public data for calculating NHTSA prices are not available, we calculate prices in the EPA GHG credit market and then convert them into equivalent NHTSA credit prices.

#### 3.4.1. Estimating Prices: Approach 1

Under the first approach, we estimate the credit price by merging trading quantities from EPA (2014a) with revenue data from Tesla Motors' 2013 SEC Filing Form 10-K to compute 2012 and 2013 EPA GHG credit prices. In 2013, Tesla sold $64.6 million worth of EPA GHG credits, which is equal to $63.7 million denominated in 2012$ (see Table 4). By dividing revenue reported from GHG credit sales by the total sales of EPA GHG credits sold by Tesla, we find that Tesla sold each GHG credit for an average of about $36 for 2012 and $63 for 2013 as show in the 5th column of Table 4 (both in 2014$).

#### 3.4.2. Estimating Prices: Approach 2

For the second approach, we use public information from a settlement between two manufacturers and the federal government. More specifically, in November 2014, EPA and the US Department of Justice reached a settlement with Hyundai and Kia concerning violations of the CAA. The initial complaint was filed in response to the companies' sales of about 1.2 million model year 2012 and 2013 cars and SUVs that had labels that overstated the vehicles' fuel economy. The settlement required both companies to forgo 4.75 million EPA GHG credits in 2014, which EPA "estimated to be worth over $200 million" (EPA 2014b). If we assume that these credits are worth exactly $200 million in 2014$, or $193.97 million in 2012$, and divide this by the number of credits (4.75 million), we get a credit price of $40.84/Mg (see Table 4).

Based on assumptions about the $CO_2$ content of a gallon of gasoline, mileage for cars, and a baseline level of fuel economy, we convert the EPA GHG credit prices to equivalent NHTSA credit prices and obtain a 2012 NHTSA credit price of $67.76 per mile per gallon per vehicle, and a 2013 price of $115.67 (see Table 4). These values are higher than the NHTSA fine of $55 per mile per gallon per vehicle during this time period, which implies that the EPA rules are more binding on manufacturers during this period than the NHTSA rules.

[14] The costs of finding suitable trading partners are higher in thin markets, especially in the absence of a centralized trading system (Klier et al. 1997).

[15] Both agencies require manufacturers to report credit holdings and credit trades for compliance purposes only.

**TABLE 4. CALCULATING CREDIT PRICES (2014$)**

| Year | Action | Value (million 2014$) | Quantity (million Mg) | EPA GHG price ($/Mg) | Equivalent NHTSA credit price ($/ mpg/vehicle) |
|---|---|---|---|---|---|
| 2012 | Tesla sales of EPA GHG credits | 8.4 | 0.228 | 36 | 70 |
| 2013 | Tesla sales of EPA GHG credits | 65.7 | 1.049 | 63 | 119 |
| 2014 | Hyundai and Kia CAA settlement | 200 | 4.750 | 42 | 80 |

*Notes*: To convert the price of an EPA GHG credit to 10 NHTSA credits (1 NHTSA credit is 1/10 of an mpg), we assume that: increasing mpg by 1 from 30 to 31 is equivalent to reducing gallons per mile by 0.0011; each gallon of gasoline contains 0.008887 Mg of $CO_2$; and cars are driven 195,264 miles over their lifetime.
*Sources*: Tesla Motors' 2013 SEC Filing Form 10-K; EPA (2014a, table 4-1; 2015a, table 4-1;2014b).

## 4. Assessment of the Credit Trading Markets and Lessons From Other Pollution Regulations

Despite the opportunities for lower cost of compliance allowed by the new credit trading markets, there are several issues that may influence how effective these markets will be in practice. In this section we explore four areas that could prevent the credit markets from improving efficiency in achieving the goals of the EPA and NHTSA regulations: overlapping regulations, are emissions, reductions additional, lack of transparency and thin markets, and the effects of market power.

### *4.1. Overlapping Regulations*

One area of increasing concern for the success of emissions trading programs is the issue of overlapping regulations (Burtraw and Shobe 2012; Goulder 2013).[16] The relationship among regulations, both across jurisdictions and over time, is complex and depends on the regulations' timing and design (Levinson 2012; Goulder and Stavins 2012). Because the joint NHTSA and EPA regulations are separate but effectively regulate the same thing (i.e., fuel use and the associated emissions of $CO_2$),[17] unless they are completely harmonized, they are likely to interact with each other, resulting in higher costs.

[16] Another area of concern is changing regulations. For example, although the $SO_2$ allowance trading market was successful for a long period, it was later essentially gutted by changes in broader air pollution regulations and the ability of utilities to trade ton for ton across state lines (Schmalensee and Stavins 2013).

[17] The reason for the overlapping regulations of the two programs appears to be legal. Under early legislation, and more recently under the EISA, Congress authorized NHTSA to set fuel economy standards. However, EPA has been authorized under the CAA to set $CO_2$ standards starting in 2012. Thus, the agencies claim to have separate legal mandates.

Given the differences between the regulations (see table 1), a key impact of their overlap is that navigating compliance under the two programs is more difficult than it would be under a single program. If the programs were fully harmonized but continued to overlap, then compliance under the two programs would be similar to achieving compliance under a single program; manufacturers would simply use the same compliance strategy for both programs. However, given the differences in how credits are defined and how they can be traded within and across manufacturers fleets means manufacturers must have separate compliance strategies for the two programs. This makes it more difficult to achieve an efficient allocation of both fuel economy improvements and GHG abatement.

The overlapping nature of the two programs will make credit trading especially challenging. Under a single trading program, prices reflect the marginal costs of compliance, which helps guide market participants in making efficient investment decisions. However, with multiple, overlapping programs, prices in one credit market may no longer reflect the marginal costs of compliance. For example, the marginal cost of compliance in one program may be close to or equal to zero for a manufacturer that is in compliance under the other program.[18] Rules that create overlapping regulations that are not well harmonized, such as these by EPA and NHTSA, reduce transparency and increase the costs of attaining the joint goals of the two standards.

[18] Appendix A2 discusses this issue in more detail using a stylized model. Appendix A3 discusses how the overlap between the Zero Emission Vehicle (ZEV) regulation and the CAFE/EPA regulations influences credit prices and efficiency. These are now going to be online.

### *4.2. Are Emissions Reductions from the Regulations Additional?*

Some automakers have historically exceeded fuel economy standards (EPA, 2014a, 2016). This means that if these companies earn credits for exceeding the standards, these credits do not represent "additional" reductions because the companies would have achieved the reductions without the crediting program. When there are credit markets, the sale and use of credits earned from non-additional behavior effectively loosens the stringency of the standard, which lowers realized fuel economy improvements and GHG reductions.

The problem of additionality has been an issue in other emissions markets, including Phase 1 of the US Acid Rain Program.[19] Montero (1999) finds that many electricity generating units that opted into Phase 1 of the program had business-as-usual (BAU) emissions that were below their permit allocations. Thus they were able to sell the surplus permits to other capped firms, which actually resulted in higher overall emissions. Similar additionality issues have arisen more recently in cap-and-trade programs for $CO_2$ that have carbon offset programs (Bushnell 2012; Bento et al. 2015).[20]

[19] The Acid Rain Program allowed large power plants in the middle and eastern parts of the Untied States to trade emissions for reduction of $SO_2$ under the Clean Air Act of 1990. During Phase 1 of the program, the regulation allowed a subset of unconstrained electricity generating units to voluntarily be regulated. Owners of these units were then able to earn and sell SO2 permits to other regulated power plants.

[20] Carbon offset programs allow owners of unregulated emissions sources, such as dairy farms, to earn carbon credits for reducing emissions below a specified baseline.

### 4.2.1. Evidence of Additionality

We find some evidence that credits were given for BAU behavior in the early years of the new fuel economy and GHG standards for passenger cars and light trucks. Figures 3a and 3b, which indicate average fuel economy and the CAFE standards from 2000 to 2011 for cars and light trucks, respectively, reveal that passenger car standards remained flat until 2011, when they were changed under the new standards, while light truck standards were flat until 2005 and began to increase in 2006. As shown in Figure 3a, many of the large manufacturers appear to have overcomplied with their passenger car standard, independent of any change in the standard. Toyota, for example, increased its passenger car fleet fuel economy from slightly less than 30 miles per gallon in 1999 to 35 miles per gallon by 2005. Ford and GM also increased their passenger car fleet fuel economy, from slightly under the standard in 1999 to more than 2 miles per gallon over the standard by 2007. As shown in figure 3b, the trends for trucks are similar although not as strong.

One reason for overcompliance in the years leading up to the recent policy changes is the significant increase in real gasoline prices. Between 1999 and 2008, real gasoline prices nearly tripled, from approximately $1.17 to $3.24 (in 2015$). Numerous studies have shown that this gasoline price increase led to consumers demand more fuel efficient vehicles in new and used automobile markets (Li et al. 2009; Busse et al. 2013), which likely resulted in some manufacturers banking credits for BAU behavior. [21]

From 2009 to 2011, before the new standards took effect, most manufacturers continued to produce fleets that have fuel economy levels above the standards, as we can see from Figures 3a and 3b. This was a time when many credits were banked for future use (see section on banking above). To the extent these banked credits were not additional, then total fuel reductions from the standards will be lower than expected. However, the stringency of both standards is scheduled to increase to be far above the historic BAU fuel economies of even the most fuel-efficient fleets, reducing the likelihood that additionality issues will influence program outcomes in the long run. Separating whether banked credits are non-additional or whether they are an efficient investment in longer term compliance requires a detailed model of the new vehicle market and is thus a potential area of future empirical research.

[21] This is consistent with Montero (1999), who found that BAU emissions were falling prior to implementation of the Acid Rain Program because of declining low-sulfur coal prices.

**FIGURE 3A. AVERAGE FUEL ECONOMY AND CAFE STANDARDS FOR PASSENGER CAR FLEETS, 1999–2011**

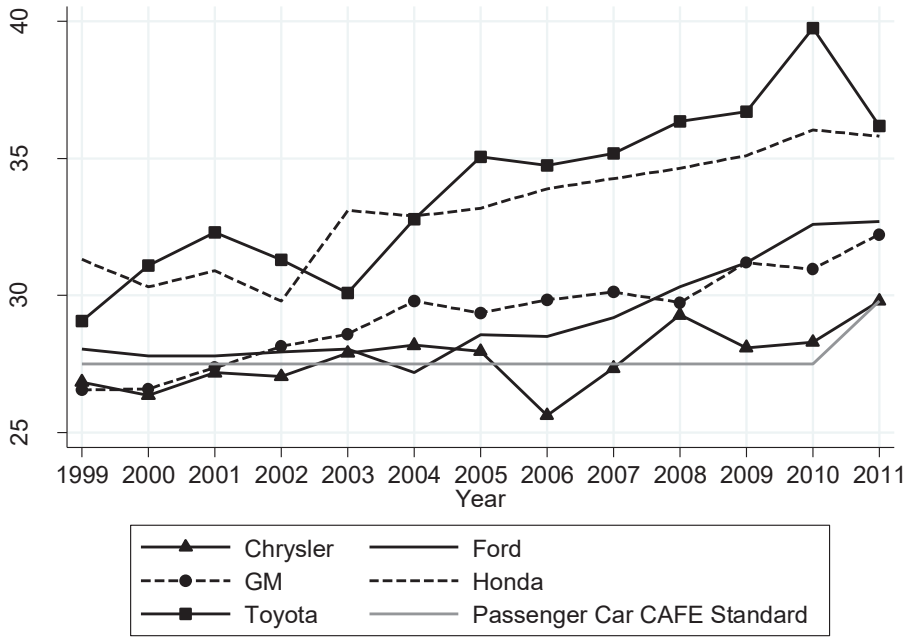
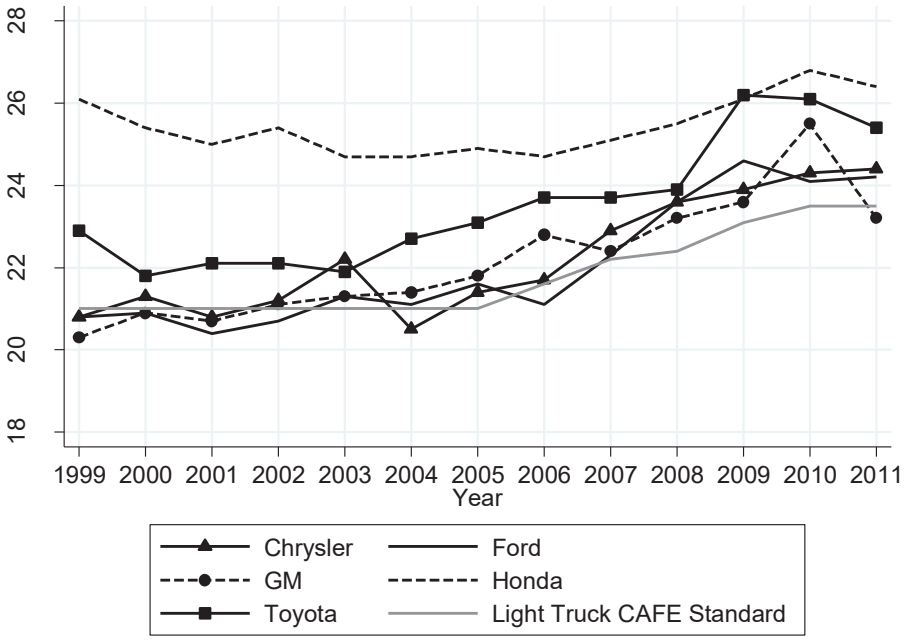



**FIGURE 3B. AVERAGE FUEL ECONOMY AND CAFE STANDARDS FOR LIGHT TRUCK FLEETS, 1999–2011**




*Note*: The gray lines indicate the CAFE standards. *Sources for 3a and 3b*: 1999 and 2000 fuel economy data: http://www.nhtsa.gov/cars/rules/CAFE/FuelEconUpdates/2000/index.html; 2001 and 2002 fuel economy data: http://www.nhtsa.gov/cars/rules/CAFE/FuelEconUpdates/2002/index.htm; 2003 and 2004 fuel economy data: http://www.nhtsa.gov/Laws+&+Regulations/CAFE++Fuel+Economy/2004+Automotive+Fuel+Economy+Program; 2005–2011 fuel economy data: http://www.nhtsa.gov/staticfiles/rulemaking/pdf/cafe/June_2014_Summary_Report.pdf.

### *4.3. Lack of Transparency and Thin Markets*

A well-functioning market for trading credits between companies requires transparency about the prices of trades that have occurred and a way for potential traders to find each other without incurring high transaction costs (Stavins 1995). The history of credit trading under other vehicle programs such as the California Low-Emission Vehicle and Zero Emission Vehicle programs has been that buyers and sellers of credits find each other on an as-needed basis, and regulators report information on quantities traded but not on prices (CARB, 2016[22]).

The CAFE and EPA credit-trading programs are getting started in a similar way. The limited trading thus far has been done informally, with manufacturers contacting each other directly. EPA reports on quantities traded and who bought and sold credits for each vehicle model year, but not on the price of the trades. NHTSA does not report any information about the credit market. In most auction markets as well as in previous emissions trading programs, the trading price is published and then participants decide whether to buy or sell. Given that parties have to find each other and they do not have information about previous prices, it is not surprising that few trades have taken place.

In addition to the problems of potentially high transactions costs and no price transparency, credit markets have also been thin because of the agencies' midterm review of the standards that is to be finalized in 2018. Uncertainty about the outcome of this review in terms of the longer-term stringency of the standards is likely to make manufacturers reluctant to trade credits until these issues are resolved.

#### 4.3.1. Bounding Credit Market Prices

One potential role for the agencies to encourage more trading is to reduce uncertainty for manufacturers by providing information about the range of possible credit prices. The NHTSA fine for non-compliance[23] already sets an effective price cap on the credit price,, which effectively establishes a "safety valve" on the costs of the regulations. The notion of a safety valve is attributed to Roberts and Spence (1976) and later applied to climate policy by Pizer (2002) and Murray et al. (2009). It involves trading off some confidence about the quantity of pollution reduction that will be attained for more certainty about the cost of the reductions. In this case, if the rules turn out to be more expensive than anticipated or fall more heavily on some firms than others, a fee imposed on the firm in lieu of reductions limits the additional cost and also provides information to manufacturers about the maximum price of a credit. EPA is prohibited from allowing manufacturers to pay a fine, as discussed above, but EPA could sell credits to buyers at a fixed price to set a ceiling on costs.

The agencies could also set a price floor on credits by offering to buy credits at a given price. The combination of the price floor and ceiling would provide certainty to manufacturers about the range of credit prices and would push the market toward greater efficiency. More information would be available to potential participants, and there would be less credit price fluctuation due to likely future shifts in supply and demand (e.g., the development of alternative fuel technologies and changes in gasoline prices).

[22] Information on trades is available at https://www.arb.ca.gov/msprog/zevprog/zevprog.htm

[23] The current NHTSA fine is $140/mpg per vehicle under the manufacturer's standard.

### *4.4. Effects of Market Power*

In a tradable permits market with relatively few firms, as is the case for light-duty vehicles, one issue that arises is whether the market is susceptible to market power. The potential for market power in the CAFE and EPA GHG credit markets depends on the credit balances held by the largest manufacturers. We focus on the EPA GHG program again here because more recent data are available and the EPA and CAFE programs have a similar distribution of credits. Table 5, which ranks the concentration of EPA GHG credits among the six largest companies, suggests that market power may pose a threat to the allocative efficiency of these markets because these six manufacturers own about 80 percent of the credits.

In his analysis of the impact of market power on the efficiency of pollution markets, Hahn (1984) argues that if a few firms have a relatively large number of pollution permits, they will exercise monopoly power by selling relatively few permits, thereby lowering the efficiency gains from trading. The large number of EPA emissions credits held by a few firms as shown in Table 5, and the limited number of trades to date under the EPA program (less than 10 percent of credits have been traded), is consistent with a setting where some firms can act in ways that would restrict competition. However, there is no direct evidence of such strategic behavior and the firms with the largest number of credit holdings have sold some credits over the past few years. Moreover, there are other reasons that companies may be holding credits.

**TABLE 5. CONCENTRATION OF EPA GHG CREDITS AT THE END OF THE 2015 COMPLIANCE YEAR**

| (Rank) manufacturer | Credit balance (million Mg) | Market share (%) | Cumulative market share (%) |
|---|---|---|---|
| (1) Toyota | 80 | 29 | 29 |
| (2) Honda | 38 | 13 | 42 |
| (3) Ford | 31 | 11 | 53 |
| (4) GM | 31 | 11 | 64 |
| (5) Hyundai | 20 | 7 | 71 |
| (6) Nissan | 25 | 9 | 80 |
| All other manufacturers | 58 | 20 | 100 |
| Total | 286 | 100 | — |

*Notes*: Credit balances include the sum of car and light truck credits and are net of deficits, penalties, and trades between manufacturers. Manufacturers can use the 2010-15 vintages for compliance up to the 2021 standard.
*Source*: Author calculations based on EPA (2016).

For example, they may be uncertain about future compliance costs, or they may believe that there could be future changes in the standards. In addition, the trading market is relatively new, and companies are likely to need time to become familiar with the idea of trading credits.[24]

It is also important to note that Hahn's analysis assumes perfect competition in output markets, an assumption that is unlikely to hold in the US automobile market. Rubin et al. (2009) conduct numerical simulations of an imperfectly competitive automobile market to measure the cost savings from incorporating tradable fuel economy standards. They find that market power in the credit trading market between firms lowers the potential cost savings from trading, but only modestly. Overall, we do not find any suggestion that market power is being misused, but it will be important to reexamine this issue as the credit markets become more robust in the future.

## 5. Conclusions and Future Outlook

This article has looked at two overlapping regulations, one on vehicle fuel use by NHTSA and the other on GHG emissions by EPA, and at how increased flexibility for manufacturers that allows banking and trading can make these regulations more efficient. We focus here on the market for credit trading between auto manufacturing firms, which offers a way for vehicle manufacturers to reduce the costs of attaining increasingly strict standards through the 2025 model year. Our analysis of the credits and credits markets is likely to have implications for other countries that have recently implemented regulations for light-duty fuel consumption, since many of these are including flexible mechanisms for compliance that are similar to those in the United States. The market for credit trading between companies in the United States is at an early stage, and though so far there have been few trades, the number of trades has been increasing rapidly in the last few years. Most manufacturers are in compliance with the standards, and many have used banking provisions to accumulate varying amounts of credits to hold in reserve. It is not clear, at this stage, whether many of the banked reduction credits were additional to what firms would have done anyway, or whether they are needed for spreading the high costs of compliance over time by overcomplying early and undercomplying later. More analysis of this issue is important because the former suggests the standards may be too lax, and the latter suggests that the banking and credit market will be essential to reducing the costs of very stringent standards, especially in the 2022-2025 time period. The combination of these costly standards in the later years and large variation in the ease of compliance between manufacturers suggests an important role for credit trading in the future.

However, we have identified here a number of problems in the structure of the credit markets that may be leading to thin markets with few trades. There is too little information about prices of past trades, and the transactions cost of finding a trading partners can be high. There are ways government can facilitate the market. We suggest that reducing uncertainty about the price of credits, and about the stringency of future regulations will both be important.

Perhaps the greatest barrier to efficient credit trading markets for GHGs and fuel economy is that there are two separate but overlapping rules, with two separate credit markets, each with somewhat different rules about what counts as a credit and how they can be traded. This complicates compliance for the manufacturers and drives up the cost of meeting the joint goals of reducing oil use and GHG emissions. The two rules are governed by two different pieces of legislation, but ideally, they will be more fully harmonized with a single compliance system and credit market.

[24] This possible explanation is consistent with evidence on the efficiency of the first few years of allowance trading under Phase 1 of the Acid Rain Program (Carlson et al. 2000).

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## Appendix

### *A1. Example of Representative Manufacturer Overcompliance*

In this Appendix we illustrate how manufacturers comply with both the NHTSA gallons per mile standards and the EPA GHG standards., Table A1 presents an example of a representative manufacturer that overcomplies with both standards during a given model year. As shown in the left panel, which presents information on credits earned under NHTSA's CAFE program, the manufacturer overcomplies by 1.2 to 1.5 mpg among its car and truck fleets, respectively, earning 1,200,000 car credits and 1,350,000 truck credits. The right panel, which provides example data on the manufacturer's earned EPA credits, indicates that the manufacturer also overcomplies under the EPA program.

**TABLE A1. CREDITS EARNED BY A REPRESENTATIVE MANUFACTURER DURING A GIVEN MODEL YEAR**

| CAFE program | | | EPA program | | |
|---|---|---|---|---|---|
| | **Car fleet** | **Truck fleet** | | **Car fleet** | **Truck fleet** |
| Vehicles sold | 100,000 | 90,000 | Vehicles sold | 100,000 | 90,000 |
| Fleet average (miles/gallon) | 30.2 | 25 | Average (grams of $CO_2$/mile) | 294.3 | 355.5 |
| CAFE requirement (average miles per gallon) | 29 | 23.5 | EPA GHG requirement (grams $CO_2$/mile) | 306.4 | 378.2 |
| Difference (average miles/gallon) | 1.2 | 1.5 | Difference | 12.1 | 22.7 |
| Credits earned (10* miles/gallon* no. of vehicles) | 1,200,000 | 1,350,000 | Credits earned over vehicle lifetime (Mg of $CO_2$) | 236,270 | 461,440 |

*Notes*: Credits are in miles per gallon saved on average for the fleet, not total fuel saved over the vehicles' lifetimes. To convert car credits to truck credits, for example, NHTSA requires that these estimates first be converted to total fuel use and then traded. In other words, under the NHTSA crediting system, car and truck credits do not trade one for one. Cars and trucks are assumed to travel 195,264 miles and 225,865 miles, respectively, over their lifetimes. EPA credits are designated in terms of Mg saved over vehicle lifetimes. Therefore, credits can be traded between car and truck fleets. The EPA and NHTSA make the same assumptions about total miles traveled.

### *A2. Conceptual Framework for Analyzing the Effects of Overlapping NHTSA and EPA Rules*

To illustrate the effects of the overlapping NHTSA and EPA rules on the credit markets, we present a simplified example of two representative manufacturers with different marginal costs of compliance.[25] Figure A1 presents these manufacturers and their costs of complying over the next few years. Each manufacturer is subject to two rules, one from NHTSA to increase the miles per gallon (mpg) of its fleet of vehicles, and one from EPA to reduce megagrams (Mg) of $CO_2$ (or metric tons of $CO_2$). If the requirements under the two rules are fully harmonized, we can show the marginal cost of the requirements in terms of either $CO_2$ reductions or improvements in mpg. One is a linear function of the other. We show the marginal costs in Figure A1 in terms of reduced Mg of $CO_2$, but we use the figure to talk about both rules.

Each manufacturer is subject to a different target or standard, depending on the fleet of vehicles it produces under the two regulations. Firm 1 represents a large-volume manufacturer that has midrange GHG emissions initially but has relatively low costs of reducing emissions from its fleet ($MC_1$). Firm 2 has smaller production volumes but higher average initial emissions from its fleet and higher costs of reducing emissions ($MC_2$), representing, for example, a European manufacturer.

Starting at point A and moving from left to right, the horizontal axis measures Mg of $CO_2$ reduced by Firm 1 over and above BAU reductions (at the left origin). Starting at point M and moving from right to left, the horizontal axis measures Mg of $CO_2$ reduced by Firm 2, where the origin (at point M) represents BAU reductions. Both vertical axes measure the marginal cost of reducing one Mg of $CO_2$ beyond BAU levels. The figure also shows the emissions reduction target that each firm must meet, indicated by the vertical black line representing reductions equal to $Mg_T$. This target or standard could be different for each firm, depending on the sizes and types of vehicles each firm sells.

#### Both Firms Complying under the NHTSA Rules that Allow Payment of the Fine

We start with the effect of the NHTSA requirements because they have been in place the longest, and firms have been able to pay a fine in lieu of compliance. To attain this NHTSA standard, the cost for Firm 1 is shown by AFD, and the cost for Firm 2 to attain its standard is MDH. The new NHTSA rules allow firms to trade credits, but they also allow payment of the fine. The NHTSA fine for an automaker is currently $14.00 per 1/10 mpg, or $140 per mpg per vehicle over the standard.[26] Since figure A1 is in terms of Mg of $CO_2$, we show the fine as $f_N$, which is either $140/mpg or $61/Mg of $CO_2$.[27] In this case, both firms would pay the fine rather than comply with the standard. Firm 1 would reduce to $Mg_{1,N}$ or to an average fleet mpg that is below the standard, with costs of ACB; Firm 2 would reduce to $Mg_{2,N}$, with costs of MKL, which is also below the standard. Firm 1 would pay BCED in fines to NHTSA, and Firm 2 would pay KDEL in fines. In this case, even when trading is allowed, no trading in the credit market would occur. Here the fine

[25] Our analysis abstracts from dynamic effects, such as the impact of the regulations on technological advances or on the future stringency of CAFE standards.

[26] The NHTSA fine had been $5.50 per 1/10th mpg or $55 per mpg for many years. It was changed by NHTSA to $14 per 1/10th mpg in July of 2016.

[27] Conversion from mpg to Mg is explained in the notes to table 4.

represents a safety valve policy that prevents marginal costs from going above $f_N$.[28]

**Result When Both Firms Must Comply with Both Regulations**

What is the effect of the binding EPA regulation with credit trading on the NHTSA outcome? Firm 1 is more than complying under the EPA rules, so it has already paid for reductions up to $Mg_E$. Firm 1 could now sell credits in the NHTSA market ($Mg_E - Mg_T$ equivalent for NHTSA units), but the opportunity cost of these reductions is now zero. Firm 2 is reducing up to $Mg_E$ under the EPA standard with trading, so it does not meet the NHTSA standard. It could pay the fine for the additional mpg needed to meet the standard, but firms like Firm 1 have already earned EPA credits and should be willing to sell at less than $f_N$, possibly at a price close to zero.

The result is that because the two regulations have effectively the same target, the sum of the credit prices should equal the marginal cost of reducing fuel use (or equivalent $CO_2$ emissions). Firms will not pay twice for essentially the same reductions. In the case where the EPA standards are binding and no fine is allowed, an EPA credit market with a price such as $P_E$ per Mg is likely to develop, and the price should closely reflect marginal costs. No NHTSA fines would be paid, and the NHTSA credit price may be close to zero.[29]

### *A3. Effects of Other Regulations: Zero Emission Vehicle Regulations in California and Participating States*

Other regulations may also have an effect on the CAFE credit markets. One such regulation is the Zero Emission Vehicle (ZEV) mandate in California and participating states.[30] The ZEV mandate requires that a certain percentage of vehicles sold in participating states be "zero emitting," which currently includes only pure electric or fuel cell vehicles. The required percentage for the large-volume manufacturers is as high as 15 percent by 2025, which has important implications for the fleet of vehicles that these manufacturers will sell, because the participating states make up about 25 percent of the US market.

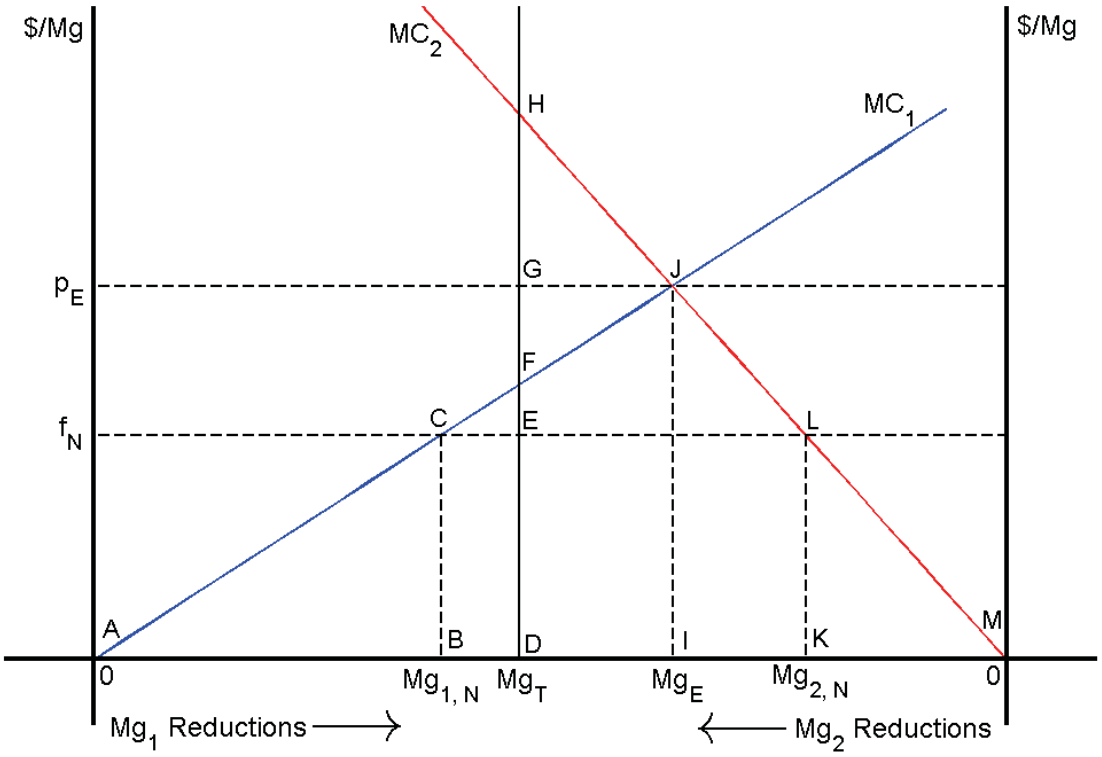
If firms that sell vehicles in California have to sell ZEV vehicles, then the costs of meeting the CAFE standards with the remaining vehicles in their fleets will be lower than they would be in the absence of the ZEV mandate. However, the companies' costs of meeting the CAFE standards *overall* are higher because they are required to produce and sell more ZEV vehicles than they would choose to, in order to meet the standards at the lowest cost.

[28] It is possible that the fine is higher than Firm 1's marginal costs at the target standard but still below the cost of complying for Firm 2. A limited NHTSA market for credits may develop if auto companies are willing to trade with each other at costs slightly lower than the fine. Under these circumstances Firm 2 would still pay some fines but would also purchase some credits from Firm 1.

[29] In the presence of other differences in credit allowances and limits to trading, the outcomes in the credit markets will be more complex than described here. For example, companies can earn credits in different ways (see table 1).

[30] For details on the ZEV mandate, see http://www.arb.ca.gov/msprog/zevprog/zevprog.htm.

**FIGURE A1. MANUFACTURERS FACING OVERLAPPING REGULATIONS FOR IMPROVING FUEL ECONOMY AND REDUCING $CO_2$ EMISSIONS**




*Note*: Figure is shown in terms of marginal cost of reducing emissions of $CO_2$ (in Mg), but it could be shown instead in terms of cost of fuel economy improvements.

# ADDENDUM

## Pursuant to Circuit Rule 27(a)(4)

## CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to Circuit Rule 28(a)(1), Petitioners National Coalition for Advanced Transportation, Consolidated Edison Company of New York, Inc., National Grid USA, New York Power Authority, and The City of Seattle, by and through its City Light Department state as follows:

### A. Parties and Amici

Petitioners: State of California, by and through its Governor Edmund G. Brown Jr., Attorney General Xavier Becerra and California Air Resources Board; State of Connecticut; State of Delaware; District of Columbia; State of Illinois; State of Iowa; State of Maine; State of Maryland; Commonwealth of Massachusetts; State of Minnesota, by and through its Minnesota Pollution Control Agency and Minnesota Department of Transportation; State of New Jersey; State of New York; State of Oregon; Commonwealth of Pennsylvania, by and through its Department of Environmental Protection and Attorney General Josh Shapiro; State of Rhode Island; State of Vermont; Commonwealth of Virginia; State of Washington; National Coalition for Advanced Transportation; Center for Biological Diversity; Conservation Law Foundation; Environmental Defense Fund; Natural Resources Defense Council; Public Citizen, Inc.; Sierra Club; the Union of Concerned Scientists; Consolidated Edison Company of New York, Inc.; National Grid USA;

New York Power Authority; and The City of Seattle, by and through its City Light Department.

Respondents: Environmental Protection Agency and Andrew Wheeler, as Acting Administrator of the United States Environmental Protection Agency ("EPA").

Intervenors: On May 25, 2018, the Alliance of Automobile Manufacturers and the Association of Global Automakers, Inc. filed motions for leave to intervene in this case. These motions are currently pending before this Court.

Amici: On August 9, 2018, the Court granted the South Coast Air Quality Management District leave to participate as amicus curiae in support of Petitioners.

**B. Ruling Under Review**

This case involves a challenge to a final action by EPA entitled "Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles" published in the Federal Register at 83 Fed. Reg. 16,077 on April 13, 2018.

**C. Related Cases**

This case was not previously before this Court or any other court. By Orders on May 18, 2018 and June 15, 2018, this Court consolidated the cases filed by the petitioners listed above in No. 18-1114, 18-1118, 18-1139, and 18-1162 into this proceeding. Petitioners are not aware of any other related cases.

August 29, 2018

Respectfully submitted,

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**RULE 26.1 CORPORATE DISCLOSURE STATEMENT FOR PETITIONER NATIONAL COALITION FOR ADVANCED TRANSPORTATION**

Pursuant to Federal Rule of Appellate Procedure 26.1 and Circuit Rule 26.1, Petitioner National Coalition for Advanced Transportation ("NCAT") states:

NCAT is a coalition of companies that supports electric vehicle and other advanced transportation technologies and related infrastructure, including business leaders engaged in energy supply, transmission and distribution; vehicle and component design and manufacturing; and charging infrastructure production and implementation, among other activities. NCAT is an unincorporated association and does not have a parent corporation. No publicly-held entity owns 10% or more of NCAT.

NCAT currently has the following members:

- Ampaire
- Atlantic City Electric
- Baltimore Gas & Electric
- Commonwealth Edison Company
- Delmarva Power
- Edison International
- EVgo
- Exelon

- Los Angeles Department of Water & Power
- Pacific Gas and Electric Company
- PECO
- PEPCO
- Portland General Electric
- Sacramento Municipal Utility District
- Tesla, Inc.
- Workhorse Group Inc.

Dated: August 29, 2018

Respectfully submitted,

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**RULE 26.1 DISCLOSURE STATEMENT FOR PETITIONERS CONSOLIDATED EDISON COMPANY OF NEW YORK, INC. AND NATIONAL GRID USA**

Pursuant to Rule 26.1 of the Federal Rules of Appellate Procedure and Circuit Rule 26.1, Petitioners Consolidated Edison Company of New York, Inc. ("Con Edison") and National Grid USA provide the following disclosure statements.

**Con Edison** states that it is a regulated public utility, incorporated in the State of New York, engaged in the generation, transmission, distribution and the wholesale and retail sale of electric power throughout the five boroughs of New York City and in the County of Westchester and the retail sale of steam and gas in parts of New York City and the County of Westchester. Con Edison has outstanding debt securities held by the public and may issue additional securities to the public. Con Edison is a subsidiary of Consolidated Edison, Inc., which has outstanding shares and debt held by the public and may issue additional securities to the public. Con Edison is also affiliated with Orange & Rockland Utilities, Inc. ("O&R"), a subsidiary of Consolidated Edison, Inc., which also has outstanding debt securities and may issue additional securities. O&R has a subsidiary, Rockland Electric Company, which may issue debt securities. No other publicly held companies have a 10% or greater ownership interest in Con Edison.

**National Grid USA** states that it is a public utility holding company with regulated subsidiaries engaged in the transmission, distribution and sale of electricity

and natural gas and the generation of electricity. It is the corporate parent of several subsidiary distribution companies, Massachusetts Electric Company, Nantucket Electric Company, Niagara Mohawk Power Corporation and The Narragansett Electric Company, each of which is and will be investing in electric vehicle infrastructure as part of its service to customers. All of the outstanding shares of common stock of National Grid USA are owned by National Grid North America Inc. All of the outstanding shares of common stock of National Grid North America Inc. are owned by National Grid (US) Partner 1 Limited. All of the outstanding ordinary shares of National Grid (US) Partner 1 Limited are owned by National Grid (US) Investments 4 Limited. All of the outstanding ordinary shares of National Grid (US) Investments 4 Limited are owned by National Grid (US) Holdings Limited. All of the outstanding ordinary shares of National Grid (US) Holdings Limited are owned by National Grid plc. National Grid plc is a public limited company organized under the laws of England and Wales, with ordinary shares listed on the London Stock Exchange, and American Depositary Shares listed on the New York Stock Exchange.

August 29, 2018

Respectfully submitted,

*/s/ Kevin Poloncarz*

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**ORAL ARGUMENT NOT YET SCHEDULED**

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

| | |
|---|---|
| NATIONAL COALITION FOR ADVANCED TRANSPORTATION,<br><br>Petitioner,<br><br>v.<br><br>ENVIRONMENTAL PROTECTION AGENCY,<br><br>Respondent. | Case No. 18-1118<br><br>Consolidated with case nos. 18-1114, 18-1139, 18-1162 |

**DECLARATION OF CAROLINE CHOI**

I, Caroline Choi, do hereby declare that the following statements made by me under oath are true and accurate to the best of my knowledge, information, and belief:

1. I am Senior Vice President, Regulatory Affairs for Southern California Edison ("SCE"). I am responsible for SCE's regulatory strategy and policy at the national and state levels, including regulatory affairs, regulatory operations and environmental affairs.

2. SCE is a subsidiary of Edison International, and is headquartered in Rosemead, California. SCE is one of the nation's largest electric utilities in the United States, serving more than 15 million people in a 50,000-square-mile area of southern California.

3. Edison International is a member of the National Coalition for Advanced Transportation ("NCAT").

4. SCE is committed to leading the transformation of the electric power industry toward a clean energy future. This electric-led strategy includes utility investment in programs to build and support the expansion of transportation electrification.

5. SCE supports strong vehicle greenhouse gas ("GHG") emissions standards and believes that the existing United States Environmental Protection Agency ("EPA") standards for model year ("MY") 2022-2025 light-duty vehicles are appropriate and readily achievable. SCE believes that the standards are critical to achieving air quality and climate goals, and, as described below, SCE is actively investing in infrastructure and other programs that support customer adoption of zero-emission vehicles and successful implementation of the standards.

6. SCE has developed a comprehensive and long-term business strategy in which SCE will play a leadership role in the electrification of the transportation sector, in order to achieve significant reductions in GHG and criteria pollutant

emissions. This strategy is described in SCE's vision for "Transportation Electrification: Reducing Emissions, Driving Innovation"[1] and "The Clean Power and Electrification Pathway."[2]

7. SCE's strategy involves substantial development of electrical infrastructure to support and enable the attainment of state and federal air quality and state climate change goals. These programs also stimulate technology innovation and market competition, enable consumer choice in charging equipment and services, attract private capital investments, and create high quality jobs for the public and our customers.

8. For example, in June of 2018 SCE filed an application with the California Public Utilities Commission seeking approval for a $760 million program in electric vehicle ("EV") fueling infrastructure—supporting up to 48,000 charge ports in SCE's service area—and market education and outreach.[3] To-date, SCE has funded approximately $18 million in infrastructure and programs to support 1,042 charge ports at 69 customer sites through its "Charge Ready" program. SCE also

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[1] White Paper (Jan. 2017), https://www.edison.com/content/dam/eix/documents/our-perspective/201701-transportation-electrification-reducing-emissions-driving%20-innovation.pdf.

[2] White Paper (Nov. 2017), https://www.edison.com/content/dam/eix/documents/our-perspective/g17-pathway-to-2030-white-paper.pdf.

[3] Application of SCE for Approval of its Charge Ready 2 Infrastructure and Market Education Programs (June 26, 2018), http://www3.sce.com/sscc/law/dis/dbattach5e.nsf/0/2393DAED8E6B077F882582B800734ED4/$FILE/A1806XXX-%20SCE%20Charge%20Ready%202%20Application.pdf.

has approval from the California Public Utilities Commission for $360 million in transportation electrification infrastructure and programs to support medium-and-heavy-duty electric vehicles, $4 million in infrastructure and programs supporting direct-current fast charging ports, and $4 million in infrastructure to support electrification of port equipment at the Port of Long Beach.

9. In order to successfully plan, develop, obtain approval, and execute programs like these, SCE must rely on consistent implementation of regulatory programs.

10. SCE's parent company, Edison International, participated in EPA's mid-term evaluation process to assess the appropriateness of maintaining the existing light-duty vehicle GHG standards for vehicle MY 2022–2025, submitting comments to the agency through NCAT.[4]

11. EPA's mid-term evaluation final determination issued in April 2018[5] ("Revised Final Determination") has created substantial uncertainty by finding that the current standards are not appropriate, and by including inaccurate and erroneous

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[4] NCAT, Comments on EPA's 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, EPA Docket No. EPA–HQ–OAR–2015–0827–9101 (Oct. 5, 2017).

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

findings on topics such as EV adoption and consumer acceptance. (83 Fed. Reg. at 16,080-81 & Fig. 1[6]).

12. Regulatory uncertainty and inconsistent and inaccurate analysis and findings related to key factors, such as EV demand and emission reduction needs, leads to unnecessary transaction and planning costs by causing confusion and producing distorted data regarding the market.

13. SCE supports strong vehicle GHG emissions standards and believes that the existing standards for MY 2022-2025 light-duty vehicles are appropriate and readily achievable. SCE believes that the standards are critical to achieving air quality and climate goals. SCE is actively developing infrastructure and other programs that support customer adoption of the zero-emission vehicles and successful implementation of the standards.

14. SCE believes that clear, consistent, and factually supported regulatory programs controlling emissions from mobile sources are critical to achieving vital air quality and climate goals, and ensuring that SCE can effectively plan and

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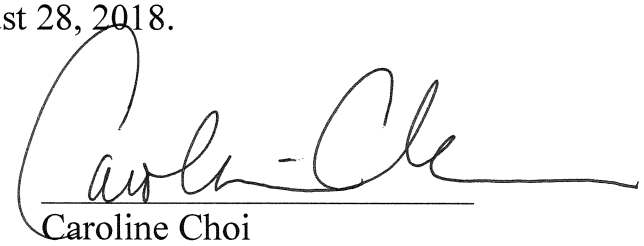
[6] EPA's inclusion of an out-of-date figure which suggests EV sales continued to decline in 2016, coupled with the assertions that "consumer adoption remains very low," (83 Fed. Reg. at 16,081) and "EV Sales have decreased" (*id.* at 16,083) are examples of unsupported and invalid findings in the Revised Final Determination that can adversely impact SCE by, among other things, increasing transaction and planning costs to respond to, and account for, the EPA findings and decision in the Revised Final Determination. As explained in NCAT's Comments (at 17): "2016 sales of EVs jumped by 37 percent year over year—to over 159,000 vehicles—and the number of offerings increasing to 30 different models."

implement infrastructure programs to support these goals and our customers. The EPA's findings in the Revised Final Determination impair these efforts.

I declare under penalty of perjury pursuant to 28 U.S.C. § 1746 that the foregoing is true and correct. Executed on August 28, 2018.



Caroline Choi

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| NATIONAL COALITION FOR ADVANCED TRANSPORTATION,<br><br>Petitioner,<br><br>v.<br><br>ENVIRONMENTAL PROTECTION AGENCY,<br><br>Respondent. | Case No. 18-1118<br><br>Consolidated with case nos. 18-1114, 18-1139, 18-1162 |

**DECLARATION OF JOSEPH MENDELSON, III**

I, Joseph Mendelson, III, do hereby declare that the following statements made by me under oath are true and accurate to the best of my knowledge, information, and belief:

1. I am Senior Counsel, Policy and Business Development at Tesla, Inc. ("Tesla"). I am responsible for Tesla's relations with government agencies at the federal level related to the Environmental Protection Agency's ("EPA") light-duty vehicle greenhouse gas ("GHG") vehicle emissions standards and National Highway Traffic Safety Administration ("NHTSA") corporate average fuel economy ("CAFE") standards. These responsibilities have included facilitating Tesla's

participation, including the drafting and submission of written comments, in the Mid-Term Evaluation process.

2. Tesla is a member of the National Coalition for Advanced Transportation ("NCAT").

3. Tesla is a publicly traded corporation, incorporated in the State of Delaware on July 1, 2003, with headquarters located at 3500 Deer Creek Road, Palo Alto, CA 94304.

4. Tesla's mission is to accelerate the world's transition to sustainable energy. Moreover, Tesla believes the world will not be able to solve the climate change crisis without directly reducing air pollutant emissions—including carbon dioxide and other greenhouse gases—from the transportation and power sectors.

5. To accomplish its mission, Tesla designs, develops, manufactures and sells high-performance fully electric vehicles, and energy generation and storage systems, and also installs and maintains such systems and sells solar electricity. Tesla currently produces and sells three fully electric vehicles: the Model S sedan, the Model X sport utility vehicle, and the Model 3 sedan. A little over a year after its first delivery to customers, the Tesla Model 3 is now one of the top ten best selling cars in America and the Tesla Model S is the best-selling vehicle in its class.

6. Tesla has established, and continues to grow, a large network of retail stores, vehicle service centers, and electric vehicle charging stations to accelerate and support the widespread adoption of its products.

7. In the United States, Tesla conducts vehicle manufacturing and assembly operations at its facilities in Fremont, California and Sparks, Nevada. As an automobile manufacturer, Tesla is subject to regulation under the EPA light-duty vehicle GHG emissions standards and NHTSA CAFE standards.[1]

8. Tesla supports strong EPA GHG and NHTSA CAFE standards for light-duty vehicles. Regulatory certainty in the existing standards has contributed to billions of dollars in investments by Tesla.

9. Tesla has expanded direct investment in its cutting-edge auto manufacturing, to develop innovative new sustainable energy technologies and products, and to invest in new electric vehicle charging and support infrastructure throughout the United States. In 2013, Tesla had 8 Supercharger (DC fast charging) stations in North America. As of July 2018, Tesla's North American network has grown to include over 600 Supercharger Stations with nearly 5,500 individual chargers. It also includes a network of more than 3500 Destination Charging

[1] EPA & NHTSA, 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).

locations that replicate the convenience of home charging by providing hotels, resorts, and restaurants with Tesla Wall Connectors.[2]

10. Tesla participated in EPA's Mid-Term Evaluation process to assess the appropriateness of maintaining the existing light-duty vehicle GHG standards for vehicle model years ("MY") 2022 through 2025, submitting comments to the agency separately and through NCAT.[3]

11. In April 2018, EPA completed the Mid-Term Evaluation process, issuing a final determination that its existing light-duty vehicle GHG standards for MY 2022–2025 are no longer appropriate under Section 202(a) of the Clean Air Act—a reversal of the agency's January 2017 final determination that these standards were appropriate. EPA's decision, entitled "Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles," was published in the Federal Register at 83 Fed. Reg. 16,077 on April 13, 2018 (the "Revised Final Determination").

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[2] *See* Tesla, On the Road, https://www.tesla.com/supercharger (last visited Aug. 22, 2018).

[3] Tesla, Comments, EPA Docket No. EPA–HQ–OAR–2015–0827–9201 (Oct. 5, 2017); NCAT, Comments on EPA's 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, EPA Docket No. EPA–HQ–OAR–2015–0827–9101 (Oct. 5, 2017).

12. The EPA's Revised Final Determination that the existing light-duty vehicle MY 2022-2025 standards were no longer technologically achievable harms Tesla's ability to fulfill its corporate mission of transitioning the world's car fleet to electric vehicles and threatens to negatively influence consumers' confidence in the environmental and technical performance of Tesla's vehicles.

13. EPA's regulations for the Mid-Term Evaluation process require the agency to explain to the public in detail the basis for its final determination, including the agency's assessment of factors specifically listed in the regulation.[4] EPA's failure to provide this information in support of its Revised Final Determination adversely affects Tesla as a participant in the public regulatory process and as an entity regulated by the light-duty vehicle GHG standards. As an electric vehicle manufacturer Tesla has an interest in understanding EPA's justification for its reversal in position on the availability and effectiveness of electric vehicle technology in the agency's feasibility analysis.

14. Tesla's business interests in marketing electric vehicles are adversely affected by EPA's unsubstantiated, inadequately supported, and/or incorrect statements in the Revised Final Determination that reflect negatively on the performance, cost, and consumer acceptance of electric vehicles. EPA's statements in the Revised Final Determination represent a sharp, arbitrary and unsupported

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[4] *See* 40 C.F.R. § 86.1818-12(h).

reversal of course in comparison with more favorable statements in its prior January 2017 final determination.

15. EPA's Revised Final Determination creates needless investment uncertainty. This harms Tesla's business by increasing current transaction costs associated with evaluating, planning, and making potential investments in its charging infrastructure and manufacturing expansion.

I declare under penalty of perjury pursuant to 28 U.S.C. § 1746 that the foregoing is true and correct. Executed this 28th day of August.

Joseph Mendelson, III

**ORAL ARGUMENT NOT YET SCHEDULED**

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

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| NATIONAL COALITION FOR ADVANCED TRANSPORTATION,<br><br>Petitioner,<br><br>v.<br><br>ENVIRONMENTAL PROTECTION AGENCY,<br><br>Respondent. | Case No. 18-1118<br><br>Consolidated with case nos. 18-1114, 18-1139, 18-1162 |

## DECLARATION OF O. KEVIN VINCENT

I, O. Kevin Vincent, do hereby declare that the following statements made by me under oath are true and accurate to the best of my knowledge, information, and belief:

1. I am the Vice President for Government, Regulatory and Safety Affairs at Workhorse Group Inc. ("Workhorse"). I am responsible for Workhorse's relations with government agencies at the federal, state, and local level, compliance with regulatory requirements, and the filings necessary for the company to qualify for benefits from government agencies, including credits under the United States Environmental Protection Agency's ("EPA") light-duty vehicle greenhouse gas

("GHG") emission standards and the Corporate Average Fuel Economy ("CAFE") standards of the National Highway Traffic Safety Administration ("NHTSA").

2. Workhorse is a member of the National Coalition for Advanced Transportation ("NCAT").

3. Workhorse is a United States small business truck manufacturer headquartered in Ohio with a factory located in Indiana. Workhorse is a publicly-traded company that is not controlled by any foreign persons or entities.

4. At the present time Workhorse has approximately 125 employees. All of Workhorse's employees and operations are located within the United States.

5. Workhorse manufactures electric drive trucks and does not manufacture any on-road vehicles that are propelled primarily by diesel or gasoline. Two of the vehicle models developed by Workhorse are light-duty vehicles subject to EPA's light-duty vehicle GHG emission standards and NHTSA's CAFE standards.

6. The W-15 is a plug-in range-extended electric drive pickup truck with an all-electric range of 80 miles and an onboard generator that allows the vehicle to recharge while driving. The gross vehicle weight rating ("GVWR") of the W-15 is 7200 lbs. Workhorse plans to begin production of the W-15 in 2019.

7. The N-GEN 450 is an all-electric delivery van with a range of 100 miles. The GVWR of the N-GEN 450 is 10,001 lbs. Workhorse is beginning production of the N-GEN 450 in 2018.

8. To date, Workhorse has expended more than $10 Million in developing the W-15 and N-GEN 450.

9. Both EPA's and NHTSA's performance-based regulations incorporate the compliance flexibilities of averaging, banking and trading mechanisms through which an over-performing manufacturer may earn and trade regulatory credits to other manufacturers. As electric vehicles with zero tailpipe emissions, each sale of the W-15 and the N-GEN 450 will earn credits for Workhorse under EPA's existing GHG and NHTSA's existing CAFE standards regulatory programs. Credit value depends on market demand for the credits. The credit value increases when the standards are more stringent and there is a greater demand for credits from auto manufacturers that need credits to comply with the standards. The standards provide important long-term incentives for Workhorse's investments in electric vehicle technologies.

10. Workhorse plans to sell the credits it earns to other auto manufacturers to offset some of the costs that Workhorse is incurring in developing and producing the W-15 and N-GEN 450. Workhorse includes revenue from credit sales in the

company's planning and investment in development of its W-15 and N-GEN 450 electric vehicles.

11. In April 2018, EPA completed the Mid-Term Evaluation process, issuing a final determination that its existing light-duty vehicle GHG standards for MY 2022–2025 are no longer appropriate under Section 202(a) of the Clean Air Act—a reversal of the agency's January 2017 final determination that these standards were appropriate. EPA's decision, entitled "Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles," was published in the Federal Register at 83 Fed. Reg. 16,077 on April 13, 2018 (the "Revised Final Determination").

12. EPA's Revised Final Determination will harm Workhorse by adversely affecting the market for regulatory credits earned under the GHG and CAFE light-duty vehicle standards. Workhorse expects to begin earning those credits in 2018. EPA's decision to reduce the stringency of the existing light-duty vehicle standards will reduce, or eliminate altogether, the value of the credits that Workhorse expects to generate through the production and sale of the W-15 and N-GEN 450. The agency's action in the Revised Final Determination has created uncertainty over the future need and demand for the credits, which in turn will reduce the interest in transactions to acquire credits and correspondingly the value of those credits.

13. EPA's regulations for the Mid-Term Evaluation process, adopted pursuant to the Clean Air Act, require the agency to explain to the public in detail the basis for its final determination, including the agency's assessment of factors specifically listed in the regulation.[1] EPA's failure to provide the information in support of its Revised Final Determination adversely affects Workhorse as a participant in the public regulatory process and as an entity regulated by the light-duty vehicle GHG standards. In particular, as an electric vehicle manufacturer Workhorse has an interest in understanding EPA's justification for its reversal in position on the availability and effectiveness of electric vehicle technology in the agency's feasibility analysis.

I declare under penalty of perjury pursuant to 28 U.S.C. § 1746 that the foregoing is true and correct. Executed on August 28, 2018.

O. Kevin Vincent

[1] *See* 40 C.F.R. § 86.1818-12(h).

**ORAL ARGUMENT NOT YET SCHEDULED**

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

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| NATIONAL COALITION FOR ADVANCED TRANSPORTATION,<br><br>Petitioner,<br><br>v.<br><br>ENVIRONMENTAL PROTECTION AGENCY,<br><br>Respondent. | Case No. 18-1118<br><br>Consolidated with case nos. 18-1114, 18-1139, 18-1162 |

## DECLARATION OF PAUL LAU

I, Paul Lau, do hereby declare that the following statements made by me under oath are true and accurate to the best of my knowledge, information and belief:

1. I am the Chief Grid Strategy and Operations Officer at the Sacramento Municipal Utility District ("SMUD"). I am responsible for operation of SMUD's power markets, transmission, and distribution grids, including the Balancing Authority of Northern California (BANC), the development of a holistic smart grid strategy, and overseeing our utility's research & development programs.

2. Created by voters in 1923, SMUD is the nation's sixth-largest community-owned electric service provider, serving 624,770 customer accounts and a population of approximately 1.4 million in Sacramento, California.

3. SMUD is a member of the National Coalition for Advanced Transportation ("NCAT").

4. SMUD supports the United States Environmental Protection Agency's ("EPA") existing light-duty vehicle greenhouse gas ("GHG") emissions standards. EPA's existing model year ("MY") 2022-2025 standards provide important long-term incentives for manufacturing and deployment of electric vehicle technologies and supporting infrastructure. SMUD's interest in opposing a reduction in the stringency of EPA's existing light-duty vehicle standards stems primarily from SMUD's direct financial investments in infrastructure and in special electricity rates to foster electric vehicle ("EV") growth.

5. The regulatory certainty of EPA's existing standards has allowed SMUD to model projected EV penetration in SMUD's service territory, budget for needed infrastructure investments, and offer incentives to encourage EV adoption that will scale SMUD's investments. Between 2010 and 2017, SMUD spent over $27 million on its internal EV research and development program, and is on track to spend an additional $7.3 million by 2021. In addition since 2000, SMUD has spent $10.5 million to support EV charging infrastructure, outreach and education,

and incentives for electric vehicles. SMUD has relied on EPA's existing MY 2022-2025 light-duty vehicle GHG standards in planning for these programs.

6. SMUD participated in EPA's Mid-Term Evaluation process to assess the appropriateness of maintaining the existing light-duty vehicle GHG standards for vehicle model years 2022 through 2025, submitting comments to the agency through NCAT.[1]

7. In April 2018, EPA issued its revised mid-term evaluation final determination ("Revised Final Determination") finding that the MY 2022-2025 standards are not appropriate, and must be revised.[2] EPA's Revised Final Determination also withdrew its prior January 2017 final determination in which the agency had found the MY 2022-2025 standards were appropriate.[3] In the Revised Final Determination, EPA relied on incomplete and inaccurate findings related to electric vehicle technology adoption and consumer acceptance.[4]

8. EPA's Revised Final Determination has created substantial uncertainty by determining that the existing MY 2022-2025 standards must be

[1] NCAT, Comments on EPA's 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, EPA Docket No. EPA–HQ–OAR–2015–0827–9101 (Oct. 5, 2017).
[2] EPA, *Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022–2025 Light-Duty Vehicles*, 83 Fed. Reg. 16,077 (Apr. 13, 2018).
[3] *Id.* at 16,077.
[4] *Id.* at 16,079-81.

revised, and that the levels of EV deployment the agency previously projected are not feasible. By requiring revision of the standards, EPA's Revised Final Determination has undermined confidence in and/or altered the market projections that SMUD uses to determine the appropriate level of investment in EV infrastructure and the value of the rates it has offered to EV customers. EPA's action accordingly has required SMUD to bear new and additional planning and analysis costs related to these market projections.

9. SMUD estimates that relaxing the current standards could slow or reverse EV adoption trends and result in 2 to 3 times lower return on SMUD's investments out to 2030. This would, in turn, cause SMUD to reevaluate its rates and incentives for EV owners, and face choices of taking further financial losses to encourage enough EV adoption to make SMUD's investments scale, increasing rates for EV owners to recoup some losses, or abandoning the EV program after 25 years of investment. In any case, SMUD will need to spend further time and expense modeling, rolling out, and negotiating updated rates.

I declare under penalty of perjury pursuant to 28 U.S.C. § 1746 that the foregoing is true and correct. Executed on August 28, 2018.

Paul Lau

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

STATE OF CALIFORNIA, et al.,

*Petitioners*,

v.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, et al.,

*Respondents.*

No. 18-1114 (consolidated with Nos. 18-1118, 18-1139 and 18-1162)

**Declaration of Terence Sobolewski**

1. I am Senior Vice President and Chief Customer Officer with National Grid USA ("National Grid") and am responsible for the company's activities related to brand, new products, emerging technologies, sales of gas conversion and energy efficiency programs, and customer analytics.

2. National Grid is one of the largest investor-owned utilities in the world and, through its subsidiary companies, delivers electricity and natural gas to

millions of customers in the Northeastern states of Massachusetts, New York, and Rhode Island.

3. The states in which we operate have adopted ambitious plans to address climate change and reduce emissions of greenhouse gases. National Grid considers itself a partner in those efforts and puts environmental sustainability at the core of its mission to deliver affordable, reliable and increasingly clean energy to its customers.

4. National Grid is committed to supporting clean, efficient transportation options for our customers. The company is investing in clean transportation by adding electric vehicles ("EVs") to our fleet and through the buildout of an EV charging infrastructure. To date, National Grid has supported EV adoption by installing and managing more than 150 publicly accessible EV charging stations in Massachusetts, Rhode Island, and New York, with the goal of demonstrating the next generation of faster-charging stations, and by implementing a "Voluntary Time-of-Use Rate" (SC-1 VTOU), offering customers a reduced rate to charge their EVs during off-peak hours (11 pm to 7 am).

5. National Grid has also submitted a three-year EV pilot to the state of Massachusetts that will increase the number of charging ports in our service areas, boost EV adoption rates through various awareness campaigns and pay close attention to how the new load impacts the distribution network. National Grid is

taking these efforts because of the significant environmental and economic benefits EVs can provide to both its customers and the grid.

6. Along with other electric utilities and power providers, National Grid USA has challenged the final action of the United States Environmental Protection Agency ("EPA") entitled "Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year 2022-2025 Light-Duty Vehicles" ("Action"), in which EPA withdrew its "Final Determination" that its greenhouse gas emissions standards for light-duty vehicles for model years 2022-2025 are appropriate and also announced a "Revised Final Determination" that the standards are not appropriate and should be revised because they are based on outdated information and more recent information indicates they are too stringent.

7. National Grid, along with other companies, submitted comments to EPA on its reconsideration of the Final Determination, urging EPA to maintain the standards because they provide the regulatory certainty needed to send long-term investment signals to promote low-carbon, low-emitting transportation.

8. By withdrawing its determination that its emissions standards are appropriate and finding instead that the standards are not appropriate and should be revised to be less stringent, EPA's Action has created substantial uncertainty with respect to whether and when EVs will be deployed by automakers and

adopted by consumers in the numbers needed to realize the economic and environmental benefits of the company's investments in EV infrastructure.

I declare under penalty of perjury pursuant to 28 U.S.C. § 1746 that the foregoing is true and correct. Executed on August 29, 2018.

Terence Sobolewski