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U.S. Environmental Protection Agency
EPA Docket Center (EPA/DC)
Air and Radiation Docket, Mail Code 28221T
1200 Pennsylvania Ave NW
Washington, DC 20460

**RE: Docket No. EPA-HQ-OAR-2021-0257
California State Motor Vehicle Pollution Control Standards; Advanced Clean Car
Program; Reconsideration of a Previous Withdrawal of a Waiver of Preemption**

On behalf of the Center for Biological Diversity (the “Center”) and our more than 1.7 million members and online activists, the Center submits this comment letter in reference to the proposed reconsideration of the Safer Affordable Fuel-Efficient Vehicles Rule: Part One (“SAFE I”).¹ The Center unequivocally supports the reinstatement of California’s waiver to set its own GHG and ZEV standards. The waiver is a critical tool in California’s quest to protect the health and welfare of its residents while mitigating the destructive impacts of climate change. The previous administration illegally stripped California of its waiver, and EPA’s prompt reinstatement is compelled by both law and science.

After the waiver is restored, EPA will turn to the promulgation of interim and long-term emissions standards to replace the Safer Affordable Fuel-Efficient Vehicles Rule: Part Two (“SAFE II”). If sufficiently strong, those rulemakings have the potential be the single biggest step the agency takes to address the climate emergency. We urge you to adopt a rule that mandates 100% Zero Emission Vehicle (ZEV) sales after 2030 and a minimum 7% annual increase in efficiency for the tens of millions of gas-powered vehicles that will be produced until then, as described below.

The effects of climate change continue to spiral higher: in May scientists recorded the highest level of carbon dioxide in the atmosphere in human history.² Many states, including California, would like to set auto emissions standards to confront that challenge. At the very least, EPA should not stand in the way of those states; in fact, it should support them by both restoring the waiver and raising standards for the rest of the country. EPA should recommit to its duty to safeguard the health and welfare of U.S. residents by reaffirming its clean air agenda.

¹ California State Motor Vehicle Pollution Control Standards; Advanced Clean Car Program; Reconsideration of a Previous Withdrawal of a Waiver of Preemption, 86 Fed. Reg. 22,421 (Apr. 28, 2021).

² Plumer, Brad, *Carbon Dioxide in Atmosphere Hits Record High Despite Pandemic Dip*, N.Y. TIMES, Jun. 7, 2021.

This letter will first describe the legal and scientific imperative to restore California's waiver, and then go on to detail what climate science requires in future rulemakings.

I. California's Waiver Should Be Promptly and Unambiguously Reaffirmed

The EPA should enact a wholesale rescission of the Trump Administration EPA's ("Trump EPA") 2019 decision to partially withdraw the 2013 grant of a Clean Air Act Section 209(b) preemption waiver for the State of California's Advanced Clean Car (ACC) program, as well as its determination that Clean Air Act section 177 does not authorize other states to adopt or enforce standards identical to the California standards.³ The Trump EPA made these determinations illegally, and they have been engulfed in litigation since the very first day they were enacted.⁴ For EPA to rescind those actions on reconsideration is nondiscretionary because retaining an *ultra vires* action is, by definition, "in excess of statutory ... authority."⁵

The Trump EPA lacked the legal authority to rescind California's waiver. The Clean Air Act explicitly lays out the requirements to grant a waiver. But it contains no explicit grant of authority to withdraw a waiver previously issued under Section 209(b). And any implicit statutory authority cannot be based on a factor not enumerated in Section 209(b). This was the first time an administration had tried to stretch the law in this way. Instead, Trump's EPA based its unprecedented decision on NHTSA's choice to declare California's standards preempted under an entirely separate law. This deferential reasoning was at odds with both historical practice and common sense, as it allowed EPA to sidestep its statutory mandate.

Moreover, the Trump EPA adopted a novel approach to evaluating California's "need" under Section 209(b)(1)(B) to promulgate its own standards "to meet compelling and extraordinary circumstances."⁶ The Trump EPA improperly separated California's need for greenhouse gas regulations from its need for criteria pollutant standards. In reality, these two goals are tightly linked, and both are critical to the Clean Air Act's goals of safeguarding public health and welfare. To highlight one example: in its waiver request, CARB established that the ZEV standard would address criteria pollution in two ways: 1) by reducing emissions associated with the production, transportation, and distribution of gasoline; and 2) by driving the commercialization of zero-emission-vehicle technologies necessary to reduce future emissions

³ These comments are intended to supplement our full legal analysis in comments submitted jointly with other public interest organizations and the ongoing litigation to which the Center is a party. *See* Comments of Twelve Public Interest Organizations on the Environmental Protection Agency's Reconsideration of a Previous Withdrawal of a Waiver of Preemption for California State Motor Vehicle Pollution Control Standards, Docket No. EPA-HQ-OAR-2021-0257; *Br. of State and Local Gov't Petrs. & Public Interest Org. Petrs, Union of Concerned Scientists v. NHTSA (UCS)*, No. 19-1230 (D.C. Cir. Oct. 27, 2020).

⁴ The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule Part One: One National Program, 84 Fed. Reg. 51,310, 51,310 (Sept. 27, 2019); Petition for Review, *Env'tl. Def. Fund v. NHTSA*, No. 19-1200 (D.C. Cir. Sept. 27, 2019); *see Bell Atl. Tel. Cos. v. FCC*, 79 F.3d 1195, 1207 (D.C. Cir. 1996) ("The rule does not upset petitioners' reasonable reliance interests. The state of the law has never been clear, and the issue has been disputed since it first arose").

⁵ 5 U.S.C. § 706(2)(C).

⁶ 42 U.S.C. § 7543(b)(1)(B).

and achieve California's long-term air quality goals.⁷ Moreover, in prior actions EPA had approved ZEV and GHG standards in various State Implementation Plans because of their relationship to reducing criteria pollutants.⁸ And we know that global warming exacerbates criteria pollution and makes it harder to meet air pollution standards.⁹ EPA nonetheless finalized its SAFE I actions without even considering, let alone justifying, the criteria pollution increases that would result. That renders EPA's SAFE I action unlawful and provides a more than sufficient basis upon which EPA should reverse the rule.

But even were that not so, the premise of the Trump EPA's argument is incorrect because California *also* experiences uniquely dangerous effects from increases in greenhouse gases. For example, the California legislature has found that global warming will cause adverse health impacts from increased air pollution and a projected doubling of catastrophic wildfires.¹⁰ Many of the state's most extreme weather events have occurred in the last decade, including a severe drought from 2012-2016, an almost non-existent Sierra Nevada winter snowpack in 2014-2015, three of the five deadliest wildfires in state history, and back-to-back years of the warmest average temperatures on record.¹¹ These ongoing disasters demonstrate California's status as "one of the most 'climate-challenged' regions of North America."¹² In this proceeding, EPA should make factual findings about the unique danger climate change poses to California to underscore that the equal-sovereignty doctrine does not govern in this or future waiver proceedings.

Finally, there is no legal principle or precedent that restricts the EPA from immediately restoring California's waiver for all model years. EPA should not be moved by automakers that claim they would need significant "lead time" to comply with the restored waiver because they had presumably relied on the much weaker SAFE II Rule. Indeed, the Clean Air Act simply requires consideration of adequate lead time necessary to "permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance."¹³ The Obama EPA granted California's waiver to enforce its GHG standards and ZEV mandate in January 2013, after California adopted its regulation in 2012. Accordingly, automakers have had almost a

⁷ Clean Air Act § 209(b) Waiver Support Document Submitted by the California Air Resources Board (May 2012) EPA-HQ-OAR-2012-0562-0004, at 16 (quantifying criteria benefits from "increased use of electricity and concomitant reductions in fuel production" resulting from ZEV standards by 2030); *id.* at 22 (describing "ZEV technology commercialization and long-term GHG and *criteria emission goals*" as "one of the [ZEV] program's primary objectives").

⁸ *See, e.g.*, Approval and Promulgation of Implementation Plans; California; California Mobile Source Regulations, 81 Fed. Reg. 39,424, 39,425 (June 16, 2016) (California's SIP approval).

⁹ U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (D.R. Reidmiller et al. eds.) (2018) at 56, 181, 1059, https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf.

¹⁰ 2002 Cal. Legis. Serv. Ch. 200 (A.B. 1493).

¹¹ Thorne, James et al., California's Changing Climate 2018, California Natural Resources Agency (2018) at 3, https://www.energy.ca.gov/sites/default/files/2019-11/20180827_Summary_Brochure_ADA.pdf; California Department of Forestry and Fire Protection, Top 20 Deadliest California Wildfires (2021), *available at* https://www.fire.ca.gov/media/lbfd0m2f/top20_deadliest.pdf.

¹² Bedsworth, Louise et al., Statewide Summary Report, California's Fourth Climate Change Assessment, California Governor's Office of Planning and Research, Scripps Institution of Oceanography, California Energy Commission, California Public Utilities Commission (2018) at 13, https://www.energy.ca.gov/sites/default/files/2019-11/Statewide_Reports-SUM-CCCA4-2018-013_Statewide_Summary_Report_ADA.pdf.

¹³ 42 U.S.C. § 7521(a).

decade of lead time to prepare at this point, and they had all adjusted their business plans accordingly well before the waiver revocation. In fact, they signed letters of commitment to the EPA in 2010, pledging to honor the deal.¹⁴ Surely almost a decade constitutes enough notice that automakers would be required to produce vehicles they already have the technology to make.

II. Interim and Long-term Replacement Rules for SAFE II Must Be Aggressive and Well-Designed for Maximum Effectiveness

As explained above, we urge EPA to take prompt action to restore California's waiver and allow other willing states to join the effort to protect their residents' health. Yet because not all states will do so, EPA has an immense responsibility to the residents of those other states to promulgate an aggressive rule protecting human health and welfare while also slowing climate change.

a. The Interim Standard Must Take Effect in Model Year 2023

EPA's interim rule must be enforced no later than model year 2023 for two important reasons. First, effective ZEV mandates and emissions standards must start early to capture the maximum possible benefits from their implementation. EPA needs to recapture the lost emissions from the years when SAFE I was in effect, which could be four years or longer (model years 2020 to 2023). As vehicle emissions are the country's largest source of greenhouse gas emissions, every year is critical to reduce the carbon impact of this sector.¹⁵ The Trump EPA's standards represent at least 4 years of missed opportunities to improve.

Given the maturity of ZEV and ICEV light duty fleet technology, manufacturers do not need significant lead time to comply with more stringent standards.¹⁶ In fact, with an earlier implementation date, manufacturers would face a gentler slope of improvement to reach 100% ZEV sales by 2030 than if the rule started later, which would require steeper annual improvements to reach the target. A smarter policy is to have a gradual rate of improvement, completed over more years. This approach requires as early a start date as possible.

The second reason why the rule must take effect no later than 2023 is because automakers have had almost a decade to plan for improvements in line with the Obama standards, which the automakers agreed to and with which they had complied for 7 years. In order to comply with the Obama standards, manufacturers had already built into their business plans an increase in fleet-

¹⁴ See generally Environmental Protection Agency, 2010 Commitment Letters for MY2017-2025 Light-Duty and MY 2014-2018 Heavy-Duty Programs, available at <https://www.epa.gov/regulations-emissions-vehicles-and-engines/2010-commitment-letters-my2017-2025-light-duty-and-my>

¹⁵ U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2019; Executive Summary (2021) at ES-13, <https://www.epa.gov/sites/production/files/2021-04/documents/us-ghg-inventory-2021-main-text.pdf>.

¹⁶ See e.g., German, John, Technology Leapfrog: Or, all recent auto technology forecasts underestimate how fast innovation is happening, International Council on Clean Transportation Blog (Sept. 25, 2017), <https://theicct.org/blog/staff/technology-leapfrogging>. See also, Lipshaw, Jeremy, What is Lightweighting and How Does it Improve Fuel Economy in Vehicles, Union of Concerned Scientists (Aug. 24, 2020), https://blog.ucsusa.org/science-blogger/lightweighting-and-fuel-economy-in-vehicles?_ga=2.137492341.437148802.1598470463-789117557.1592936422.

average mileage and a decrease in emissions. CARB's own Midterm Review in 2017 showed that they were "over complying" with GHG standards and had offered models that were already able to comply with the standards for later years.¹⁷ After reneging on their agreement and asking the Trump Administration to roll back the Obama standards, they have now put the brakes on improvements. It would be outrageous to foist higher emissions and billions of dollars in climate- and health-related costs just because automakers seized the opportunity to roll back standards under the previous administration. They should not be rewarded for their successful delaying tactic. The climate simply cannot afford to give the industry any more handouts.

Finally, EPA should not commit to another midterm evaluation ("MTE") of the standards. Automakers simply used the 2018 MTE as an avenue to loosen emission standards they were capable of meeting.

We urge EPA to adopt a final rule by December 2021 so that the new rule can apply to model year 2023. Any delay beyond what is required by regulation or statute is not warranted given the scale of the climate crisis.

b. EPA's Replacement Rule Must Be Stronger Than the Weak California Deal

EPA should not revert to a nationwide version of the 2019 California deal. Automakers will no doubt advocate for an expansion of this option, but as a scalable solution to the climate crisis, it is fool's gold.

First, the California deal is substantially weaker than the Obama standards. The Obama standards reduce annual emissions by 4.7%, while on its face, the California deal reduces them by 3.7%. However, a closer look reveals that due to various loopholes, the effective emissions reductions are around 2.5%.¹⁸ This is primarily due to the huge increase in EV multiplier credits, a 50% increase in the off-cycle credit cap from 10% to 15%, and the failure to account for upstream emissions to recharge EVs. These differences have a real effect on the climate. Compared with the recommendations in this letter, as described below, extending the California deal nationwide would result in an additional 2.5 billion metric tons CO₂ released by 2045, an amount roughly equal to India's total emissions in 2019.¹⁹

Second, the California deal was the product of very specific political circumstances, and because those circumstances no longer exist, it would be inappropriate to export this model to the rest of the country. At the time, the Trump EPA attempted to revoke California's waiver and roll back federal standards. With that grim possibility in mind, California sought to salvage some emissions savings and likely saw the deal with the five companies as the best it could get under

¹⁷ California Air Resources Board, California's Advanced Clean Cars Midterm Review at ES-2 (Jan. 18, 2017), https://ww2.arb.ca.gov/sites/default/files/2020-01/ACC%20MTR%20Summary_Ac.pdf.

¹⁸ Union of Concerned Scientists, Rolling Back the Rollback: Strong Near-Term Standards To Set Up A Cleaner Future, <https://ucs-documents.s3.amazonaws.com/clean-vehicles/ucs-memo-rolling-back-the-rollback-2021-04-09.pdf> (last visited June 10, 2021) ("If implemented federally, the California framework would net barely more than half the emissions reductions of the 2012 Obama-Biden standards and, despite numerous incentives, result in no greater penetration of electric vehicles (EVs).")

¹⁹ See calculations in Appendix A, Table 5.

the circumstances. It was within that context that California negotiated a voluntary pact with five automakers at a stringency level between SAFE II and the Obama standards.

The world looks very different than it did even six months ago: there is a new administration in Washington that seems intent on establishing strong environmental protections and fighting the climate crisis. Many voters supported candidate Biden in part because of his stated commitment to the environment. This massive shift in policy comes alongside ongoing litigation by 23 states, the District of Columbia, and many advocates to compel that change. There is no need to design standards for 2023-26 with a 2019 mindset. Instead, it is imperative that the current administration design standards that truly seek to address the climate crisis we are facing.

c. EPA Should Adopt 100% ZEVs by 2030 and 7% Annual Emissions Reductions in ICE Vehicles Until Then

The current federal emission standards are inadequate to control climate change and meet federal and international emissions goals. Instead, EPA should require that ZEVs represent 100% of vehicle sales by 2030 and, in the interim, require new ICEVs to meet 7% annual reductions in emissions.

Recent and long-standing federal and international goals commit the U.S. to reducing net carbon emissions to zero by 2050 or sooner. The IPCC recently stated the Paris Agreement's target of limiting warming to under 1.5°C would require "rapid and far-reaching transitions" across all sectors in order to cut global CO₂ emissions in half by 2030 and to zero by 2050.²⁰ President Biden, who upon taking office immediately recommitted the United States to the Paris Agreement,²¹ recently established a target of 50-52% emissions reductions below 2005 levels by 2030 to reach net zero by 2050.²²

Significant and immediate changes in the transportation sector are necessary to meet these goals. In 2019, transportation emissions accounted for 37.5% of U.S. CO₂ emissions, the largest share of any sector, of which 57.7% came from passenger cars and light duty trucks.²³ The U.S. automobile fleet is responsible for a quarter of global light-duty vehicle emissions.²⁴ Waiting

²⁰ Intergovernmental Panel on Climate Change, Summary for Policymakers, Global Warming of 1.5°C, An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018) at 12, 15, *available at* <https://www.ipcc.ch/sr15/>.

²¹ The White House, Paris Climate Agreement: Acceptance on Behalf of the United States of America, Press Release (Jan. 20, 2021), *available at* <https://www.whitehouse.gov/briefing-room/statements-releases/2021/01/20/paris-climate-agreement/>.

²² The White House, FACT SHEET: President Biden Sets 2030 Greenhouse Gas Pollution Reduction Target Aimed at Creating Good-Paying Union Jobs and Securing U.S. Leadership on Clean Energy Technologies, Press Release (Apr. 22, 2021), *available at* <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/22/fact-sheet-president-biden-sets-2030-greenhouse-gas-pollution-reduction-target-aimed-at-creating-good-paying-union-jobs-and-securing-u-s-leadership-on-clean-energy-technologies/>.

²³ U.S. Environmental Protection Agency, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2019, *supra* note 15.

²⁴ United Nations Environment Programme, Emissions Gap Report 2019, UNEP, Nairobi (2019) at 60, <https://www.unenvironment.org/resources/emissions-gap-report-2019>.

until 2050 to replace these vehicles will be insufficient to meet long-term emissions goals because of the vehicles' long average lifespan. A 2019 study concluded that immediately phasing out all fossil fuel technology at the end of its design lifetime would preserve only a 64% chance of limiting global temperature rise below 1.5°C.²⁵ Thus, even accelerating the 100% ZEV mandate to 2030 *still* might not be enough to meet the 1.5°C goal.

The U.S. is already suffering significant harms from global warming. These ongoing harms include rising temperatures, increased frequency and severity of heatwaves and other extreme weather events, coastal flooding due to rising seas and storm surges, intensified hurricanes, rapidly melting Arctic sea ice, declining food and water security, and increasing species extinctions.²⁶ As global warming progresses, these impacts are becoming more severe. For example, Hurricane Harvey, which dropped record rainfall over southeast Texas in 2017, is estimated to have been made 3.5 times more likely and 19% more intense due to global warming.²⁷ Likewise, the June heatwave across the Northwest U.S. set temperature records in Seattle, WA and Portland, OR.²⁸ These ongoing and worsening disasters demonstrate the need for prompt action to halt these trends.

The 2030 100% ZEVs sales mandate would ensure the majority of ICEVs sold by 2030 have aged out of the fleet by the 2050 zero emission target. A 2019 study found if new vehicle technology is immediately adopted and incorporated into 100% of all new vehicle sales, in 20 years it will still only be present in 90% of the on-road vehicle fleet.²⁹ Even under a 2030 100% ZEV-sale requirement 10% of the U.S.'s fleet would still be ICEVs in 2050, continuing to emit carbon pollution and undermining national emission targets.

The 2030 100% ZEV mandate is feasible. Cost parity between ICEVs and ZEVs already exists without the use of incentives,³⁰ and experts have concluded that EVs are already cheaper to buy

²⁵ Smith, Christopher J. et al., Current fossil fuel infrastructure does not yet commit us to 1.5°C warming, 10 Nature Communications 101 (2019) at 1, available at <https://www.nature.com/articles/s41467-018-07999-w>.

²⁶ U.S. Global Change Research Program, Climate Change Impacts in the United States: The Third National Climate Assessment (Melillo, J.M. et al. eds.) (2014); U.S. Global Change Research Program, Climate Science Special Report: Fourth National Climate Assessment, Vol. I (D.J. Wuebbles et al. eds.) (2017); U.S. Global Change Research Program, Impacts, Risks, and Adaptation in the United States, Fourth National Climate Assessment, Volume II (D.R. Reidmiller et al. eds.) (2018); Abram, Nirilie et al., Summary for Policymakers, in IPCC Special Report on the Ocean and Cryosphere in a Changing Climate (H.-O. Pörtner et al., eds. 2019), <https://www.ipcc.ch/srocc/>.

²⁷ Risser, Mark D. & Michael F. Wehner, Attributable human-induced changes in the likelihood and magnitude of the observed extreme precipitation during Hurricane Harvey, 44 Geophysical Res. Lett. 12,457 (2017).

²⁸ Vigdor, Neil, *Pacific Northwest Heat Wave Shatters Temperature Records*, N.Y. TIMES, June 27, 2021, <https://www.nytimes.com/2021/06/27/us/heat-wave-seattle-portland.html>

²⁹ Keith, David R. et al., Vehicle fleet turnover and the future of fuel economy, 14 Environmental Research Letters (2019) at 2, <https://iopscience.iop.org/article/10.1088/1748-9326/aaf4d2/pdf>.

³⁰ See e.g., Lutsey, Nic & Michael Nicholas, Update on electric vehicle costs in the United States through 2030, The International Council on Clean Transportation (Apr. 2, 2019) at 11, https://theicct.org/sites/default/files/publications/EV_cost_2020_2030_20190401.pdf; see also Fulton, Lew & Dan Sperling, Zero cost for zero-carbon transportation?, UC Davis Institute of Transportation Studies (July 14, 2020), <https://its.ucdavis.edu/blog-post/zero-cost-for-zero-carbon-transportation/> (finding that, after 2030, the costs of owning and operating electric vehicles will be lower than for gasoline and diesel cars and trucks).

and maintain over their lifetimes.³¹ In fact, the latest study from the Office of Energy Efficiency and Renewable Energy found that light duty BEVs cost 6.1 cents per mile to maintain, while their ICEV counterparts cost 10.1 cents per mile.³² For the federal government's light duty vehicle fleet, which travels nearly 2 billion annual miles, that difference amounts to around \$78 million a year.³³ Moreover, experts predict that ZEV sticker prices will match their ICEV counterparts as early as 2023 to 2025, primarily due to declining battery costs.³⁴ Thus, it is clear that ZEVs will be cheaper for manufacturers and consumers well before the 2030 sales target.

EPA should simultaneously require automakers to reduce fleet emissions by 7% annually as ICEVs are completely phased out. Under the Obama-era EPA standards, manufacturers were committed to only a 4.7% annual reduction, while the 2019 California framework held automakers to a 3.7% annual reduction (and various loopholes make the effective reduction only 2.5%).³⁵ At this point, simply reverting to the Obama-era standards is inadequate to meet the nation's emissions targets, given the time lost over the past several years and that will continue to be lost until EPA promulgates new standards.

Instead, requiring a 7% annual reduction, starting in 2024, along with a 100% ZEV sales mandate by 2030, would substantially reduce cumulative emissions from passenger vehicles.³⁶ Under the Obama standards and a 100% ZEV mandate by 2035, ICEVs sold between 2020 and 2035 would emit 6.8 billion metric tons CO₂ by 2045, whereas under the regressive CARB deal those emissions would total 7.4 billion metric tons. This difference of 668 million metric tons CO₂ roughly equals Germany's 2019 CO₂ emissions.³⁷ But even the reduction from using the Obama standards is insufficient to meet federal and international goals. Rather, EPA could reduce emissions by 2.5 billion metric tons if the agency implemented the Center's alternative, a 7% annual emissions reduction in 2024 coupled with a 2030 ZEV mandate.³⁸ Compared to the current CARB deal, those emission savings roughly equal the total 2019 emissions of India.³⁹

³¹ Harto, Chris, *Electric Vehicle Ownership Costs: Today's Electric Vehicles Offer Big Savings for Consumers*, Consumer Reports (Oct. 2020), <https://advocacy.consumerreports.org/wp-content/uploads/2020/10/EV-Ownership-Cost-Final-Report-1.pdf>.

³² Burnham, Andrew et al., *Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains*, U.S. Department of Energy, Argonne National Laboratory, (2021) at 83 fig. 3.28, <https://www.osti.gov/biblio/1780970/>.

³³ Yekikian, Nick, *The Government Confirms Obvious: Electric Cars Cheaper to Maintain Than Internal Combustion Vehicles*, MOTOR TREND, June 21, 2021, <https://www.motortrend.com/news/government-ev-ice-maintenance-cost-comparison>.

³⁴ Gearino, Dan, *Inside Clean Energy: How Soon Will An EV Cost the Same as a Gasoline Vehicle? Sooner Than You Think.*, INSIDE CLIMATE NEWS, July 30, 2020, <https://insideclimatenews.org/news/29072020/inside-clean-energy-electric-vehicle-agriculture-truck-costs>.

³⁵ Union of Concerned Scientists, *supra* note 18.

³⁶ We estimated emissions out to 2045 because California has committed to reaching carbon neutrality by 2045. EO B-55-18. Note that these calculations assume a start date of Model Year 2024. As described earlier, we strongly urge EPA to finalize the rule quickly so it can apply from Model Year 2023. That would generate even more carbon savings than we calculate here.

³⁷ Data analyzed by Center for Biological Diversity, attached as Appendix A; Ritchie, H. and Roser, M., CO₂ emissions, Our World in Data (Accessed June 8, 2021), <https://ourworldindata.org/co2-emissions>.

³⁸ Data analyzed by Center for Biological Diversity, attached as Appendix A.

³⁹ *Id.*; Ritchie, H. and Roser, M., CO₂ emissions, Our World in Data (Accessed June 8, 2021), <https://ourworldindata.org/co2-emissions>.

A 7% annual reduction is also feasible. Recent EPA Fuel Economy Trends Reports show wide disparities among automakers in the adoption of existing technologies that reduce emissions, such as continuously variable transmissions (which allow the vehicle to run more cleanly, reducing pollution) and cylinder deactivation (which allows a vehicle to use part, rather than all, of the engine when less power is called for, thus reducing emissions).⁴⁰ Indeed, not only do these and other technologies exist, but manufacturers already use them in many vehicles they produce for overseas markets (but often not yet in their domestic equivalents).⁴¹

EPA should require automakers to meet a 7% annual emissions reduction rather than reinstate the Obama-era standards. Immediate emissions reductions are necessary to limit global warming to 1.5°C, and automakers already have the tools to comply with more stringent requirements.

d. EPA's Replacement Rule Must Avoid Loopholes and Superfluous Credits Schemes

EPA should avoid regulatory loopholes that could allow automakers to continue producing high emission fleets that fail to meet federal standards or continue producing ICEVs in model years after the 100% ZEV sales mandate. To do so, EPA should curb emissions from light duty trucks, limit the issuance and use of credits that would allow manufactures to avoid current standards, and establish a backstop to ensure compliance with the ZEV sales mandate and emission standards.

EPA must reduce emissions from light duty trucks, which have come to dominate the domestic market. Due to weaker emission standards and higher profitability, manufacturers have increasingly shifted from producing passenger cars to SUVs, pickups, and vans. Whereas passenger cars represented roughly 80% of the passenger car-light duty truck market in 1975 and 50% as recently as 2013, they now represent a mere 33%.⁴² The increasing share of light duty trucks subject to looser emissions standards means that while emissions are at near record lows for most vehicle types, cumulative emissions reductions have been offset by the higher portion of light trucks sold to consumers.⁴³ The imbalance is particularly severe for the U.S. Big Three manufacturers, whose fleets also have the highest average emissions among the 14 largest auto manufacturers. Ford and GM's fleets actually *increased* their emissions in 2020.⁴⁴ Due to the long average lifespan of these vehicles, the imbalance of light trucks to passenger cars will persist for decades and continue to impede national emission targets.

EPA can help counter light truck emissions by establishing a single combined car and light truck emissions standard rather than the current separate ones. This would help lessen the incentive automakers have to turn cars into trucks with the resulting increase in emissions.

⁴⁰ U.S. Environmental Protection Agency, The 2019 EPA Automotive Trends Report (March 2020) at 38, <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100YVFS.pdf>.

⁴¹ Cooke, Dave, Automakers Can Build Better Cars, But We Need Strong Standards to Make Them, Union of Concerned Scientists Blog (Nov. 25, 2019), <https://blog.ucsusa.org/dave-cooke/automakers-can-build-better-cars-but-we-need-strong-standards-to-make-them>.

⁴² U.S. Environmental Protection Agency, The 2020 EPA Automotive Trends Report (Jan. 2021) at 14-15, <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1010U68.pdf>.

⁴³ U.S. Environmental Protection Agency, The 2020 EPA Automotive Trends Report, Executive Summary (Jan. 2021) at ES-3.4, <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1010UBX.pdf>.

⁴⁴ U.S. Environmental Protection Agency, *supra* note 42 at 8 fig. 2.3, 16 fig. 3.3.

Additionally, new standards must limit automakers' ability to use the credit system to delay emissions reductions. While originally intended as a tool to help manufacturers achieve compliance in difficult years, the credit system has been abused by manufacturers that routinely use them as an alternative compliance path. Between 2009 and 2011, EPA issued credits worth 234 Tg of CO₂, and by 2012, the industry had achieved average emissions of 287 g/mi—12 g/mi below the required standard.⁴⁵ However, the reductions that generated the credits were achieved through the adoption of existing and economically feasible technologies. Instead of fostering the development of ever cleaner emissions technologies, the glut of pre-2012 credits helped automakers delay making these advances. Between 2012 and 2018, the industry generated 96 Tg worth of credits, and by 2016 the industry average emissions exceeded federal standards by 8 g/mi due to the use of previously earned credits.⁴⁶ Since 2016, the industry average emissions as measured from the tailpipe remained above federal standards as manufacturers continue to utilize the early year credits.⁴⁷ As of MY 2019, the tailpipe emissions of 15 of the 20 largest manufacturers, including Ford, GM, and Fiat-Chrysler, exceeded the federal standards.

To improve the credit system, EPA should further restrict credit lifetimes, remove credit multipliers, and impose tight restrictions on manufacturers' annual credit use. While credits issued after 2017 expire within five years, credits issued between 2010 and 2016 expire in 2021, which allowed manufacturers to stockpile massive numbers of credits for use in recent years. This has led to a substantial delay in improving vehicle emissions in later years. Similarly, current credit multipliers for EVs overvalue emissions savings from the credit generating vehicles, resulting in increased emissions from the manufacturers' ICEVs. Finally, capping annual credit use by manufacturer would help ensure that all manufacturers are steadily moving toward lower emission vehicles instead of relying on credits generated by a few compliant manufacturers.

EPA should also include a backstop to the credit system in case automakers' tailpipe emissions continue to grossly exceed federal emissions targets. For example, in 2019, while the industry's average tailpipe emissions exceeded the federal standard by 7 g/mi, Fiat Chrysler's automobiles exceeded the federal standard by 57 g/mi, over eight times the industry average.⁴⁸ A backstop provision would kick in when a company's tailpipe emissions, like those of Chrysler, significantly exceed the federal standard and impose mandatory emissions reductions on the automaker. This would ensure that all automakers are steadily reducing their average emissions and would avoid the possibility of any automaker maintaining steady tailpipe emissions and suddenly becoming noncompliant due to a lack of available credits.

In summary, the U.S. can only meet its climate targets if all new cars and light-duty trucks sold beyond 2030 produce zero emissions. EPA has a responsibility to live up to its reputation as the backbone of the nation's clean air policies. The health and well-being of millions of Americans depend on the strength of this new rule.

⁴⁵ *Id.* at 117 tbls. 5.19.

⁴⁶ *Id.*

⁴⁷ *Id.*

⁴⁸ *Id.* at 104 fig. 5.13, 119 fig. 5.17.

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Appendix A: U.S. Vehicle Emissions Estimates Under Three Scenarios

We estimated CO₂ emissions through 2045 under three scenarios of zero-emission vehicle (ZEV) adoption and fuel efficiency improvements. These are three paths that the United States could take to curb passenger vehicle emissions following the expected repeal of SAFE I which would give the U.S. the opportunity to set stringent emissions standards.

Scenario 1: After 2020, fuel economy improves by 4.7% annually through 2035 following the previous Obama car standard. The United States reaches 100% ZEV sales in 2035.

Scenario 2: After 2020, fuel economy improves by 2.5% annually through 2035 as is expected if the U.S. adopts the deal previously reached between California and the automakers BMW, Ford, Honda, Volkswagen, and Volvo (CARB deal). The United States reaches 100% ZEV sales in 2035.

Scenario 3: The Obama standard of 4.7% improvement applies for 2021-2023 followed by 7% improvement from 2024 to 2030, the point at which 100% ZEV sales is reached.

ZEV Sales Trajectories

Below are two potential sales trajectories for passenger vehicles between 2020 and 2035 corresponding to the above scenarios. Table 1 shows the sales trajectories for zero-emission vehicles (ZEVs) and internal combustion engine vehicles (ICEVs) between 2020 and 2035 assuming 100% ZEV sales by 2030, with a linear increase in ZEV sales percentage between 2020 and 2030. Table 2 shows the sales trajectories assuming 100% ZEV sales by 2035, with a linear increase in ZEV sales percentage between 2020 and 2035. Based on U.S. passenger vehicle sales trends, an assumption is made that annual passenger vehicle sales are about 17 million.¹ It is also assumed that all ZEV sales are battery-electric vehicle (BEV) sales.

Year	% ZEV sales	Total ZEV sales	Total ICEV sales
2020	2 ²	340,000	16,660,000
2021	12	2,006,000	14,994,000
2022	22	3,672,000	13,328,000
2023	31	5,338,000	11,662,000
2024	41	7,004,000	9,996,000
2025	51	8,670,000	8,330,000
2026	61	10,336,000	6,664,000
2027	71	12,002,000	4,998,000
2028	80	13,668,000	3,332,000
2029	90	15,334,000	1,666,000
2030	100	17,000,000	0
2031	100	17,000,000	0
2032	100	17,000,000	0
2033	100	17,000,000	0
2034	100	17,000,000	0
2035	100	17,000,000	0

Table 1: ZEV and ICEV sales trajectories with 100% ZEV sales by 2030. It is assumed that annual passenger vehicle sales are 17 million and that there is a linear increase in percent ZEV sales between 2020 and 2030.

¹Wayland, Michael, "US auto sales fall in 2019 but still top 17 million for fifth consecutive year," CNBC (January 6, 2020), <https://www.cnbc.com/2020/01/06/us-auto-sales-down-in-2019-but-still-top-17-million.html>; Bureau of Transportation Statistics, New and Used Passenger Car and Light Truck Sales and Leases, (Accessed June 30, 2021), <https://www.bts.gov/content/new-and-used-passenger-car-sales-and-leases-thousands-vehicles>.

² Bureau of Transportation Statistics, Hybrid-Electric, Plug-in Hybrid-Electric and Electric Vehicle Sales (Accessed June 30, 2021), <https://www.bts.gov/content/gasoline-hybrid-and-electric-vehicle-sales>.

Year	% ZEV sales	Total ZEV sales	Total ICEV sales
2020	2	340,000	16,660,000
2021	9	1,495,881	15,504,119
2022	15	2,606,542	14,393,458
2023	22	3,717,203	13,282,797
2024	28	4,827,864	12,172,136
2025	35	5,938,525	11,061,475
2026	41	7,049,186	9,950,814
2027	48	8,159,847	8,840,153
2028	55	9,270,508	7,729,492
2029	61	10,381,169	6,618,831
2030	68	11,491,830	5,508,170
2031	74	12,602,491	4,397,509
2032	81	13,713,152	3,286,848
2033	87	14,823,813	2,176,187
2034	94	15,934,474	1,065,526
2035	100	17,000,000	0

Table 2: ZEV and ICEV sales trajectories with 100% ZEV sales by 2035. It is assumed that annual passenger vehicle sales are 17 million and that there is a linear increase in percent ZEV sales between 2020 and 2035.

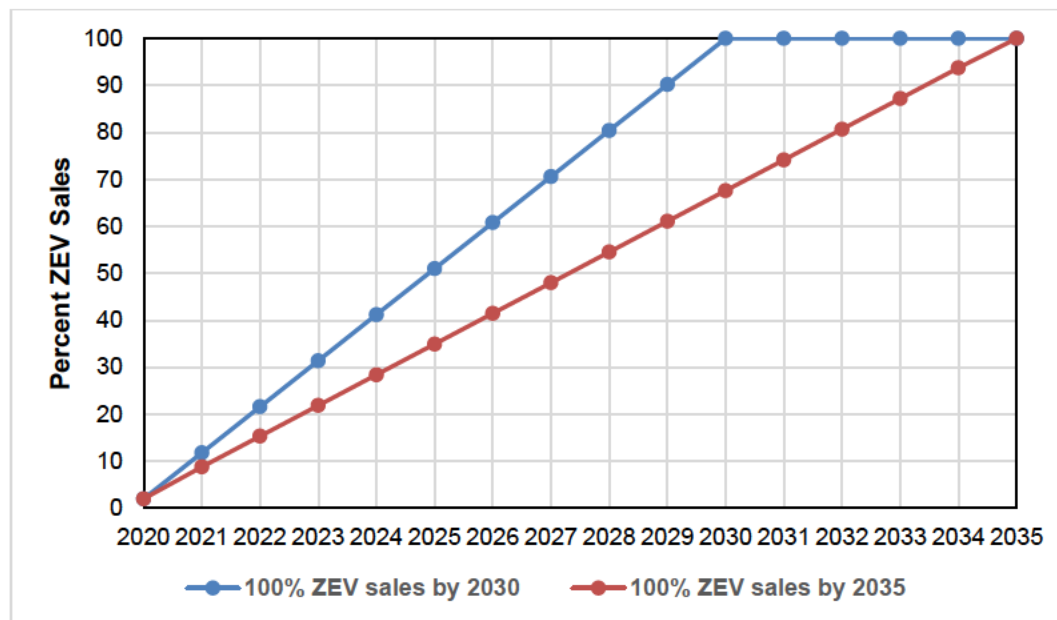


Figure 1: Sales trajectories for ZEVs under “100% ZEV sales by 2030” and “100% ZEV sales by 2035” scenarios.

Estimates of CO₂ emitted between 2020 and 2045 from all cars sold between 2020 and 2035

According to the 2020 EPA Automotive Trends Report, real-world CO₂ (tailpipe) emissions from passenger vehicles in 2020 averaged 344 g/mi, with a fuel economy of 25.7 mpg.³ This represents sedan/wagon, car SUV, truck SUV, minivan/van, and pickup categories. Taking 2020 as the base year for

³ U.S. Environmental Protection Agency, The 2020 EPA Automotive Trends Report (2021), <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockkey=P1010U68.pdf>.

estimates of improvements in fuel economy, Table 3 shows the expected emissions per mile under our three scenarios for ICEV passenger vehicles between 2020 and 2035.

Year Car Sold (MY)	Scenario 1 (g CO ₂ /mi)	Scenario 2 (g CO ₂ /mi)	Scenario 3 (g CO ₂ /mi)
2020	344	344	344
2021	328	335	328
2022	312	327	312
2023	298	319	298
2024	284	311	277
2025	270	303	258
2026	258	296	239
2027	246	288	223
2028	234	281	207
2029	223	274	193
2030	213	267	179
2031	203	260	167
2032	193	254	155
2033	184	248	144
2034	175	241	134
2035	167	235	125

Table 3: Real-world CO₂ emissions (g/mi) from passenger vehicles based on model year (MY), assuming three scenarios of increasing fuel economy. Because Scenario 3 calls for 100% ZEV sales by 2030, the fuel economy numbers from 2030 to 2035 are not relevant for Scenario 3.

Because global anthropogenic CO₂ emissions must be halved by 2030 and reach near zero around 2045 to limit warming to 1.5°C,⁴ the transportation sector will have to almost entirely decarbonize over the next 25 years. Therefore, we looked at total emissions from cars sold between 2020 and 2035 out to 2045, assuming that vehicles sold between 2020 and 2035 have a 16-year lifetime,⁵ and they emit the same amount annually from their year of sale. We estimated the emissions for the above scenarios incorporating the different ZEV sales and fuel economy trajectories.

First, we estimated the emissions from new ICEVs in their first sales year using the following equation (Table 4):

$$\text{Metric tons CO}_2 \text{ (mt)} = \# \text{ of cars} \times \text{average annual vehicle miles} \times (\text{g CO}_2/\text{mi}) \times (1 \text{ mt CO}_2/1,000,000 \text{ g})$$

Where “average annual vehicle miles” is assumed to be 11,505.⁶

⁴ Intergovernmental Panel on Climate Change, Global Warming of 1.5°C, An IPCC special report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty (2018), <https://www.ipcc.ch/sr15/>.

⁵ Keith, D.R. et al., Vehicle fleet turnover and the future of fuel economy, 14 Environ. Res. Lett. (2019).

⁶ U.S. Department of Energy, Alternative Fuels Data Center (AFDC), Average Annual Vehicle Miles Traveled by Major Vehicle Categories (Accessed July 1, 2021), <https://afdc.energy.gov/data/10309>. Average annual vehicle miles were determined as the average for the categories car and light truck/van in AFDC mileage data.

Year Car Sold (MY)	Years on Road 2020 to 2045	Scenario 1	Scenario 2	Scenario 3
2020	16	65,935,615	65,935,615	65,935,615
2021	16	58,476,997	59,826,938	56,552,977
2022	16	51,736,377	54,152,616	47,906,655
2023	16	45,500,200	48,724,619	39,948,162
2024	16	39,735,938	43,534,176	31,844,392
2025	16	34,413,006	38,572,802	24,679,404
2026	16	29,502,653	33,832,288	18,361,477
2027	16	24,977,856	29,304,692	12,807,130
2028	16	20,813,218	24,982,330	7,940,421
2029	16	16,984,879	20,857,771	3,692,296
2030	16	13,470,428	16,923,826	0
2031	15	10,248,816	13,173,542	0
2032	14	7,300,280	9,600,195	0
2033	13	4,606,266	6,197,282	0
2034	12	2,149,363	2,958,515	0
2035	11	0	0	0

Table 4: Emissions (metric tons CO₂) from ICEVs in their first sales year for Scenario 1 - Obama standard with 100% ZEV sales by 2035; Scenario 2 – CARB deal through 2035 with 100% ZEV sales by 2035; Scenario 3 – Obama standard 2021-2023 followed by 7% annual improvement with 100% ZEV sales by 2030. The number of years between 2020 and 2045 that a given model year is expected to be on the road assuming a 16-year lifetime is also included.

To determine the total emissions from cars of a model year 2020 to 2035 out to 2045, the emissions from ICEVs in their first sales year were multiplied by the number of years they are expected to be on the road between 2020 and 2045 (Table 5). Essentially, column 2 in Table 4 was multiplied by the scenario columns. For example, under Scenario 1, the emissions from MY 2020 cars were calculated to have been about 66 million metric tons in the year 2020. Multiplying this value by the vehicle lifetime of 16 years gives the total emissions from MY 2020 vehicles between 2020 and 2045, assuming that vehicles emit the same amount annually from their year of sale.

Year Car Sold (MY)	Scenario 1	Scenario 2	Scenario 3
2020	1,054,969,843	1,054,969,843	1,054,969,843
2021	935,631,946	957,231,005	904,847,635
2022	827,782,030	866,441,857	766,506,485
2023	728,003,195	779,593,897	639,170,595
2024	635,775,001	696,546,809	509,510,274
2025	550,608,097	617,164,829	394,870,463
2026	472,042,455	541,316,607	293,783,624
2027	399,645,691	468,875,068	204,914,078
2028	333,011,480	399,717,282	127,046,728
2029	271,758,068	333,724,339	59,076,729
2030	215,526,854	270,781,220	0
2031	153,732,245	197,603,137	0
2032	102,203,914	134,402,736	0
2033	59,881,454	80,564,670	0
2034	25,792,353	35,502,177	0
2035	0	0	0
Total	6,766,364,627	7,434,435,477	4,954,696,454

Table 5: Comparison of total emissions (metric tons of CO₂) out to 2045 under Scenario 1 - Obama standard with 100% ZEV sales by 2035; Scenario 2 – CARB deal through 2035 with 100% ZEV sales by 2035; Scenario 3 – Obama standard 2021-2023 followed by 7% annual improvement with 100% ZEV sales by 2030. Column 1 can be considered the model year, whereas the remaining columns show the CO₂ emissions out to 2045 from a given model year.

Under Scenario 1 with the Obama standard through 2035 and 100% ZEV sales by 2035, cars sold between 2020 and 2035 will produce 6.8 billion metric tons CO₂ by 2045. With the CARB deal through 2035 and 100% ZEV sales by 2035 (Scenario 2), emissions by 2045 are higher at 7.4 billion metric tons CO₂. So the difference between implementing the Obama standard through 2035 vs. implementing the CARB deal through 2035 is about 668 million metric tons CO₂ which is near Germany's total CO₂ emissions in 2019.⁷

Meanwhile, under a scenario with 7% annual improvement starting in 2024 and 100% sales by 2030 (Scenario 3), the emissions by 2045 would be less than 5 billion metric tons CO₂. This is almost 2.5 billion metric tons less than Scenario 2 with the CARB deal through 2035 and 100% ZEV sales by 2035. The difference is near India's total CO₂ emissions in 2019.⁸

⁷ Ritchie, H. and Roser, M., CO₂ emissions, Our World in Data (Accessed June 8, 2021), <https://ourworldindata.org/co2-emissions>.

⁸ Ritchie, H. and Roser, M., CO₂ emissions, Our World in Data (Accessed June 8, 2021), <https://ourworldindata.org/co2-emissions>.