



COMMENTS OF THE CENTER FOR CLIMATE AND ENERGY SOLUTIONS

This document constitutes the comments of the Center for Climate and Energy Solutions (C2ES) on the Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards proposed by the U.S. Environmental Protection Agency.

C2ES is an independent, nonprofit, nonpartisan organization dedicated to advancing strong policy and action to reduce greenhouse gas emissions, promote clean energy, and strengthen resilience to climate impacts. Through the *Climate Innovation 2050 Initiative*, C2ES has worked closely with more than four dozen leading companies to examine the decarbonization challenges facing the United States and develop pathways toward decarbonization, including through developing *Getting to Zero: A U.S. Climate Agenda*, a comprehensive policy agenda to decarbonize the U.S. economy by 2050.

The views expressed here are those of C2ES alone and do not necessarily reflect the views of members of the C2ES Business Environmental Leadership Council (BELC).

Executive Summary

Climate change caused by greenhouse gas emissions from the extraction and burning of fossil fuels poses a direct and intensifying threat to global ecosystems, human health, and the global economy. To avert the most catastrophic impacts of the climate crisis, the world must reach economy-wide net-zero emissions by 2050. Decarbonizing the U.S. transportation sector is an essential element required to reach net-zero goals, and the United States must make all light-duty vehicles on the roads zero-emissions by 2050.

The Environmental Protection Agency (EPA) has requested comment on its proposed Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards. In the following comments, C2ES has developed responses to the proposed standard, as well as to elements of the proposal on which EPA requested specific comment.

C2ES welcomes the proposed greenhouse gas emissions standards for passenger cars and light trucks and supports the expedient reinstatement of standards that are significantly more stringent than the SAFE rule. That said, in order to keep the nation on track to meet mid-century decarbonization goals, the standards should be at least as stringent, if not more so, than proposed in Alternative 2, and Alternative 1 should be eliminated as a feasible option. The current rate of emissions reductions is not sufficient to negate light-duty vehicle emissions in the United States by 2050 without significant acceleration of this rate of year-over-year change in subsequent standards. If EPA determines that Alternative 2 is more stringent than appropriate for model year (MY) 2023, given the relatively short lead time between the implementation of the SAFE rule and the year this proposal would go into effect, C2ES suggests that EPA consider an intermediate approach that would start at the proposed standard in MY 2023 but lower the gram per mile (g/mile) standard (i.e., increase stringency) more rapidly than in the proposed approach, in order to reach the same level of stringency in MY 2026 as under Alternative 2. Regardless of whether EPA finalizes C2ES's proposed approach, Alternative 2, or something in between, in subsequent EPA rulemakings, standards beginning in MY 2027 should follow a more accelerated rate of change to be consistent with a target of 100 percent reductions in tailpipe greenhouse gas emissions from new light-duty vehicles by 2035.

The multipliers, credit carry-forward extensions, and incentives included in the proposal allow for significant flexibility in the means of meeting the standards. C2ES believes the advanced technology multipliers should be reinstated as proposed and supports the elimination of the multiplier for natural gas vehicles. However, given that (as EPA acknowledges in the proposed rule) the multipliers have the effect of allowing for slightly higher emissions in the near term, it is vital that they be implemented in a way that maximizes the acceleration of new zero-emission technology while minimizing the potential short-term increase in emissions. Multipliers should also be based on demonstrated data that they serve as incentives to spur the production of zero-emission vehicles without relaxing the overall emissions reductions produced by the standards.

Along the same lines, C2ES supports the reinstatement of the pickup strong hybrid/20 percent better performance credit on the condition that EPA demonstrates they are likely to appreciably accelerate the development of zero-emission vehicles.

Finally, with regards to the proposed input changes, C2ES supports the replacement of the domestic values for the social cost of greenhouse gases with global values. However, the interim values and discount rates used in the proposal are insufficient to capture the expected damages of climate change and should be

adjusted to take into account the significant marginal costs of future emissions as the world approaches critical climate thresholds.

Context for Comment

To avert increasingly severe impacts from climate change, the United States must reach economy-wide net-zero emissions by 2050.

Presently, transportation is the largest-emitting sector, accounting for 29 percent of U.S. greenhouse gas emissions; of that, light-duty vehicles are responsible for 58 percent of U.S. transportation emissions.¹ To meet mid-century decarbonization goals, all on-road light-duty vehicles must be zero-emitting by 2050.² Correspondingly, to reflect average lifespans and stock turnover, all new light-duty vehicle sales must be zero emission around 2035.

This target is consistent with goals already put into place by several states and companies in the private sector. In September 2020, California Governor Gavin Newsom issued an executive order requiring the end of new internal combustion engine sales by 2035, which other states including Massachusetts may follow if EPA reinstates its Advanced Clean Car waiver.³ In the private sector, General Motors announced a goal in January 2021 to be carbon neutral by 2040 including the elimination of tailpipe emissions from new light-duty vehicles by 2035, and Honda, Volvo, and Mercedes-Benz have similar goals to go all-electric in the next two decades.⁴ Other companies, including Ford, Stellantis, Toyota, and Volkswagen, expect low- or zero-emission vehicles to make up at least 40 percent of light-duty sales by 2030.⁵ The market is moving toward zero-emissions transportation. Greenhouse gas emissions regulations should reflect the real-world market and capitalize on the opportunity to provide regulatory certainty to accelerate this trend toward cleaner vehicles, with significant positive implications for the climate crisis, economic productivity, and public health.

Zero-emission vehicles represent a powerful economic opportunity for both U.S. manufacturers and vehicle owners and operators. Although average upfront vehicle costs currently remain higher for zero-emission vehicles than their combustion-engine counterparts, recent analysis projects up-front costs of electric vehicles to reach parity with internal combustion engine vehicles as early as 2025.⁶ Even with higher up-front costs, maintenance costs of zero-emission vehicles are up to 40 percent lower on a per-mile basis, and lifetime charging costs can save electric vehicle drivers between \$3,078 and \$10,445 over 15 years.⁷ For manufacturers, the global electric vehicle market represented about \$120 billion in 2020 and demand is projected to grow as much as 30 percent per year through 2030.⁸ As countries including the UK and China continue to expand commitments to phase out internal combustion engine vehicles, economic opportunities to supply zero-emission vehicles globally will grow accordingly.

From a public health perspective, reduced vehicle emissions will contribute significantly to reducing urban smog and supporting healthier communities. In addition to the contribution of greenhouse gas emissions to global climate change, particulate pollution, ground-level ozone, and nitrous oxides are linked to asthma, heart disease, and premature death. Avoiding these health impacts will save the American economy billions in healthcare and lost productivity costs and will improve quality of life for many Americans.⁹

C2ES recognizes that regulations and performance standards are not implemented in a vacuum; large-scale proliferation of electric vehicles in the U.S. market will require significant investment at the federal, state, and

local policy levels, as well as strong ambition from the private sector, and will rely heavily on increased demand by American drivers for low- and zero-emission vehicles. Policies like electric vehicle tax credits, point-of-sale rebates for new and used vehicles, and other purchase incentives are crucial. Additionally, federal funding for charging infrastructure is necessary to ensure all drivers will have access to charging equipment, helping to grow consumer confidence in electric vehicles.¹⁰ Hydrogen fuel cell electric vehicles and other zero-emissions technologies represent a powerful, if nascent, opportunity to expand options for decarbonizing transportation, particularly in medium- and heavy-duty applications. Federal policy support for zero-emission vehicles should also include investments in research, development, demonstration, and deployment to accelerate these technologies.

The greatest barrier to purchasing an electric vehicle for many households is the up-front cost of the vehicle; although lifetime operating and maintenance costs of electric vehicles are significantly lower than those of internal combustion engine vehicles, purchase prices for both new and used models currently remain significantly higher. Performance standards and policies should support rapid cost reductions and access to more affordable vehicles. In addition to up-front costs, many households cite lack of access to charging infrastructure as a barrier.¹¹ These households are overwhelmingly residents of lower-income communities or communities of color, and often historically marginalized communities who have disproportionately borne the largest costs of climate change and pollution, while contributing the least to global emissions.¹² An equitable and just climate future should prioritize increased access to cleaner, quieter, safer, and lower-emitting vehicles for these communities.

Comments Specific to EPA Requests

Proposed Standards and Alternatives

C2ES believes that the proposed standards, along with Alternative 2, represent a return to the approximate level of ambition displayed by the 2012 Final Rule and will drive emissions reductions from the light-duty vehicle fleet; however, alone they are not sufficient to put the United States on a path to net-zero by 2050. C2ES recommends that EPA adopt the standards presented in Alternative 2, or if EPA determines these are more stringent than technologically feasible for automakers to meet in MY 2023 given the relatively short lead time, an intermediate approach that would start at the proposed standard in MY 2023 but reach the same stringency in MY 2026 as in Alternative 2. Any future rulemaking, particularly beginning in MY 2027, should adjust the trajectory of increased ambition to coincide with this goal: reaching zero or near-zero average fleet-wide emissions no later than 2035.

The extensions of credit carry-forward included in this proposal provide significant flexibility for automakers and reduce the effective stringency of the standards. While C2ES supports compliance flexibilities for the private sector and incentives to accelerate the deployment of zero-emissions technologies, these should not come at the cost of necessary reductions in emissions. EPA should set the emissions standards at a stringent enough level to preserve ambition while still allowing this flexibility. Lowering the MY 2026 fleet average target levels five to 10 g/mile below the current level proposed would support increased ambition and prepare the auto industry for more ambitious targets beginning in MY 2027, while preparing the national fleet to meet the decarbonization challenge ahead.

Regarding feasibility of the standards for automakers, given the extended timeline over the initial 2012 final rule, automakers should be able to meet the annual performance targets with the proposed flexibilities, although some may need to rely more heavily on market credits than others. Additionally, the commitment of five major automakers to sign onto the California Clean Cars Framework Agreement with similarly ambitious targets to EPA's proposed rule demonstrates the willingness and ability of automakers to comply with the standards.

Many automakers have made voluntary commitments to electrifying 40 percent or more of their fleets by 2030 or 2035, including General Motors, Ford Motor Co., Stellantis N.V., Mercedes-Benz, and Volvo. Toyota projects 80 percent of its cars sold in 2030 to be battery, fuel cell, or hybrid electric. Adding to their ambitious targets, these companies have announced financial commitments of more than \$150 billion in electric and autonomous vehicle development through 2030, even before the application of regulatory pressure of more stringent emissions standards.¹³

In the near-decade since the release of the 2012 Final Rule, electrification technologies have improved significantly. Between 2010 and 2020, average lithium-ion battery pack prices fell 89 percent.¹⁴ At the same time, average battery electric vehicle ranges increased significantly, with the median range of all-electric vehicles reaching 250 miles for MY 2020, according to the U.S. Department of Energy.¹⁵ Longer ranges help to eliminate range anxiety among drivers, improving consumer appetite for zero-emission vehicles.

At the state level, there is growing momentum to accelerate the transition to zero-emission vehicles, both through regulatory or legislative actions and incentive structures. Many states have enacted policies providing additional purchase incentives for electric vehicles and funding the expansion of charging infrastructure. Recently, Connecticut, New York, Oregon, and Vermont instituted consumer incentives, including rebates for the purchase of hydrogen and/or plug-in electric vehicles, which augment existing federal incentives.¹⁶ In 2021 alone, states including Louisiana, Maryland, Indiana, and North Carolina announced millions of dollars in grants to local utilities and municipalities to install charging stations, many emphasizing expanding access for rural or low income communities.¹⁷ To date, fifteen states have adopted California's Clean Car standards, setting requirements for automakers to offer increasing shares of low- and zero-emission vehicles for sale. In setting emissions standards, EPA should take into account state-level ambition and align federal stringency to provide a more consistent level of ambition across the nation.

Utilities have also made significant commitments to expanding charging. For example, the Electric Highway Coalition, a collaboration between fourteen utilities across 29 states and the District of Columbia, aims to ensure efficient and effective fast charging deployment plans and to create a charging corridor with a network of DC fast chargers no more than 100 miles apart to facilitate long-distance electric travel.¹⁸

Safe, reliable technologies exist to electrify a significant portion of the global passenger fleet by 2035, and there is significant momentum behind the nationwide deployment of charging infrastructure. EPA's performance standards should build upon the stated ambitions of the private sector, holding automakers accountable through the regulatory process to their electrification goals and efficiency improvement commitments—particularly when many of them align with long-term decarbonization.

Advanced Technology Multipliers

C2ES supports the proposed reintroduction of advanced technology multipliers and the proposed multiplier cap and recommends extending the multiplier through MY 2026 to continue incentivizing automakers to scale up their share of zero emission vehicles. Prior to EPA’s proposal of the new standards, electric vehicles were projected to reach 10 percent of new sales by 2025 due to broader product offerings.¹⁹ Given major automakers’ electrification commitments and goals, and in conjunction with the proposed standards, this share is likely to be much higher. At this higher level of market penetration, the multiplier could then be phased out after MY 2026.

The proposed reinstatement of the advanced technology multiplier for battery electric, fuel-cell electric, and plug-in hybrid electric vehicles represents a market signal and strong incentive to support the continued development and scaling up of zero emission vehicle technologies. It encourages automakers to meet the fleet average performance standards through expanded offerings of zero emission vehicles, rather than through incremental adjustments to gasoline engine technology performance. While electric vehicle technologies have existed for decades, modern electric vehicles are a still-emerging industry. As price remains a significant barrier to access for many households, incentivizing further expansion of low- and zero-emissions technologies to bring down costs and improve access should be an essential goal of any transportation emissions reduction program. Additionally, ensuring that automakers are incentivized to bring more zero-emission vehicles to market is essential to meeting mid-century goals.

While plug-in hybrid electric vehicles are still responsible for tailpipe emissions when using the gasoline propulsion system, a recent study from the International Council on Clean Transportation found that, on average, plug-in hybrids are driven on battery alone for approximately 54 percent of their total miles traveled.²⁰ This corresponds to the proposed initial multiplier of 1.6 for plug-in hybrid technologies, in comparison to the proposed multiplier of 2.0 for battery and fuel-cell electric vehicles.

Natural Gas Vehicle Multipliers

C2ES supports EPA’s proposed approach to eliminate the multiplier for natural gas vehicles altogether for MYs 2023–26. While they produce fewer emissions than conventional gas and diesel vehicles, natural gas vehicles are not zero-emission vehicles. Incentives under the greenhouse gas emissions reduction program should support decarbonization, rather than fuel switching to another fossil fuel. Additionally, the 2020 EPA Automotive Trends report found no light-duty compressed natural gas vehicles available for sale from vehicle manufacturers.²¹ In light-duty applications, this technology is not applied at a significant enough volume to benefit from an additional incentive, including a multiplier.

Full-size Pickup Performance Incentives

C2ES supports the reinstatement of the previously existing full-size pickup strong hybrid/20 percent better performance incentives on the condition that EPA demonstrates significant emissions reductions facilitated by this incentive. However, EPA should ensure that automakers are not allowed to apply both incentives, as this double counting would significantly loosen the effective stringency of the proposed standards. With pickups representing a large—and growing—segment of the national light-duty market, but emitting much

higher amounts of greenhouse gases on a per-mile basis than other light-duty vehicles, it is necessary for EPA's incentives to support the rapid reduction in greenhouse gas emissions from pickups, both through improved efficiency among conventional models and increased deployment of zero-emission models.²²

Currently, while some zero-emission pickup options are entering the market, many more electric SUV and sedan models are available, providing consumers interested in those models with more choice. In the near future, high-emitting pickups will likely represent a continuously increasing share of combustion engine vehicles as drivers of sedans and SUVs increasingly switch to zero-emission vehicles while fewer offerings of zero-emission pickups remain.

Preliminary data do not suggest that the pickup incentives under the 2012 Final Rule were highly successful in reducing emissions from pickups. Where we would expect to see an accelerated rate of improvement in the emissions of pickups from MY 2017–19, when the 2012 Final Rule was in effect with the incentive, real-world fleet average emissions from pickups only decreased 3 g/mile (from 470 to 467 g/mile) in this timeframe, according to EPA data.²³ If strong hybrid incentives will not produce demonstrable emissions reductions among these remaining pickups, they should be eliminated in favor of advanced technology multipliers that directly incentivize the development battery electric, fuel-cell electric, and plug-in hybrid electric pickup models.

Off-Cycle Menu Credits

C2ES supports the proposed off-cycle menu credits and the proposed 15 g/mile cap and believes the increased cap should begin in MY 2023 when the new standards would be implemented, in order to reflect the significant increase in stringency of the MY 2023 emissions standards over the MY 2022 standards. The off-cycle menu credits in the proposal support development of technologies to reduce emissions that may not be measured in the regular two-cycle emissions testing process, such as high-efficiency alternators, waste heat recovery, solar roof panels, and others. The flexibility to generate credits through these technology improvements provides an additional incentive for automakers to increase the efficiency of their vehicles.

Base Year Fleet

EPA should use the MY 2019 data as a baseline rather than the MY 2017 base year fleet used in the proposal to ensure the standards accurately reflect the higher levels of zero-emission vehicle proliferation in the current light-duty market. Data from MY 2019 is available and reflects the implementation of the standards set in the 2012 Final Rule prior to the implementation of the SAFE rule. In particular, the increased market proliferation of electric vehicles as well as the improvements in costs of zero-emission vehicles should be considered. From 2017 to 2019, plug-in electric vehicle sales increased 67 percent in the United States, as more models became available and costs fell. Despite a small decrease in overall sales from 2018 to 2019, due largely to the discontinuation of a popular model, increased model choice is clearly linked with significant year-over-year growth in sales, and given automaker commitments to greatly expand the number of zero-emission model offerings through 2025, this more recent data indicates a strong upward trend in the U.S. electric vehicle market.²⁴

Input Changes – Global Social Cost of Carbon

C2ES supports the replacement of domestic values of the social cost of greenhouse gases with global values in the proposal but believes these values should be adjusted to more sufficiently capture the harms of marginal emissions now and in the future.

The social cost of carbon translates the future harm inflicted by the release of one additional ton of carbon dioxide into a present monetary value. The proposed rule uses the interim global estimates of the social cost of carbon published by the interagency working group (IWG) in February 2021. These values represent a significant improvement over the values EPA used in the analysis of the 2020 SAFE rule following the disbanding of the IWG, which considered only domestic climate-related damages and used a discount rate of 3 to 7 percent. The proposed rule considers global climate-related damages and uses average discount rates of 2.5 percent, 3 percent, and 5 percent, as well as the 95th-percentile of the 3 percent discount rate.

However, as EPA notes in the Draft Regulatory Impact Analysis (DRIA), these estimates are insufficient to capture the expected damages of climate change, particularly as the world approaches critical climate thresholds and each additional ton of greenhouse gases emitted represents significantly greater threats to the global climate. As the world warms, the value of avoiding future emissions becomes ever more important relative to avoiding present-day emissions and puts downward pressure on the discount rate. A discount rate of 2 percent or lower, based on the most up-to-date scientific and economic evidence, should be employed to reflect this.²⁵

EPA recognizes the shortfalls of these interim values in the DRIA, including highlighting that a discount rate of 2 percent or lower would be more appropriate. However, as EPA plans to maintain the interim social cost of greenhouse gas emissions in its analysis and lists no plans to update the values once official ones are released by the IWG, the costs and benefits used to inform EPA's analysis of the proposal will significantly underestimate the actual marginal damages of greenhouse gas emissions.

The Intergovernmental Panel on Climate Change's (IPCC) Sixth Assessment Report highlights the extreme value of each marginal unit of warming avoided.²⁶ It demonstrates that even if the global aspirational target of 1.5 degrees C of warming is exceeded, the relative severity of impacts of warming between 1.5 and 2.0 degrees C is significantly lower than that of the impacts of warming between 2 and 3 degrees C, and so on. The values used to determine the marginal cost of each ton of emissions should correspond to these marginal dangers of increased warming.

EPA and the IWG should adjust the values used for the social cost of greenhouse gases and lower the discount rates used in the analysis of this proposal to better reflect the increasing urgency of the climate crisis, and to more accurately capture the most recent scientific and economic evidence to analyze the damages of its present and future compounding impacts as emissions increase.

Statement of Nathaniel Keohane, President, Center for Climate and Energy Solutions

<https://www.c2es.org/press-release/nat-keohane-on-proposed-vehicle-standards-and-ev-targets/>

“Dramatically reducing climate pollution from transportation, and ultimately moving to a zero-emissions fleet, are vital steps to achieving our climate goals and maintaining America’s global competitiveness. The administration’s draft proposed car standards are an important step in the right direction. They demonstrate that President Biden, the EPA, and NHTSA recognize the importance of eliminating harmful transportation pollution, and point the way toward the increased ambition we will need through the end of the decade.

“Our success in cutting vehicle emissions and building an American clean energy economy will depend not only on the standards we set, but also on the investments we make. The 50 percent EV sales target reflects the direction that leading automakers are already going, with many committing to making 100 percent of new car sales electric by 2035. Congress must play its part and enact the policies needed to support those efforts, including rapid expansion of EV charging infrastructure, credits for EV sales, and offering rebates for consumers purchasing them.”

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