CALIFORNIA
AIR RESOURCES BOARD

October 5, 2017

Mr. Christopher Lieske
Office of Transportation and Air Quality (OTAQ),
Assessment and Standards Division (ASD)
Environmental Protection Agency
2000 Traverwood Drive
Ann Arbor, Michigan 48105

Ms. Rebecca Schade
Office of the Chief Counsel
National Highway Traffic Safety Administration
1200 New Jersey Avenue SE
Washington, DC 20590

RE: REQUESTS 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, AND ON MODEL YEAR 2021 GREENHOUSE GAS EMISSIONS STANDARDS, 82 FEDERAL REGISTER 39,551 (AUGUST 21, 2017)

Via: http://www.regulations.gov to Docket ID Nos. EPA-HQ-OAR-2015-0827 and NHTSA-2016-0068

Dear Mr. Liske and Ms. Schade:

The California Air Resources Board (CARB), joined by the California Attorney General's Office, submits the attached comments on the collective reconsideration by the U.S. Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration (NHTSA) of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Year (MY) 2022-2025 Light-Duty Vehicles, and of the preceding MY 2021 Greenhouse Gas Emissions Standards. The latest information affirms the January 2017 Final Determination: the one national program for controlling greenhouse gas emissions and setting fuel economy standards is working as intended, and technology development has been faster than expected at lower costs than predicted.

California's collaboration for over half a century with industry, scientists, academics, and advocacy groups has provided a deep understanding of how gasoline and diesel combustion changes our environment and harms public health, and the myriad ways these harmful effects

can be reduced. Through our collective work, we have developed emission standards that have spurred innovation and efficiency. As a result, we have cleaner, better built, and longer lasting vehicles that have delivered consumer savings and uplifted our society.

Since the 2012 model year, even though California faces greater environmental and public health challenges than many other states, our greenhouse gas emissions standards have accepted compliance with the federal greenhouse gas emission standards.[1] In November of 2012, when we adopted the regulations accepting compliance with these federal emission standards, we agreed it made sense to assess the continued vitality of those standards mid-way through their terms.[2] Because of this, we worked with EPA, NHTSA, the automobile industry, and others in a collaborative process to develop a comprehensive, peer-reviewed analysis. Collectively, thousands of hours were devoted to this effort that produced thousands of pages documenting in detail comprehensive technical and economic information. From this lengthy review of industry's progress developing cost-effective technologies, the answer became clear: the harmonized national program standards are not only working as intended but could be further strengthened.[3]

We are is deeply concerned that EPA and NHTSA's intent to look back from the midterm evaluation to the MY 2021 greenhouse gas and harmonized Corporate Average Fuel Economy (CAFE) standards suggests they are considering weakening them, despite the evidence that doing so is unwarranted. We oppose any weakening, for any model year.

The emission reductions from these standards are critically important. The standards reduce criteria and toxic pollutants, deliver cleaner technology, and make communities healthier across the country. The existing standards save consumers money, and enable automobile manufacturers and technology suppliers to design to a consistent target.

The standards are also critical to addressing the changing climate that threatens our survival. The soon-to-be-published National Climate Assessment concludes that "human activities are now the dominant cause of the observed trends in climate."[4] The report goes on, consistent with the vast body of climate science, to describe the dire effects of these emissions in the United States--including increased temperatures, ocean acidification, fire, flood, drought, sickness, and economic destabilization. Transportation emissions, including mobile sources,

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[1] *See* Cal. Code Regs. Title 13, §§ 1961.1(a)(1)(A)(ii); 1961.3 (c); 76 Fed.Reg. 74,854, 74,863 (December 1, 2011).
[2] *See* CARB Reso. No. 12-35 (Nov. 15, 2012), p. 5, available at: https://www.arb.ca.gov/regact/2012/leviiidtc12/res12-35.pdf, last visited September 27, 2017.
[3] CARB opted to maintain the standards for the current period to provide continued regulatory certainty, but has initiated a process to develop stronger standards in later years.
[4] *U.S. Global Change Research Program Climate Science Special Report, Fifth-Order Draft* (2017), p. 33:11.

are 26% of the nation's greenhouse gas emissions,[5] 39% of California's, and over half of our emissions when upstream fuel production emissions are included.[6]

A devastating hurricane season shows the urgent need to act. The latest scientific analyses suggest that Hurricanes Harvey, Irma, and Maria were more severe than they otherwise would have been due to warmer ocean temperatures caused by anthropogenic greenhouse gas emissions.[7] This was the first known time two category-4 hurricanes hit the United States in one season. Harvey and Irma have claimed at least 120 lives and caused an estimated $245 billion of damage.[8] The damage from Maria is still being assessed, and the suffering worsens. No responsible government can properly ignore these impacts.

The most vulnerable of us have the most to gain from these standards--or lose if EPA and NHTSA went backwards and gave up these benefits. Costs for emission control technology would increase as manufacturer demand for the technology falls. The American market for vehicle technology would fall behind the pace of innovation globally. Potential lawsuits between the various agencies and industry would generate years of uncertainty about the standards that would misdirect resources away from cost-effective, beneficial improvements to vehicle technology. Consumers would pay more and suffer from volatile fuel prices and more of our national wealth would be diverted to foreign oil producers. The effects of climate change would continue to worsen.

We cannot allow this to happen. The need is too great. These standards are for the benefit and protection of all, including the most vulnerable, and reject the false narrative that clean technology and prosperity are mutually exclusive. The United States, led by California if necessary, will continue to lead the world. If the federal standards are relaxed despite the overwhelming body of evidence demonstrating they should continue as is, California will maintain its standards. Moreover, we will pursue all available legal remedies to overturn federal actions that are unsupported by the facts and law.

Based on the best available information, CARB is looking ahead to more ambitious standards for model years after 2025. It is vital that the federal agencies continue to coordinate their work with CARB to achieve the critical public health, economic, and national security goals set by our governing statutes. We have already begun meeting with the major automobile manufacturers to discuss our path forward, together. CARB is prepared to provide its technical and policy expertise from its own continued progress to assist EPA and NHTSA.

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[5] *See U.S. Greenhouse Gas Inventory Report: 1990-2014*, available at: https://19january2017snapshot.epa.gov/ghgemissions/us-greenhouse-gas-inventory-report-1990-2014_.html, last visited August 22, 2017.
[6] *See California Greenhouse Gas Emission Inventory - 2017 Edition*, available at: https://www.arb.ca.gov/cc/inventory/data/data.htm, last visited August 22, 2017.
[7] *Infra.*, note 24.
[8] *Infra.*, note 25.

We are disappointed that CARB has not been included in discussions prior to the federal government's recent actions. CARB standards cover millions of vehicles across the country in California and states that have adopted our standards. NHTSA and EPA committed to collaborate with CARB on developing and implementing a national program for American vehicles. Your unilateral movement away from our successful joint effort risks shattering the harmonized California and federal emission and fuel economy standards.

We optimistically look forward to working with EPA and NHTSA to affirm the National Program is working as intended, and to continuing progress towards solving our collective challenge. We also expect the opportunity to comment on any proposed deviation from the Final Determination, before such conclusions are finalized. You may contact Richard W. Corey at (916) 322-7077 or richard.corey@arb.ca.gov to discuss any of these issues.

Sincerely,

Richard W. Corey
Executive Officer
California Air Resources Board, Executive Office

DAVID A. ZONANA
Supervising Deputy Attorney General

For XAVIER BECERRA
California Attorney General

Attachment – See next pages 7 to 40

cc: See next page

cc: The Honorable Kevin de León, President pro Tempore
California State Senate
State Capitol, Room 205
Sacramento, California 95814

The Honorable Anthony Rendon, Speaker of the Assembly
California State Assembly
State Capitol, Room 219
Sacramento, California 95814

Richard Perry, Secretary
U.S. Department of Energy
1000 Independence Ave. SW
Washington DC 20585

Mary D. Nichols, Chair
California Air Resources Board

Docket ID Nos. EPA-HQ-OAR-2015-0827 and NHTSA-2016-0068

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Comments of the California Air Resources Board and the Attorney General of California

Responding to

The United States Environmental Protection Agency

and the

National Highway Traffic Safety Administration's

Requests for Comment on Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Years 2022-2025 Light-Duty Vehicles, and on Model Year 2021 Greenhouse Gas Emissions Standards

Docket Nos.

EPA-HQ-OAR-2015-0827 and NHTSA-2016-0068

The California Air Resources Board (CARB) and California Attorney General's Office submit these responses to the United States Environmental Protection Agency (EPA) and the National Highway Traffic Safety Administration's (NHTSA) Federal Register notice requesting comment on Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Years 2022-2025 Light-Duty Vehicles, and on Model Year 2021 Greenhouse Gas Emissions Standards.[9]

I. The Light-Duty Vehicle Greenhouse Gas Standards for MY 2022-2025 Remain Appropriate, as Shown by the U.S. EPA Final Determination and CARB's Midterm Review.

It would be improper for the EPA to consider weakening the current 2022-2025 model year greenhouse gas standards. Considering the advances in technology since the current standards were developed, it would, in fact, be arbitrary for EPA not to consider stronger standards, as there is record evidence that they are reasonable. Weaker standards would also be inconsistent with the methodology used to establish the 2017-2025 model year greenhouse gas emission standards.

In Section 202 of the federal Clean Air Act, Congress recognized that motor vehicle emissions standards would be needed to address pollution "which may reasonably be anticipated to endanger public health or welfare."[10] As the Supreme Court and the federal appellate courts have repeatedly recognized, now that EPA has determined that greenhouse gases endanger public health and welfare (as they manifestly do),[11] it must set reasoned, rigorous, standards

[9] 82 Fed.Reg. 39,551 (Aug. 21, 2017).
[10] 42 U.S.C. § 7521.
[11] 74 Fed.Reg. 66,496 (Dec. 15, 2009).

for vehicle emissions.[12] It would be arbitrary and capricious for EPA to weaken the standards it has set because this would fail to address the endangerment, and cannot be supported on the statutory bases which section 202 requires EPA to consider. On the contrary, a fair consideration of the statutory factors, and of the factors which EPA established by regulation specifically for its midterm review,[13] warrant continuing or, even strengthening the standards, as these comments and the record demonstrate. Indeed, because CARB will propose to move forward with stronger standards after 2025, as climate science demands and as technology supports, it is critical that the current standards continue to provide a glidepath towards still greater innovation in clean automotive design.

II. EPA and NHTSA Should Not Break the Harmonized California-National Program by Relaxing the Federal Standards.

Relaxing the federal program for MY 2021–2025, on the existing record that does not support doing so, would break the harmonized one national program for controlling greenhouse gas emission standards from light-duty vehicles. If EPA or NHTSA were to backtrack from the harmonized national program through 2025, California would be compelled to protect its interests against this unwarranted reversal. Other states that have adopted California's standards and rely on them may follow suit. This would end the harmonized national program that has benefited the American people, the automobile industry, and our world. EPA and NHTSA must consider the impact of this as they reconsider the Final Determination and whether to deviate from the current standards.

A. The Multi-State California and Federal Programs are Harmonized.

The existing and augural fuel economy standards and EPA's greenhouse gas emission standards through 2025 were developed in conjunction with each other - and with CARB as it considered its emission regulations.[14] California's standards are established under the authority of state law and a waiver from federal preemption under Section 209(b)[15] of the federal Clean Air Act.[16] The Administrator of the EPA must grant California a waiver, so long as the record supports it. Once a waiver is granted, other states whose air quality does not

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[12] *See generally, e.g.*, *Massachusetts v. EPA*, 549 U.S. 497 (2007).
[13] *See* 40 C.F.R. § 86.1818-12(h). Moreover, it would be arbitrary and capricious for EPA to weigh these factors dramatically differently than it already has done, because its prior decision was well-supported and based on a fair consideration of these factors. It would also be arbitrary for EPA to invent new factors, or weight old factors, in ways that are inconsistent with the protective and technology-forcing nature of the statute, or in any way that increased the danger vehicle pollution poses to health and welfare.
[14] See, e.g.: U.S. EPA, NHTSA, CARB, *Interim Joint Technical Assessment Report: Light Duty-Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards for Model Years 2017-2025* (*Interim Joint TAR*) (September 2010), available at: https://www.epa.gov/sites/production/files/2016-10/documents/ldv-ghg-tar.pdf, last visited August 17, 2017.
[15] 42 U.S.C. § 7543(a).
[16] *See* 78 Fed.Reg. 2,112 (January 9, 2013).

meet federal ambient air quality standards may elect to adopt California's standards as their own, pursuant to section 177 of the Clean Air Act.[17]

In 2011, CARB, vehicle manufacturers, EPA, and NHTSA committed to cooperatively develop national greenhouse gas emission standards and coordinated CAFE standards for 2017 through 2025 MY model year passenger cars and light-duty trucks. CARB committed to revise California's greenhouse gas emission regulations to allow vehicles certified to federal greenhouse gas emission standards for 2017 through 2025 model years to be "deemed in compliance" with the corresponding California greenhouse gas emission standards for those same model years, provided that the program did not change "substantially" from the final form it had when it was issued – which it so far has not.[18]

In 2012, CARB initially adopted California greenhouse gas emission standards for 2017 through 2025 MY passenger cars and light trucks, as part of its Advanced Clean Cars (ACC) program that combines both criteria and greenhouse gas pollutant emission standards and requirements for zero-emission vehicles into a single coordinated package of requirements for MY 2015 through 2025 vehicles.[19] In October 2012, EPA and NHTSA issued their final rules setting federal greenhouse gas emission and fuel economy standards for MY 2017 through 2025 vehicles,[20] and CARB subsequently amended the ACC program in November 2012 to provide vehicle manufacturers the option to demonstrate compliance with the "2017 through 2025 MY National greenhouse gas program."[21] In 2013, CARB obtained from EPA a waiver of preemption for the ACC program, as amended in November 2012.[22] Twelve other states have elected to adopt California's greenhouse emission standards for model years out to 2025 (as well as its criteria pollutant standards), pursuant to Section 177 of the Clean Air Act.[23]

B. California Must Obtain the Benefits of the Harmonized National Program – Either With or Without the Current Federal Standards.

CARB's greenhouse gas motor vehicle emission standards are a fundamental component of California's strategy to protect the health of its citizens and its natural resources from the

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[17] 42 U.S.C. § 7507.
[18] *See* CARB Reso. No. 12-35 (Nov. 15, 2012), p. 4, available at: https://www.arb.ca.gov/regact/2012/leviiidtc12/res12-35.pdf, last visited September 27, 2017. CARB's commitment specifically referenced federal greenhouse gas emission standards adopted by EPA for MY 2017 through 2025 vehicles that were substantially as described in EPA and NHTSA's Notice of Intent for MY 2017 through 2025 model years, issued in July of 2011.
[19] CARB Reso. No. 12-21 (Mar. 22, 2012), p. 3.
[20] 77 Fed.Reg. 62,624 (Oct. 15, 2012).
[21] Defined as "the national program that applies to new 2017 through 2025 model year passenger cars, light-duty-trucks, and medium-duty passenger vehicles as adopted by the U.S. Environmental Protection Agency as codified in 40 C.F.R. Part 86, Subpart S, § 1801-01, et seq."] in lieu of complying with otherwise applicable California greenhouse gas emission standards. Cal. Code Regs., tit. 13, § 1961.3(c).
[22] 78 Fed.Reg. 2112 (January 9, 2013).
[23] See CARB, Compilation of Section 177 States, May 10, 2017, citing data from https://autoalliance.org/energy-environment/zev-sales-dashboard/.

threats of climate change. NHTSA's CAFE standards and EPA and CARB's greenhouse gas motor vehicle emission standards are interconnected. Thus, while there are significant numbers of vehicles (and hence emissions) not governed by the California standards, California and the other states that have adopted California's greenhouse gas emission standards would suffer climate change, air pollution, and other environmental as well as economic harms, if EPA were to relax the greenhouse gas emission standards, or if NHTSA were to relax the CAFE standards from the current standards applicable to MY 2021 vehicles, or the augural standards for MY 2022 - 2025.

The effects of climate change are apparent. Hurricanes Harvey, Irma and Maria were more severe than they otherwise would have been due to warmer ocean temperatures caused by anthropogenic greenhouse gas emissions. [24] This was the first known time two category-4

[24] There is broad agreement in the relevant scientific literature that human factors (greenhouse gases and aerosols) have had a measurable impact on the observed oceanic and atmospheric variability in the North Atlantic, and there is medium confidence that this has contributed to the observed increase in hurricane activity since the 1970s. Several studies have projected increases of precipitation rates within hurricanes over ocean regions (Knutson et al. 2010), particularly for the Atlantic basin (Knutson et al. 2013). The primary physical mechanism for this increase is the enhanced water vapor content in the warmer atmosphere, which enhances moisture convergence into the storm for a given circulation strength, although a more intense circulation can also contribute (Wang et al. 2015). Since hurricanes are responsible for many of the most extreme precipitation events in the southeastern United States (Kunkel et al. 2010, 2012), such events are likely to be even heavier in the future. Both theory and numerical modeling simulations (in general) indicate an increase in tropical cyclone (TC) intensity in a warmer world, and the models generally show an increase in the number of very intense TCs (Camargo 2013; Walsh et al. 2015; Knutson et al. 2015). For Atlantic and eastern North Pacific hurricanes and western North Pacific typhoons, increases are projected in precipitation rates (high confidence) and intensity (medium confidence). The frequency of the most intense of these storms is projected to increase in the Atlantic and western North Pacific and in the eastern North Pacific (medium confidence). In addition, sea level rise will increase the frequency and extent of extreme flooding associated with coastal storms, such as hurricanes. A projected increase in the intensity of hurricanes in the North Atlantic could increase the probability of extreme flooding along most of the U.S. Atlantic and Gulf Coast states beyond what would be projected based solely on relative sea level rise.
See, e.g.,: Camargo, S. J., 2013: Global and regional aspects of tropical cyclone activity in the CMIP5 models, Journal of Climate, 26 (24), 9880–9902, doi:10.1175/JCLI-D-12-00549.1;
Knutson, T.R., J.L. McBride, J. Chan, K. Emanuel, G. Holland, C. Landsea, I. Held, J.P. Kossin, A.K. Srivastava, and M. Sugi, 2010: Tropical cyclones and climate change. Nature Geoscience, 3, 157-163. http://dx.doi.org/10.1038/ngeo779;
Knutson, T.R., J.J. Sirutis, G.A. Vecchi, S. Garner, M. Zhao, H.-S. Kim, M. Bender, R.E. Tuleya, I.M. Held, and G. Villarini, 2013: Dynamical Downscaling Projections of Twenty-First-Century Atlantic Hurricane Activity: CMIP3 and CMIP5 Model-Based Scenarios. Journal of Climate, 27, 6591-6617. http://dx.doi.org/10.1175/jcli-d-12-00539.1;
Knutson, T. R., and Coauthors, 2015: Global Projections of Intense Tropical Cyclone Activity for the Late Twenty-First Century from Dynamical Downscaling of CMIP5/RCP4.5 Scenarios. Journal of Climate, 28 (18), 7203-7224, doi:10.1175/JCLI-D-15-0129.1;
Kunkel, K.E., D.R. Easterling, D.A.R. Kristovich, B. Gleason, L. Stoecker, and R. Smith, 2010: Recent increases in U.S. heavy precipitation associated with tropical cyclones. Geophysical Research Letters, 37, L24706. http://dx.doi.org/10.1029/2010GL045164;

hurricanes hit the United States in one season. Hurricanes Harvey and Irma have claimed at least 120 lives and caused an estimated $245 billion of damage.[25] The extreme suffering levied by Maria continues to worsen.

We described some of the impacts of climate change in our comment letter to NHTSA on the scope of the EIS for the MY 2022 – 2025 CAFE standards, which we fully incorporate here.[26] Those impacts include:

- With continued increases in greenhouse gas (GHG) emissions, there will be significant reductions in runoff water in California.[27]

- In the Southwest U.S. over the past 50 years, climate change has contributed to decreased late winter precipitation in the form of snow, earlier snow melt, and earlier arrival of a high proportion of annual stream flow.[28, 29]

- Ecosystems are crucial in buffering extreme climate events, such as wildfires and floods.[30] For example, in the case of floods, climate change contributes to the loss of

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Walsh, K. J. E., and Coauthors, 2015: Hurricanes and climate: The U.S. CLIVAR Working Group on Hurricanes. Bulletin of the American Meteorological Society, 96 (12) (6), 997-1017, doi:10.1175/BAMS-D-13-00242.1.
Wang, C.-C., B.-X. Lin, C.-T. Chen, and S.-H. Lo, 2015: Quantifying the Effects of Long-Term Climate Change on Tropical Cyclone Rainfall using a Cloud-Resolving Model: Examples of Two Landfall Typhoons in Taiwan. Journal of Climate, 28, 66-85. http://dx.doi.org/10.1175/JCLI30D-14-00044.1.

[25] Hurricane Irma claimed 31 U.S. lives among 69 total, and caused an estimated $55 billion in damages, as of September 14, 2017, as reported by CBS News, available at: https://www.cbsnews.com/news/huricane-irma-death-toll-florida-power-outage/, last visited September 14, 2017; Hurricane Harvey claimed 63 U.S. lives, as of September 14, 2017, as reported by CBS News, available at: https://www.cbsnews.com/news/hurricane-harvey-death-toll-flood-houston-recovery-harris-county/, and caused as much as $190 billion in damages, available at: https://www.cbsnews.com/news/how-hurricane-harveys-cost-stacks-up-against-past-disasters/, last visited September 14, 2017.

[26] Document ID No. NHTSA-2017-0069-0138.

[27] G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, Eds., *Assessment of Climate Change in the Southwest United States*, Island Press, ch. 6, Cayan, D., K. Kunkel, C. Castro, A. Gershunov, J. Barsugli, A. Ray, J. Overpeck, M. Anderson, J. Russell, R. B., R. I., and P. Duffy, pp. 153-196 (2013), available at: http://www.swcarr.arizona.edu/sites/all/themes/files/SW-NCA-color-FINALweb.pdf, last visited August 24, 2017.

[28] Hidalgo, H. G., T. Das, M. D. Dettinger, D. R. Cayan, D. W. Pierce, T. P. Barnett, G. Bala, A. Mirin, A. W. Wood, C. Bonfils, B. D. Santer, and T. Nozawa, *2009: Detection and attribution of streamflow timing changes to climate change in the western United States*. Journal of Climate, 22, 3838-3855, doi:10.1175/2009jcli2470.1.

[29] Pierce, D. W., T. P. Barnett, H. G. Hidalgo, T. Das, C. Bonfils, B. D. Santer, G. Bala, M. D. Dettinger, D. R. Cayan, A. Mirin, A. W. Wood, and T. Nozawa, *2008: Attribution of declining western US snowpack to human effects*. Journal of Climate, 21, 6425-6444, doi:10.1175/2008JCLI2405.1.

[30] Peters, D. P. C., A. E. Lugo, F. S. Chapin, III, S. T. A. Pickett, M. Duniway, A. V. Rocha, F. J. Swanson, C. Laney, and J. Jones, *2011: Cross-system comparisons elucidate disturbance complexities and generalities*. Ecosphere, 2, 1-26, doi:10.1890/ES11-00115.1, available at: http://www.esajournals.org/doi/pdf/10.1890/ES11-00115.1, last visited August 24, 2017.

natural areas such as salt marshes and floodplain wetlands, which makes these areas more vulnerable to catastrophic damage from extreme events.[31]

- Climate change-induced increases in wildfires are projected to result in up to a 74% increase in California burn areas, with the northern part of the state possibly doubling its risk by the end of the century, if GHG emissions are not abated.[32]

- Climate change has led to changes in plant and animal species distributions.[33, 34] If species are not able to keep up with these changes (for example, due to movement restrictions), they may face local extinction; thus, in combination with range shifts, the resulting mix of species may change drastically.[35, 36, 37, 38]

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[31] Fitzgerald, D. M., M. S. Fenster, B. A. Argow, and I. V. Buynevich, *2008: Coastal impacts due to sea-level rise.* Annual Review of Earth and Planetary Sciences, Annual Reviews, 601-647.
[32] Westerling, A. L., B. P. Bryant, H. K. Preisler, T. P. Holmes, H. G. Hidalgo, T. Das, and S. R. Shrestha, *2011: Climate change and growth scenarios for California wildfire.* Climatic Change, 109, 445-463, doi:10.1007/s10584-011-0329.
[33] Chen, I.-C., J. K. Hill, R. Ohlemüller, D. B. Roy, and C. D. Thomas, *2011: Rapid range shifts of species associated with high levels of climate warming*. Science, 333, 1024-1026, doi:10.1126/science.1206432, available at: http://www.sciencemag.org/content/333/6045/1024.abstract, last visited August 17, 2017.
[34] Staudinger, M. D., S. L. Carter, M. S. Cross, N. S. Dubois, J. E. Duffy, C. Enquist, R. Griffis, J. J. Hellmann, J. J. Lawler, J. O'Leary, S. A. Morrison, L. Sneddon, B. A. Stein, L. M. Thompson, and W. Turner, *2013: Biodiversity in a changing climate: A synthesis of current and projected trends in the US. Frontiers in Ecology and the Environmen*t, 11, 465-473, doi:10.1890/120272, available at: http://onlinelibrary.wiley.com/doi/10.1890/120272/abstract, last visited on August 17, 2017.
[35] Staudinger, M. D., N. B. Grimm, A. Staudt, S. L. Carter, F. S. Chapin, III, P. Kareiva, M. Ruckelshaus, and B. A. Stein, *2012: Impacts of Climate Change on Biodiversity, Ecosystems, and Ecosystem Services. Technical Input to the 2013 National Climate Assessment*, p. 296, U.S. Geological Survey, Reston, VA, available at: https://downloads.globalchange.gov/nca/technical_inputs/Biodiversity-Ecosystems-and-Ecosystem-Services-Technical-Input.pdf, last visited August 17, 2017.
[36] Wenger, S. J., D. J. Isaak, C. H. Luce, H. M. Neville, K. D. Fausch, J. B. Dunham, D. C. Dauwalter, M. K. Young, M. M. Elsner, B. E. Rieman, A. F. Hamlet, and J. E. Williams*, 2011: Flow regime, temperature, and biotic interactions drive differential declines of trout species under climate change. Proceedings of the National Academy of Sciences*, 108, 14175–14180, doi:10.1073/pnas.1103097108, available at: http://www.pnas.org/content/108/34/14175.full, last visited August 17, 2017.
[37] Cheung, W. W. L., V. W. Y. Lam, J. L. Sarmiento, K. Ke¬arney, R. Watson, and D. Pauly, *2009: Projecting global marine biodiversity impacts under climate change scenarios. Fish and Fisheries*, 10, 235-251, doi:10.1111/j.1467- 2979.2008.00315.x, available at: http://onlinelibrary.wiley.com/doi/10.1111/j.1467-2979.2008.00315.x/abstract, last visited August 17, 2017.
[38] Stralberg, D., D. Jongsomjit, C. A. Howell, M. A. Snyder, J. D. Alexander, J. A. Wiens, and T. L. Root, *2009: Re-shuffling of species with climate disruption: A no-analog future for California birds? PLoS ONE*, 4, e6825, doi:10.1371/ journal.pone.0006825, available at: http://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0006825, last visited August 17, 2017.

- Invasive plant and insect species are likely to become more common.[39, 40] Agricultural production will likely suffer; for example, the invasive yellow star-thistle, which is currently costing California annually $17 million in forage and control efforts[41] and $75 million in water losses, is expected to increase with climate change.[42]

- Heat waves have become more frequent in the U.S., particularly in the West; tree ring data for this region suggest that drought during the past decade is the driest it has been in 800 years.[43, 44]

- Models of sea level rise predict increases between about 2 feet to as much as 6 feet by 2100.[45, 46, 47, 48]

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[39] Bradley, B. A., D. S. Wilcove, and M. Oppenheimer, *2010: Climate change increases risk of plant invasion in the Eastern United States. Biological Invasions*, 12, 1855-1872, doi:10.1007/s10530-009-9597-y, available at: http://europepmc.org/abstract/AGR/IND44367832/reload=0;jsessionid=geMUvZpMPs0zzRUz8D6h.2, last visited August 17, 2017.

[40] Raffa, K. F., B. H. Aukema, B. J. Bentz, A. L. Carroll, J. A. Hicke, M. G. Turner, and W. H. Romme, *2008: Cross-scale drivers of natural disturbances prone to anthropogenic amplification: The dynamics of bark beetle eruptions. Bio-Science*, 58, 501-517, doi:10.1641/b580607, available at: https://academic.oup.com/bioscience/article/58/6/501/235938/Cross-scale-Drivers-of-Natural-Disturbances-Prone, last visited August 17, 2017.

[41] Eagle, A. J., M. E. Eiswerth, W. S. Johnson, S. E. Schoenig, and G. C. van Kooten, *2007: Costs and losses imposed on California ranchers by yellow starthistle. Rangeland Ecology & Management*, 60, 369-377, https://doi.org/10.2111/1551-5028(2007)60[369:CALIOC]2.0.CO;2.

[42] Dukes, J. S., N. R. Chiariello, S. R. Loarie, and C. B. Field, *2011: Strong response of an invasive plant species (Centaurea solstitialis L.) to global environmental changes. Ecological Application*, 21, 1887-1894, doi:10.1890/11-0111.1, available at: http://www.esajournals.org/doi/pdf/10.1890/11-0111.1, last visited August 17, 2017.

[43] Karl, T. R., J. T. Melillo, and T. C. Peterson, Eds., *2009: Global Climate Change Impacts in the United States. Cambridge University Press*, p. 189, available at: http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf, last visited August 24, 2017.

[44] Schwalm, C. R., C. A. Williams, K. Schaefer, D. Baldocchi, T. A. Black, A. H. Goldstein, B. E. Law, W. C. Oechel, K. T. Paw, and R. L. Scott, *2012: Reduction in carbon uptake during turn of the century drought in western North America. Nature Geoscience*, 5, 551-556, doi:10.1038/ngeo1529, available at: http://ir.library.oregonstate.edu/xmlui/bitstream/handle/1957/33148/LawBeverlyForestryReductionCarbonUptake.pdf?sequence=1, last visited August 24, 2017.

[45] Grinsted, A., J. C. Moore, and S. Jevrejeva, *2010: Reconstructing sea level from paleo and projected temperatures 200 to 2100 AD. Climate Dynamics*, 34, 461-472, doi:10.1007/s00382-008-0507-2, available at: http://link.springer.com/article/10.1007/s00382-008-0507-2/fulltext.html, last visited August 24, 2017.

[46] Jevrejeva, S., J. C. Moore, and A. Grinsted, *2012: Sea level projections to AD2500 with a new generation of climate change scenarios. Global and Planetary Change*, pp. 80-81, 14-20, doi:10.1016/j. gloplacha.2011.09.006.

[47] Rahmstorf, S., G. Foster, and A. Cazenave, *2012: Comparing climate projections to observations up to 2011. Environmental Research Letters*, 7, 044035, doi:10.1088/1748-9326/7/4/044035, available at: http://iopscience.iop.org/1748-9326/7/4/044035/pdf/1748- 9326_7_4_044035.pdf, last visited August 24, 2017.

[48] Vermeer, M., and S. Rahmstorf, *2009: Global sea level linked to global temperature. Proceedings of the National Academy of Sciences*, 106, 21527-21532, doi:10.1073/pnas.0907765106.

The damage and threat to California from greenhouse gas emissions are too great to ignore. California must do what it can to reduce these emissions. Controlling motor vehicle greenhouse gas emissions is a critical and necessary means to do so.

C. EPA Properly Issued the Final Determination in January 2017

We agree with several Attorneys General and others that the Final Determination of January 2017 was reached in accordance with the law.[49] EPA met its regulatory requirements for a draft technical assessment report (Draft TAR),[50] followed by a Final Determination by the deadline. Indeed, EPA went beyond the minimum by providing an opportunity for public comment on a proposed Final Determination.[51] This wasteful exercise is diverting resources from true progress.

D. The Existing Record Supports the Current Standards.

In reviewing the current 2022-2025 model year greenhouse gas standards, EPA and NHTSA must consider the entirety of the prior analyses that support those standards, reflected in this docket, and the related NHTSA dockets: NHTSA-2010-0131, NHTSA-2011-0056, NHTSA-2016-0068, and NHTSA-2017-0069. EPA and NHTSA's consideration must also include, but not be limited to, the following documents:

- NHTSA: *Corporate Average Fuel Economy Standards Passenger Cars and Light Trucks Model Years 2017-2025: Final Environmental Impact Statement: Summary,* July 2012.[52]

- U.S. EPA and NHTSA, October 15, 2012: *2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards*.[53]

- CARB: *Staff Report: Initial Statement of Reasons for Proposed Rulemaking; Public Hearing to Consider the "LEV III" Amendments to the California Greenhouse Gas and Criteria Pollutant Exhaust and Evaporative Emission Standards and Test Procedures*

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[49] Attorneys General of New York, Connecticut, Delaware, the District of Columbia, Iowa, Maine, Maryland, Massachusetts, Oregon, Pennsylvania, Rhode Island, Vermont, and Washington and the Secretary of the Commonwealth of Pennsylvania Department of Environmental Protection, to E. Scott Pruitt, Administrator, U.S. EPA, re: Midterm Evaluation of Emission Standards for Passenger Cars and Light Duty Trucks for Model Years 2022-25, June 8, 2017, pp. 2-3.
[50] U.S. 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 (Draft TAR) (July 2016).
[51] 81 Fed.Reg. 87,927 (Dec. 6, 2016).
[52] Available at: https://www.regulations.gov/document?D=NHTSA-2011-0056-2088, last visited August 17, 2017.
[53] Final rule, 77 Fed.Reg. 62,624, 63,033.

> *and to the On-Board Diagnostic System Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and to the Evaporative Emission Requirements for Heavy-Duty Vehicles*, December 7, 2011.[54]

Since the current 2022-2025 model year greenhouse gas standards were established, the industry has advanced further than predicted. Recent information that EPA must consider shows these standards should, if anything, be strengthened. The National Academy of Sciences, in reviewing the EPA and NHTSA analyses supporting the emission and fuel economy standards through 2025, found them "to be thorough and of high caliber on the whole."[55]

Following the original rulemaking analysis, the multi-year midterm evaluation process produced an exhaustive joint EPA-NHTSA-CARB technical analysis (2016 TAR) that concluded the current 2022-2025 model year greenhouse gas standards are more than feasible based on technologies that are currently available.[56] In addition, EPA concluded and confirmed in the Final Determination[57] that the net lifetime consumer savings for an "average" MY 2025 vehicle compared to the MY 2021 greenhouse gas standards will be $1,650.

EPA noted in the Final Determination that this technical analysis has been criticized by some auto industry commenters as being unrealistic in terms of the effectiveness of projected vehicle technologies. EPA summarized these comments and correctly pointed out the flaws in industry's arguments as follows:

> Some auto industry commenters stated generally that the EPA models and/or effectiveness assumptions are overly optimistic, while other commenters recommended higher technology effectiveness values than we estimated in the Draft TAR. In some cases, the commenters either did not provide any supporting evidence, or provided evidence that was incomplete, not applicable, or not relevant to an assessment of the cost, effectiveness, and

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[54] Available at: https://www.arb.ca.gov/regact/2012/leviiighg2012/levisor.pdf, last visited August 17, 2017.
[55] NAS: 2015: *Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles*; (p. 2), available at: https://www.nap.edu/catalog/21744/cost-effectiveness-and-deployment-of-fuel-economy-technologies-for-light-duty-vehicles, last visited August 17, 2017.
[56] Draft TAR. "The agencies' independent analyses complement one another and reach similar conclusions: A wider range of technologies exist for manufacturers to use to meet the MY2022-2025 standards, and at costs that are similar or lower, than those projected in the 2012 rule." p. ES-2. "…because EPA and NHTSA developed independent assessments of technology cost, effectiveness, and reference case projections, the compliance pathways and associated costs that result are also different. Consideration of these two results provides greater confidence that compliance can be achieved through a number of different technology pathways." p. ES-12, available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100OXEO.PDF?Dockey=P100OXEO.PDF, last visited August 17, 2017.
[57] 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* (January 2017, EPA-420-R-17-001) (p. 7), available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100QQ91.pdf, last visited September 19, 2017.

> implementation feasibility in MYs 2022-2025. In particular, the conclusion drawn by the Alliance of Automobile Manufacturers that "MY2021 and MY2025 targets cannot be met with the suite of technologies at the deployment rates projected by the Agencies in the 2012 FRM" is based on the premise that the only possible technology available in MY2025 will be represented by technology already contained in the Draft TAR's MY2014 baseline fleet, and that technology will not improve in efficiency.

In sum:

> EPA disagreed with this assertion, noting that it is not plausible that the best gasoline powertrain efficiencies of today represent the limit of achievable efficiencies in the future. Even 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 methodology used in the Alliance-contracted study (which was not peer reviewed) does not even allow for the recombination of existing technologies, and thus severely and unduly limits potential effectiveness increases obtainable by MY2025…. Further, EPA disagreed with this assumption that the only technology combinations available in MY2025 are those that are present in the MY2014 fleet. EPA noted that events had already disproven this assumption and provided, as one specific example, a Ford-introduced 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-contracted study.[58]

These conclusions remain sound and the evidence supports staying the course.

III. New Information Since the Midterm Review Further Confirms the Current Standards Remain Appropriate.

The latest information continues to confirm that the greenhouse gas emission standards and the established and augural fuel economy standards for MY 2021–2025 should be maintained or strengthened. CARB completed its independent midterm review of the greenhouse gas emission standards (along with emission standards for other pollutants and for zero-emission vehicles) after the Final Determination was issued in January 2017, was comprehensive. The information and analyses reflected in it must be considered by EPA and NHTSA as they reconsider the Final Determination. We incorporate the entirety of it here, which is available at: https://www.arb.ca.gov/msprog/acc/mtr/acc_mtr_finalreport_full.pdf.

[58] Final Determination, pp. 12-15, ch. 2: Technology Assessment, section 2.1 "Effectiveness Assessment: General Comments, Technology Packages, Penetrations, and Sufficiency of Non-Electrified Technologies," "summary of comments on the Draft TAR addressed in the Proposed Determination."

Based on its midterm review, CARB found that the current standards should be maintained.[59] CARB agreed with the findings in EPA's Final Determination, concluding:

> The current national 2022 through 2025 model year greenhouse gas emission standards can be readily met at the same or lower cost than originally projected when the standards were adopted in 2012, predominantly with advanced gasoline engines and transmissions.[60]

In terms of greenhouse gas emission control technology developments, CARB's midterm review found, among other things, that:

- Manufacturers have successfully employed a variety of technologies that reduce greenhouse gas emissions and increase fuel efficiency many at a faster rate of deployment than was originally projected, notably, large penetration rates of advanced engine and transmissions across the industry in the last five years.

- Currently, manufacturers are over complying with the greenhouse gas requirements[61] and are offering various vehicles on the road today that are already able to comply with the greenhouse gas standards for later model years. For example, of the more than 1,300 conventional vehicle model configurations available in 2016, 23 truck configurations,[62] 23 sport utility vehicle (SUV) configurations,[63] and 26 passenger car configurations[64] meet 2020 or later greenhouse gas standards with a conventional gasoline powertrain. An additional 78 model variants comprised of hybrid electric vehicles, plug-in hybrid electric vehicles, and battery electric vehicles also meet the 2020 or later standards.

The latest information continues to support maintaining or strengthening the current standards.

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[59] CARB, Advanced Clean Cars Midterm Review, Reso. 17-3 (March 24, 2017), available at: https://www.arb.ca.gov/msprog/acc/mtr/res17-3.pdf, last visited September 22, 2017.

[60] CARB: California Advanced Clean Cars Midterm Review, *Summary Report for the Technical Analysis of the Light-Duty Vehicles Standards, with Appendices*: January 18, 2017 (p. ES-3), available at: https://www.arb.ca.gov/msprog/acc/mtr/acc_mtr_finalreport_full.pdf, last visited September 19, 2017. *See* California Midterm Review full report and appendices: January 18, 2017, available at: https://www.arb.ca.gov/msprog/acc/acc-mtr.htm , last visited September 19, 2017.

[61] United States Environmental Protection Agency. *Greenhouse Gas Emission Standards for Light-Duty Vehicles: Manufacturer Performance Report for the 2014 Model Year*. EPA-420-R-15-026. December 2015, available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100O5TH.PDF?Dockey=P100O5TH.PDF last visited September 19, 2017.

[62] Some variants of the F-150 meet the 2024 greenhouse gas standards while some variants of the Ram 1500 and the Chevrolet Silverado meet the 2021 greenhouse gas standards.

[63] Such as the Subaru Outback, the Nissan Rogue, and the Honda CR-V. Includes minivans and station wagons classified as trucks.

[64] Such as the Mazda 6, the Hyundai Sonata, and the Honda Civic.

A. The Clean Air Act Requires EPA and NHTSA to Consider the Relevant Factors to Protect Public Health and Conserve Fuel.

EPA and NHTSA have requested comment on various factors to be considered in the Final Determination.[65] Congress has determined the guiding principles for EPA and NHTSA's consideration: the public health and welfare. EPA must reduce the emissions from motor vehicles that "cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare,"[66] and EPA has recognized this includes greenhouse gas emissions. NHTSA must set the "maximum feasible average fuel economy standards."[67] The factors about which EPA and NHTSA seek comment must be weighed in a manner that makes the public health and welfare the primary concern; they may not be considered in a manner that subordinates those goals to any other.[68]

When considering the various relevant factors, EPA may not avoid its obligations to control emissions in deference to NHTSA.[69] EPA and NHTSA have already shown, through the harmonized program, that emissions and fuel economy standards may complement each other. NHTSA must also consider EPA's established emission standards, as well as CARB's, as "other motor vehicle standards of the government" when setting fuel economy standards.[70]

To the extent any of the factors about which EPA and NHTSA requested comment do not protect public health, lack bearing on the maximum feasible fuel economy, or were not enumerated by Congress, they are irrelevant and should not be considered. This would include factors like apparent "consumer preference."

With this in mind, we offer further comments on the following factors on which EPA and NHTSA requested comment.

B. Feasibility: The Availability and Effectiveness of Technology, and the Appropriate Lead Time for Introduction of Technology

CARB held an Advanced Clean Cars Symposium, called The Road Ahead, on September 27-28, 2016, focused on evaluating more recent technology beyond the 2016 TAR. The second day of the symposium covered engine and vehicle technologies that were not extensively used in the analysis for the 2016 TAR but are expected to be on production vehicles in the near term

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[65] See 82 Fed.Reg. at 39,553.
[66] 42 U.S.C. § 7521(a)(1), CAA § 202(a)(1).
[67] 49 U.S.C. § 32902(f).
[68] *Husqvarna AB v. E.P.A.* 254 F.3d 195, 200 (D.C. Cir. 2001) [construing CAA § 213(a)(3), 42 U.S.C. § 7547(a(3), which is similar to CAA § 202]; *Center for Biological Diversity v. Nat'l Highway Traffic Safety Admin*., 538 F.3d 1172, 1195 (9th Cir. 2008).
[69] *Massachusetts v. EPA*, 549 U.S. at 531.
[70] 49 U.S.C. § 32902(a), (f).

and could help meet the adopted greenhouse gas and particulate matter standards.[71] Symposium speakers and the topics they discussed included:

- Dr. Dean Tomazic, Executive Vice President & CTO, FEV North America, Inc., discussed "Potential Game Changing Technologies" including "development trends in gasoline engines" and transmissions such as:
    - Combustion efficiency improvements (e.g., direct injection and variable charge motion, variable compression ratio, Miller/Atkinson cycle engines, cooled exhaust gas recirculation, and controlled auto-ignition);
    - Reduction of throttling losses (e.g., downsizing, boosting, cylinder deactivation, variable valve train, and lean-burn operation);
    - Electrification/hybridization (e.g., micro/mild/full hybrid, plug-in hybrid electric vehicle technology, 48 volt infrastructure, and accessory electrification); and,
    - Reduction of parasitic and idle losses (e.g., friction reduction, stop/start, advanced thermal management, and (again) accessory electrification);
    - "Direct" transmission efficiency improvements (e.g., high efficiency oil pumps, minimized open clutches, low-loss bearings/seals/gears, low-leakage hydraulics, and low-viscosity oils);
    - "Indirect" transmission efficiency improvements (e.g., increased number of speeds, increased ratio spread, aggressive torque converter lock-up, and active thermal management); and,
    - Transmission types (e.g., manual transmission/automated manual transmission/dual-clutch transmission, planetary automatics, continuously variable transmission, and hybrids).[72]
- Mr. Yutaka Fujimoto, Director of Powertrain, Nissan North America, Inc., discussed the Variable Compression Turbo Engine, which he identified as "one of the key technologies to meet future requirements with sustainability."[73]

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[71] Presentations are submitted with this letter and are available at: https://www.arb.ca.gov/msprog/acc/acc-symposium.htm, last visited September 19, 2017.
[72] *GHG Reducing Advancements and Technologies*, Dr. Dean Tomazic, Executive Vice President & CTO, FEV North America, Inc.; available at: https://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/ghg_reducing_advancements_and_technologies_dean_tomazic.pdf, last visited September 19, 2017.
[73] *Introduction of Variable Compression Turbo Engine*, Yutaka Fujimoto, Director of Powertrain, Nissan North America, Inc.; available at:

- Mr. Reiji Okita, Powertrain Development Program Manager, Mazda Motor Corporation, discussed the development of Mazda's SKYACTIV-G 2.5L "dynamic pressure" turbocharged engine, which reduces fuel consumption at middle and high loads and improves vehicle performance.[74] More recently, Mazda has announced plans to introduce a next-generation engine called SKYACTIV-X on production vehicles in 2019. According to this announcement "Compression ignition makes possible a super lean burn4 [sic] that improves engine efficiency up to 20-30 percent over the current SKYACTIV-G, and from 35-45 percent over Mazda's 2008 gasoline engine of the same displacement. SKYACTIV-X even equals or exceeds the latest SKYACTIV-D diesel engine in fuel efficiency."[75] "The SkyActiv-X engine will be fitted with a supercharger and will produce 10 percent to 30 percent more torque than current (SkyActiv-G) engine. Homogeneous charge compression ignition (HCCI) makes possible a super lean burn mode that raises engine efficiency 20 to 30 percent over the current gas engine, is 35 percent to 45 percent more economical than Mazda's comparable 2008 gasoline engine, and "equals or exceeds" the new diesel in fuel efficiency.[76]

- Dr. Matthew Younkins, Chief Engineer, Powertrain, Tula Technology Incorporated, discussed the potential benefits of cylinder deactivation to achieve "significant fuel efficiency gains for spark ignited engines at a compelling cost."[77]

Since the completion of the CARB Midterm Review report in January of 2017, two additional studies have been completed that support the appropriateness of the current national 2022 through 2025 model year greenhouse gas emission standards, which should be considered by EPA.

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https://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/vct_engine_technology_yutaka_fujimoto.pdf , last visited September 19, 2017.

[74] *Mazda SKYACTIV-G Engine with New Boosting Technology*, Reiji Okita, Powertrain Development Program Manager, Mazda Motor Corporation; available at: https://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/new_engine_technology_reiji_okita.pdf, last visited September 19, 2017.

[75] Press Release - *Mazda Announces Long-Term Vision for Technology Development, 'Sustainable Zoom-Zoom 2030'.* August 8, 2018; available at: https://www.mazda-press.com/services/download.ashx?id=598886c5b47649433cdbd0c0&t=pdf&h=e7%2fuyEdwrdXdurB%2f0TcRIQSOuTUsK4vgaxkhss471Vw%3d, last visited September 19, 2017.

[76] *Mazda's 2019 Breakthrough: a Diesel Engine That Runs on Gasoline*. Bill Howard. August 9, 2017. Available at: https://www.extremetech.com/extreme/253842-mazdas-2019-efficiency-breakthrough-diesel-engine-runs-gasoline, last visited September 20, 2017.

[77] *Tula Technology's Dynamic Skip Fire*, Dr. Matthew Younkins, Chief Engineer, Powertrain, Tula Technology Incorporated; available at: https://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/potential_benefits_of_cylinder_deactivation_matthew_younkins.pdf, last visited September 19, 2017.

The first study was conducted by the International Council on Clean Transportation (ICCT). ICCT published a report on March 22, 2017, titled *Efficiency Technology and Cost Assessment for U.S. 2025–2030 Light-Duty Vehicles*. This study examined how component costs are lower than EPA's projected values in their Proposed Determination and concluded that 8%–10% greater efficiency improvement is available and cost effective for vehicles by 2025, compared to the latest U.S. regulatory analysis, and previous costs of compliance have been greatly overestimated.[78] Key differences between the EPA analysis and ICCT's revised analysis are shown in Table 1 from the ICCT report, below.

Table 1. Summary of technology fuel consumption reduction and direct manufacturing cost input differences between U.S. EPA final determination and this analysis for 2025

	Fuel consumption and CO_2 reduction benefits[a]		Direct manufacturing cost (2015 $)[b]	
	U.S. EPA	ICCT	U.S. EPA	ICCT
Cylinder deactivation	3.5%-5.8%	No change	$75-$149	No change
Dynamic cylinder deactivation[c]	Not included	6.5%-8.3%	Not included	$138-$256
Direct injection[d]	1.5%	No change	$196-$356	$91-$185
Cooled exhaust gas recirculation	1.7%-5.3%	No change	$216	$95-$114
Advanced diesel	20.0%-25.2%	No change	$2,104-$2,950	$1,491-$2,096
E-boost	Not included	5.0%	Not included	$338
Mild hybrid (48-volt)	7.0%-9.5%	10.5%-12.9%	$580	No change
High compression ratio[e]	3.4%-7.7%	10.1%-14.1%	Varies	Varies
Miller cycle[f]	12.4%-20.3%	No change	Varies	$93-$222 lower
Plug-in hybrid electric vehicle[g]	65%-75%	No change	$5,534-$10,371	$3,564-$7,805
Battery electric vehicle[g]	71%-82%	No change	$5,131-$10,663	$2,410-$9,098
Mass reduction (20%)	11.2%-13.7%	11.6%-13.7%	$0.17-$1.15 per pound	No change

[a] Shown as per mile reduction; benefits vary by vehicle type and engine size; improvements are shown for individual technology; effects are handled as applied with multiple technologies simultaneously in lumped parameter model
[b] Costs in 2015 dollars, ranges as shown because they vary by vehicle type and engine size
[c] Includes variable valve lift technology
[d] Direct injection technology without synergistic technologies such as cooled exhaust gas recirculation and turbocharging
[e] Includes Atkinson cycle, direct injection, and cooled exhaust gas recirculation
[f] Includes Atkinson cycle, 24 bar turbocharging, cooled exhaust gas recirculation, and engine downsizing; costs vary not only by vehicle type #1 through #6, but also with the base engine and camshaft configuration subject to downsizing
[g] Range shown for vehicle type #1 through #6, including low and high electric range and in-home charger; CO_2 emission reductions are based on U.S. EPA estimation of 2025 average U.S. grid emissions

The second study, conducted by Ricardo Strategic Consulting under a multi-year contract with CARB, culminated in a report published on April 25, 2017. This report, *Advanced Strong*

[78] p. iv, available at: http://www.theicct.org/sites/default/files/publications/US-LDV-tech-potential_ICCT_white-paper_22032017.pdf, last visited August 18, 2017.

Hybrid and Plug-In Hybrid Engineering Evaluation and Cost Analysis, focused on advanced component costs. This study stated:

> The initial review of vehicle technologies provided insight into some common trends embedded into new designs across OEMs: Light weighting; Reduction of mechanical and electric losses; Part reduction by component integration; Limiting exposure to potential supply chain volatility in rare earth materials; efficient thermal management…. It became clear through preparing this report that innovation at the OEMs is continuing at a brisk pace, looking not only at discrete technical engineering solutions but also at broader commercial considerations.[79]

In addition to these new studies, comments submitted on NHTSA's request for comments on the scope of the environmental impact statement for its CAFE standards for MY 2022-2025[80] also support maintaining the current 2022-2025 model year greenhouse gas standards. The Manufacturers of Emission Controls Association (MECA) commented the current standards are a valid minimum threshold "and all alternatives analyzed in the EIS could be strengthened based on demonstrated higher adoption rates and new technology penetration that has been observed over the 2012-2017 timeframe compared to what was originally predicted." Specifically, the MECA comments state:

> Besides the already mentioned ICCT white paper, a number of leading edge technologies have been announced for commercialization in the U.S. before 2021, including dynamic cylinder deactivation, new high-efficient engines (e.g., Skyactiv-D and Skyactiv-X), and others. Some of these technologies, like 48V systems, have been already introduced on vehicles in Europe, with several manufacturers projecting broad implementation across their fleet in the near future. Our members expect announcements of 48V mild hybrid technology on vehicles for sale in the U.S. in the next few years, with significant penetration into the fleet by 2025 when the standards are fully implemented. The reason for such rapid acceptance of this technology, that was not even considered in NHTSA's 2012 analysis, is because it provides 50-70% of the fuel economy benefits of a full hybrid system at 30% of the cost. The simplest versions (P1, belt starter generator) can be easily integrated into a vehicle without a complete redesign, which would be needed for a full hybrid powertrain. MECA believes that light-duty diesel powertrains continue to provide a cost-effective, durable approach for vehicle manufacturers to improve the average fuel economy of their fleets, particularly in the larger power category that includes small pick-up trucks and SUVs. A 2016 analysis completed by the Martec Group provides an updated cost-benefit analysis for light-duty cars and trucks that details the costs and benefits of diesel powertrains as part

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[79] Steir, Al, Munday, Alan, A*dvanced Strong Hybrid and Plug-In Hybrid Engineering Evaluation and Cost Analysis* (April 25, 2017), pp. XI-XII, available at: https://www.arb.ca.gov/msprog/acc/mtr/hybrid_phev_report_full.pdf, last visited August 17, 2017.

[80] NHTSA, Notice of Intent to Prepare an Environmental Impact Statement for Model Year 2022-2025 Corporate Average Fuel Economy Standards, Docket ID No. NHTSA-2017-0069.

> of a more fuel efficient light-duty fleet. Furthermore, MECA has provided input on the cost analysis in the diesel teardown study funded by EPA and conducted by FEV.[81]

The progress of the industry towards meeting the 2022–2025 fuel economy and greenhouse gas emission standards support maintaining or increasing the protectiveness of the program.

C. The Impact of the Standards on the Automobile Industry

Any consideration of the impact of the standards on the auto industry must also include the broader impacts to the businesses that supply components to the auto industry as well as to the workforce within the automobile industry. Automotive suppliers and labor groups recently commented to NHTSA on these matters. They described the negative impact of re-evaluating the appropriateness of the current national 2022 through 2025 model year greenhouse gas emission standards to committed investments and jobs for components needed in the current standard. Excerpts from some of these comments that are relevant to "the impact of the standards on the automobile industry" are as follows:

The Advanced Engine Systems Institute stated:

> As a trade association representing innovative manufacturers of emissions control and efficiency technology and products, we rely heavily on regulatory certainty to determine how and where to invest our resources. Our industry, now employing nearly 300,000 Americans in 48 states, exists in large part because the United States has adopted, enforces, and continues to refine in response to the best scientific information on pollution's impact on public health and environment, the most advanced clean car standards in the world. Those standards create a competitive advantage for US-developed vehicle technologies in a global marketplace where other countries are gradually importing our country's standards and thereby reducing conventional pollutants and greenhouse gases. If NHTSA seriously entertains selecting the "no action" alternative, the Administrator should be prepared to incorporate the resulting costs of the job losses and dis-investment that will occur in the U.S. when our standards no longer lead the world as part of calculating compliance with Executive Order 13783. Stagnating American vehicle standards are a recipe for declining international competitiveness of our manufacturing sector, decreased US investment and employment, and increased pollution here and abroad.[82]

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[81] *Comments of the Manufacturers of Emission Controls Association on the National Highway Traffic Safety Administration Notice of Intent to Prepare an Environmental Impact Statement for Model Year 2022–2025 Corporate Average Fuel Economy Standards*, internet citations omitted, available at: https://www.regulations.gov/contentStreamer?documentId=NHTSA-2017-0069-0086&attachmentNumber=1&contentType=pdf, last visited September 19, 2017.

[82] *Comments of the Advanced Engine Systems Institute on the National Highway Traffic Safety Administration's Notice of Intent to Prepare an Environmental Impact Statement for Model Year 2022–2025 Corporate Average Fuel Economy Standards*, available at: https://www.regulations.gov/contentStreamer?documentId=NHTSA-2017-0069-0087&attachmentNumber=1&contentType=pdf last visited September 19, 2017.

The Aluminum Association stated:

> To date, automakers and their suppliers have shown ongoing initiative in meeting or exceeding the required CAFE standards. The aluminum industry supply chain is committed to ongoing and further advances in the future to help their automaker customers meet regulatory fuel efficiency goals. Bottom line, adherence to the 'maximum feasible' criteria ensures continued innovation across the supply chain for advancing the cause of fuel-efficient vehicles….
>
> The notice indicates that NHTSA "may evaluate the Model Year 2021 standards to ensure they remain 'maximum feasible'". If NHTSA undertakes this evaluation, the Association asks that the full potential impact of this change on automobile manufacturers and suppliers be understood before making any changes. The Model Year 2021 standards have already been regulatorily [sic] finalized and any action taken to adjust these standards (either up or down) at this point would significantly increase uncertainty in the aluminum industry as well as for other suppliers to the auto and light truck market. As noted above, this regulatory uncertainty is exactly the opposite of what manufacturers and suppliers need to make long term investment decisions. Aluminum suppliers have made long term investment decisions based on the existing Model Year 2017 through 2021 standards set in the previous rulemaking. With an average of 5 years to take a major vehicle platform from concept to customer, many of the Model Year 2021 vehicle designs are nearing finalization. In particular, reducing the stringency of the Model Year 2021 standard could result in adverse environmental and economic impact, including loss of jobs, to the substantial long-term investment levels to which suppliers committed to in 2012 when the regulations up through 2021 were finalized. These investments include significant research and development, human capital, manufacturing facilities and equipment to satisfy auto manufacturing customer fuel efficiency regulatory requirements….
>
> [I]ncreases in the application of mass reduction technologies can help compensate for any shortfall caused by lower rates of adoption of other technologies, such as electrified vehicles and the aluminum industry is ready to provide assistance to help meet the overall CAFE program compliance goals….
>
> Given regulatory certainty via the implementation of 'maximum feasible' standards in the Model Year 2022-2025 standards, the economic benefit of these effects can be maximized. Currently, the US aluminum industry directly employs 161,000 workers and indirectly employs an additional 551,000 workers. Its economic output directly generates $75 billion and indirectly generates an additional $111 billion in economic output. In total, the U.S. aluminum industry supports nearly 713,000 jobs and $186 billion in economic output, more than 1 percent of Gross Domestic Product….

> Since 2013, the aluminum industry has announced U.S. plant expansions and planned investments totaling more than $2.3 billion to meet increasing automotive customer needs….
>
> Related, a recent study commissioned by the Aluminum Association noted that the projected increase in demand for aluminum sheet for use in automotive body and closure applications is expected to generate growth in the aluminum industry equal to approximately 6,322 American jobs by 2025.[83]

The National Coalition for Advanced Transportation stated:

> Advanced technology vehicles--including both vehicle and supply equipment manufacturing and development of supporting infrastructure--can help drive large-scale investment, economic growth and job creation across the United States. Federal and state vehicle standards play a critical role in supporting investment and unlocking the vast economic potential in this area. U.S. auto and technology manufacturers have made electric vehicles ("EVs") and other advanced technology vehicles a centerpiece of their business strategies and are backing those strategies with billions of dollars in investments. Substantial growth in jobs relating to the expansion of the EVs and other advanced technology vehicles is expected--including in vehicle manufacturing, charging and other "fueling" infrastructure, and maintenance and repair. In addition, the global market for electric 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.[84]

The American Chemistry Council stated:

> Developing technology to allow for maximum fuel efficiency spurs advanced manufacturing innovations in the United States, creates jobs and helps increase U.S. energy independence. Automotive plastic products are produced at 1,572 plants located in 45 states. These plants directly employ about 57,425 people and feature a payroll of $2.8 billion. Michigan is the leading state in terms of direct employment (over 14,400) and is followed by Ohio (over 8,400), Indiana (over 6,200), Tennessee (about 3,910), Minnesota (nearly 3,050), Pennsylvania (about 2,775), Illinois (over 2,400), Wisconsin (nearly 2,200), New York (about 1,570), and North Carolina (about 1,520).

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[83] Letter dated August 25, 2017, RE: Docket ID No. NHTSA-2017-0069 – Notice of Intent to Prepare an Environmental Impact Statement for Model Year 2022-2025 Corporate Average Fuel Economy Standards, available at: https://www.regulations.gov/contentStreamer?documentId=NHTSA-2017-0069-0111&attachmentNumber=1&contentType=pdf last visited September 19, 2017. (Footnotes omitted for brevity).

[84] *Comments of the National Coalition for Advanced Transportation On NHTSA's Notice of Intent to Prepare an Environmental Impact Statement for Model Year 2022–2025 Corporate Average Fuel Economy Standards*, available at: https://www.regulations.gov/contentStreamer?documentId=NHTSA-2017-0069-0113&attachmentNumber=1&contentType=pdf last visited September 19, 2017.

> Producers of automotive plastics and polymer composites purchase plastic resins, additives, other materials, components and services. As a result, the contributions of plastics and polymer composites go well beyond their direct economic footprint. The automotive plastics and polymer composites industry fosters economic activity indirectly through supply-chain purchases and through the payrolls paid both by the industry itself and its suppliers. This, in turn, leads to induced economic output as well. As a result, it is estimated that every job in the automotive plastics and polymer composites industry generates an additional job elsewhere in the U.S. economy, for a total of over 108,000 jobs, representing 11.7% of the light vehicle industry workforce.[85]

Engineering and development of advanced technology vehicles, including electric drivetrains, can result in a net job growth in the United States, according to the International Economic Development Council. It is important that NHTSA consider these broader economic impact benefits in setting fuel economy standards.[86] National studies evaluating the economic impact from the fuel economy standards show net job growth as a result of the augural standards.[87] Net job growth is projected when taking a broader view of investments and innovation in new technologies from component suppliers as well as automobile manufacturers.

The current standards also have provided ample lead time. The regulatory stability of maintaining the standards ensures the necessary technology will be developed.

In sum, not only would relaxing the standards hurt the environment, the economy, and job growth, and suppress technological innovation, the specter of doing so creates a self-fulfilling prophecy. The automobile industry is global. To be competitive, manufacturers must be able to sell their products world-wide. U.S. standards that keep up with international standards help ensure domestic manufacturers can compete on the world stage. Europe and Asia are moving away from internal combustion engines.[88] The United States should not abandon its leadership role and facilitate wasteful and harmful over-consumption of petroleum-based fuels

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[85] Letter dated August 2017 "RE: Docket ID No. NHTSA-2017-0069 – Notice of Intent to Prepare an Environmental Impact Statement for Model Year 2022-2025 Corporate Average Fuel Economy Standards," available at: https://www.regulations.gov/contentStreamer?documentId=NHTSA-2017-0069-0077&attachmentNumber=1&contentType=pdf last visited September 19, 2017. (Footnotes omitted for brevity)

[86] *See Midterm Review Report*, *supra,* App. B, p. B-122.

[87] *See Ibid.,* App. B, p. B-124.

[88] *See*, e.g.: http://www.independent.co.uk/environment/france-petrol-diesel-ban-vehicles-cars-2040-a7826831.html [France]; https://www.nytimes.com/2017/07/26/world/europe/uk-diesel-petrol-emissions.html [United Kingdom]; https://www.cleanenergywire.org/news/merkel-open-combustion-engine-ban-onshore-wind-prices-drop/merkel-signals-support-eventual-ban-combustion-engine [Germany]; http://insideevs.com/china-considers-zev-mandate/ [China]; http://www.mddelcc.gouv.qc.ca/changementsclimatiques/vze/index-en.htm [Quebec]; http://www.newswire.ca/news-releases/government-of-canada-to-develop-a-national-zero-emissions-vehicle-strategy-by-2018-624609563.html [Canada]; http://wccftech.com/norway-electric-cars/; [Norway]; https://www.fastcompany.com/3058649/the-netherlands-will-ban-new-gasoline-powered-vehicles-by-2025 [Netherlands], last visited August 18, 2017.

when the rest of the world demands better. EPA and NHTSA should quickly affirm the current standards, so that progress will continue on improved technology for the betterment of all.

D. The EPA Cost Effectiveness Modeling Should be Used for Greenhouse Gas Rulemakings.

CARB is confident the EPA compliance cost effectiveness modeling used in the 2016 Draft TAR and their Proposed Determination is more robust than the modeling from NHTSA for the 2016 TAR, and strongly recommends the EPA modeling continue to be used for future greenhouse gas rule development. The following comments reflect how the EPA modeling is more robust both with regards to technology packages assumed, and with projection methodologies on how industry scales technologies and applies them to new platforms.

1. The EPA analysis considers a more realistic range of technology packages.

EPA includes a wider range of advanced conventional engine technology packages that have lower compliance costs compared to hybrids and electric vehicles, and provide more alternatives for the compliance model to choose from. These technology packages reflect the current leading technology in the industry and are examples of how manufacturers are not sitting idle with engine efficiency improvements in conventional vehicles.

EPA's modeling includes 48 Volt mild hybrid systems in a much more comprehensive fashion than NHTSA's modeling, and this technology is rapidly expanding in the market. EPA models include this technology with efficiency estimates based on demonstrated performance. Even given this demonstrated performance characterization, some commenters, notably ICCT, stated the assumptions for projected years were conservative given that 48V systems can be used in combination with other components to improve efficiency (for example 48V + electric boost systems). Combining technologies in this way can lead to similar costs but higher effectiveness.

A 48V vehicle architecture can enable many other accessory systems to be electrified instead of belt driven from the engine crankshaft improving efficiency, including power steering, power brakes, water pumps, radiator cooling, and air conditioning. Proponents of this technology claim this provides two-thirds the efficiency improvement of a full hybrid at one-third the cost.[89] At higher voltages, automakers can install more powerful starter motors without redesigning the vehicle's architecture or manufacturing process. It may also be possible to update some vehicles with 48V systems as a mid-cycle change on an existing platform, without having to wait for the full platform redesign.

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[89] Bill Howard, Extreme Tech. *Why Cars Are Moving to 48-Volt Electrical Systems*, (April 26, 2017), available at: https://www.extremetech.com/extreme/247889-cars-moving-48-volt-electrical-systems, last visited September 27, 2017.

As evident from product announcements at the Frankfurt Motor Show in September 2017, many automakers are bringing 48V systems on gasoline engines to market soon as an alternative to diesel engines, including the next gen VW Golf in 2019. Major suppliers like Bosch, Valeo, and Delphi have systems in production, and Delphi predicts that one out of every 10 cars sold globally by 2025 will be a 48V mild hybrid.

Another promising technology entering the market was not even included in the NHTSA compliance modeling. The "Atkinson 2" engine technology was used by EPA in advanced powertrain technology packages to consider cylinder deactivation. Notably Mazda has had this type of engine (SKYACTIV-G) in production for several model years. When EPA applied this technology in the compliance models, the effectiveness improvement was between 20% and 23% depending on vehicles with varying power-to-weight ratios. This is a significant improvement. Refer to chapter 2.3.3.2 of the Technical Support Document for the Proposed Determination[90] for details.

2. The EPA analysis supporting the current standards considers more realistic projection methodologies.

EPA also incorporates more accurate projection methodologies for how often vehicle platforms are redesigned. EPA assumes a 5 year redesign cycle, whereas NHTSA assumes a 6-7 year cycle. EPA's approach more accurately reflects what manufacturers do today, particularly as they respond to an ever faster paced market with growing competition. This is an important distinction in the fleet compliance modeling because a longer product cycle means new technology will take longer to penetrate the market in compliance simulations, reducing the potential for effectiveness improvements.

A description of the EPA assumptions can be found in the 2016 TAR on pages 12-7 to 12-10.

> We continue to estimate a 5 year redesign cycle.[91] This cycle is consistent with our understanding of industry practice (although there are indications that cycles are becoming shorter due to competitive pressures, especially on cars)… We know that industry plans ahead for compliance with future standards and carefully considers their redesign cycles when developing their compliance plans.

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[90] *Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation: Technical Support Document* (November 2016, EPA-420-R-16-021), available at: https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2015-0827-5941&contentType=pdf.

[91] Use of a 5-year redesign cycle is consistent with that assumed by the National Academies of Science. National Research Council. 2015. *Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles*. Washington, DC: The National Academies Press. https://doi.org/10.17226/21744. (p. 342) "Opportunities for a manufacturer to bank and borrow credits over time will allow that manufacturer to better match product redesign cycles that are usually between 3 and 5 years, with the standard increasing in stringency every year."

A description of the NHTSA assumptions can be found in the 2016 TAR on pages 13-6 to 13-8.

> NHTSA's simulation of compliance actions that manufacturers might take is constrained by the pace at which new technologies can be applied in the new vehicle market. Operating at the make/model level (e.g. Toyota Camry) allows NHTSA to explicitly account for the fact that individual vehicle models undergo significant redesigns relatively infrequently. Many popular models are only redesigned every six years or so, with some larger legacy platforms stretching more than a decade between significant redesigns.

In addition to the product redesign cycle, EPA includes a "power-to-weight" ratio adjustment that is applied to technology packages to scale them for varying size vehicles. This allows a more detailed - and likely more accurate - scaling of technologies onto larger vehicle platforms instead of a simplistic assumption that one technology works on all vehicle classifications.

Vehicles with a higher power-to-weight ratio will typically result in a higher effectiveness for a given package of technologies. As cited by ACEEE in their Final Determination comments to EPA,

> EPA undertook substantial additional analysis... In order to capture variations in powertrain technology effectiveness, EPA i) altered its vehicle classification to reflect variations in power-to-weight ratio and road lower power and ii) used a power-to-weight correction factor within each class to adjust the effectiveness values produced by the lumped parameter model (LPM) before those values were input to OMEGA.[92]

Finally, in its 2015 report evaluating the national agencies' rulemaking analysis, the National Academies of Science noted the EPA's methodology was robust.[93] It noted the lumped parameter model methodology should be continued for future analysis and rulemakings.[94]

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[92] *See* 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*, EPA-420-R-17-002 (January 2017), p. 27.

[93] National Research Council. 2015. *Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles*. Washington, DC: The National Academies Press. https://doi.org/10.17226/21744. (p. 2) "The committee found the analysis conducted by NHTSA and EPA in their development of the 2017-2025 standards to be thorough and of high caliber on the whole. In particular, the committee notes that the use of full vehicle simulation modeling in combination with lumped parameter modeling has improved the Agencies' estimation of fuel economy impacts."

[94] National Research Council. 2015. *Cost, Effectiveness, and Deployment of Fuel Economy Technologies for Light-Duty Vehicles*. Washington, DC: The National Academies Press. https://doi.org/10.17226/21744. (p. 3) "Further, the committee notes that the use of full vehicle simulation modeling in combination

IV. EPA Should Maintain the Current National Harmonized Program.

The current program should remain at the current stringency or be strengthened preserve the expected health, environmental, and societal benefits. A harmonized program reduces development costs for automakers as the technology needed for compliance with greenhouse gas standards is similar to that for Corporate Average Fuel Economy standards. The technologies and vehicle products developed to comply with one facilitate compliance with the other when both programs are strong and encourage innovation.

The current standards are consistent with energy independence and economic growth, including the relevant aspects of Executive Order No. 13783 of March 28, 2017. They promote clean air.[95] They save money for consumers, providing a greater benefit than cost.[96] They are cost-effective within the expected ownership of the original purchaser, and will increase the resale value for the original purchaser as they will save money for every driver over the vehicle's life. They are based on the best available peer-reviewed science and economics, developed through a transparent process.[97]

A harmonized national program makes dollars and cents for consumers while protecting their health and the world in which they live. The distributional consequences of the current standards on households are positive and support equity. Simply weakening the stringency of the standards will not necessarily translate into lower vehicle costs to consumers. Fuel savings over the full life of the vehicle will exceed the incremental vehicle costs. As noted above, EPA concluded and confirmed in the Final Determination that the net lifetime consumer savings for an "average" MY 2025 vehicle compared to the MY 2021 greenhouse gas standards will be $1,650. While only a portion of the driving population purchases new vehicles, these purchases eventually dictate which vehicles are sold to second owners in the used car market. Consequently, buyers of used vehicles will also benefit from lifetime fuel savings of more efficient vehicles. As a result, lower-income families that purchase used vehicles will benefit from the fuel savings of vehicles developed to comply with the current standards. This will provide more discretionary income to be re-invested in the economy. The economic benefits of the current national greenhouse gas emission standards to consumers have won them the support of the consumer advocacy groups Consumer Federation of America and Consumers Union as summarized below.

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with lumped parameter modeling and teardown studies contributed substantially to the value of the Agencies' estimates of fuel consumption and costs, and it recommends they continue to increase the use of these methods to improve their analysis. The committee recognizes that such methods are expensive but believes that the added cost is well justified because it produces more reliable assessments (Recommendation 8.3)."

[95] *See* Exec. Order No. 13783, § 1.(d).

[96] *See* Exec. Order No. 13783, § 1.(e).

[97] *See* Exec. Order No. 13783, § 1.(e).

At the September 22, 2016 congressional hearing "Midterm Review and Update on the Corporate Average Fuel Economy Program and Greenhouse Gas Emissions Standards for Motor Vehicles" held by the Energy and Commerce Committee, Dr. Mark Cooper, Director of Research, Consumer Federation of America, discussed the benefits of the national greenhouse gas emission standards to consumers in his testimony,[98] stated:

> Under the base case, consumers are the big winners with total benefits in our view over five times the cost. Three-fifths of those benefits are direct consumer pocketbook benefits because the total cost of driving goes down.
>
> Second, low-income consumers benefit more than the average consumer because operating costs of vehicles are much more important in their total cost of driving than ownership cost. They buy used vehicles. And those used vehicles, it turns out, get a disproportionate share of the benefits of fuel savings because they are not fully captured in the resale price. They get the benefit of the second half of the life of the vehicle.
>
> And third, let's be clear. Low-income people suffer the most from environmental and pollution harm that results when we drive dirty cars. They suffer the most. They benefit the most from the indirect effects.

Per Executive Order 12898, as well as Title VI of the Civil Rights Act, NHTSA must also consider how the impacts of weakened CAFE standards impacts will be especially burdensome to disadvantaged communities.[99]

According to the Consumers Union,

> lowering fuel costs for new and used vehicle buyers alike [from] fuel economy standards actually deliver[s] higher-than-average net benefits to low- and moderate-income households.
>
> Based on these demographic vehicle buying trends, the main impacts of fuel economy standards would be felt in the used vehicle market. Fortunately, while the new vehicle market has tracked slightly above inflation over the last two decades, used vehicles have actually become cheaper, even as they have benefited from fleet-wide improvements to safety, fuel economy, performance, and other attributes. Fuel

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[98] Midterm Review and Update on the Corporate Average Fuel Economy Program and Greenhouse Gas Emissions Standards For Motor Vehicles, Hearings before the House Com. On Energy and Commerce, Subcom. on Commerce, Manufacturing, and Trade, 114th Cong., 2d Sess. (2016), testimony of Dr. Mark Cooper, Director of Research, Consumer Federation of America, Preliminary Tr., pp. 122-123, available at: http://docs.house.gov/meetings/IF/IF17/20160922/105350/HHRG-114-IF17-Transcript-20160922.pdf, last visited September 19, 2017.

[99] *See*, e.g., *Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations*, Exec. Order No. 12898, 59 Fed.Reg. 7629 (Feb. 11, 1994), as amended, 60 Fed.Reg. 6381 (January 30, 1995.)

> economy in particular has been improving since 2012, and both new and used vehicle sales have been at or near record highs. However, there has been only a small increase in real new vehicle prices (largely driven by a trend toward larger vehicles), and there has been a small decrease in real used car prices since that time.[100]

In sum, the evidence supports the current standards.

V. Weakening the Current Standards Must Meet Substantive and Procedural Legal Requirements – But the Evidence Does Not Meet the Requirements.

Were EPA or NHTSA to weaken the standards, they would have to conduct notice-and-comment rulemaking, and consider the implications under other protective statutes.

As required by law, any changes to the greenhouse gas emission standards in effect through and beyond MY 2025 must be made following the requirements for administrative rulemaking.[101] NHTSA has similarly acknowledged it will conduct formal rulemaking proceedings to codify the CAFE standards for MY 2022-2025. Any changes to the CAFE standards for MY 2021 must similarly be made through formal rulemaking. If a reconsidered Final Determination reached conclusions supporting a decision to propose weakened standards, the reason and basis of that reconsidered conclusion, including the revised Final Determination, would likewise be subject to notice and comment.

EPA and NHTSA must also fully identify and assess any detrimental impacts of proposed regulatory changes under various protective statutes. These include the National Environmental Policy Act (NEPA) (for NHTSA), the Endangered Species Act (ESA), and the National Historic Preservation Act (NHPA).

NEPA requires that for every major proposed federal action significantly affecting the quality of the human environment, agencies must prepare a detailed statement outlining the environmental impact of the proposed action. A "major" federal action is any action that requires substantial planning, time, resources, or expenditure.[102] Regulations are included.[103] Amending the CAFE standards involve significant research and analysis. It would be a major federal action. A federal action "significantly affects" the environment if it may significantly degrade some human environmental factor.[104] Relaxing the national fuel economy standards

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[100] Letter to EPA dated December 23, 2016 "Re: Consumers Union's Comments on EPA's Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards under the Midterm Evaluation (Docket ID No. EPA-HQ-OAR-2015-0827), available at: https://www.regulations.gov/contentStreamer?documentId=EPA-HQ-OAR-2015-0827-6028&attachmentNumber=1&contentType=pdf last visited September 19, 2017.

[101] 40 C.F.R. § 86.1818-12(h).

[102] *Natural Resources Defense Council, Inc. v. Grant*, (E.D. N.C. 1972) 341 F.Supp. 356.

[103] 40 C.F.R. § 1508.18(b); but EPA's actions under the Clean Air Act are exempt from NEPA, under the Energy Supply and Environmental Coordination Act of 1974, at 15 U.S.C. § 793(c)(1).

[104] *Columbia Basin Land Protection Ass'n v. Schlesinger* (9th Cir.1981) 643 F.2d 585.

would have significant adverse environmental effects. Before acting, an administrative agency must inquire into the potential environmental impacts of its decisions.[105]

Under the ESA, NHTSA and EPA must consider the potential impacts of any proposed relaxed standards, and resulting pollution from motor vehicle fuel extraction, refining, and consumption on threatened and endangered species and critical habitats.[106] These impacts are sweeping, critical, and potentially dispositive, as relaxing the standards would significantly exacerbate the climate change risks faced by these species.

If a revised Final Determination concludes the federal emission and fuel economy standards should be relaxed, EPA and NHTSA would have to consider the potential impacts on archaeological sites and other historical resources, under the National Historic Preservation Act.[107] These resources are, in many instances, profoundly threatened by climate change. Prior to the approval of any Federal undertaking that may directly and adversely affect any National Historic Landmark, the head of the responsible Federal agency shall to the maximum extent possible undertake such planning and actions as may be necessary to minimize harm to the landmark. The head of the Federal agency shall afford the Council a reasonable opportunity to comment with regard to the undertaking.[108] If the standards were relaxed, this could lead to additional domestic petroleum wells to meet the increased demand for gasoline and diesel fuel. Before relaxing the federal standards, EPA and NHTSA must, for instance, assess whether additional wells would impact archaeological and other relevant sites.[109] More broadly, the agencies must consider how exacerbating climate change may affect these resources.

VI. If EPA and NHTSA Reach a Different Conclusion then a Proposed Final Determination Should be Made Available for Comment.

Should EPA and NHTSA reach a different conclusion, transparency supports following the previous course by issuing a proposed determination to allow for public comment. Any proposed new Final Determination should make available for comment the agencies' assessment of the factors and evidence it considered before initiating a rulemaking. An open process is warranted given the gravity of the decision.

VII. Conclusion

The science and engineering analyses supporting the midterm evaluation of the national greenhouse gas emission standards and established and augural CAFE standards set out to

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[105] *Calvert Cliffs Coordinating Committee v. Atomic Energy Comm'n* (D.C. Cir. 1971) 449 F.2d 1109.
[106] 16 U.S.C. § 1531, et seq.
[107] 54 U.S.C. § 300101, et seq.
[108] 54 U.S.C. § 306107.
[109] 54 U.S.C. § 306102(b)(3).

2025 are thorough and sound. Any downwards departure from those standards would be arbitrary and capricious. We urge EPA and NHTSA to work collectively and responsibly in maintaining these standards, and moving forward with strong future standards.

Index to

Comments of the California Air Resources Board
and the
Attorney General of California

Responding to

The United States Environmental Protection Agency
and the
National Highway Traffic Safety Administration's

Requests for Comment on Reconsideration of the Final Determination of the Mid-Term Evaluation of Greenhouse Gas Emissions Standards for Model Years 2022-2025 Light-Duty Vehicles, and on Model Year 2021 Greenhouse Gas Emissions Standards

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EPA-HQ-OAR-2015-0827 and NHTSA-2016-0068

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26, 88	Full Documents	• France will "ban all petrol and diesel vehicles by2040"** • Britain to Ban New Diesel and Gas Cars by 2040** • Merkel signals support for eventual ban of combustion engine** • China Considers ZEV Mandate Similar To California** • Zero-emission vehicles (ZEV) standard** • Government of Canada to develop a national Zero-Emissions Vehicle Strategy by 2018** • All Cars In Norway Will Be 100% Electric By 2025** • The Netherlands Will Ban New Gasoline-Powered Vehicles By 2025**
27, 89	Full Document	Why Cars Are Moving to 48-Volt Electrical Systems**
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31, 98	122-123	Hearings before the House Com. On Energy and Commerce
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* Although specific pages are listed, the entire document is relevant to NHTSA's consideration.
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