Comments of the American Council for an Energy-Efficient Economy (ACEEE) on EPA's Notice of Proposed Rulemaking to "Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model Year 2026"
(Docket No. EPA-HQ-OAR-2021-0208)
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The American Council for an Energy Efficient Economy (ACEEE) is an independent non-profit organization dedicated to advancing energy efficiency policies, programs, technologies, investments, and behaviors. ACEEE aims to build a vibrant and equitable economy, one that uses energy more productively, reduces costs, protects the environment, and promotes public health and safety.

We offer the comments below on the Notice of Proposed Rulemaking (NPRM) to "Revise Existing National GHG Emissions Standards for Passenger Cars and Light Trucks Through Model Year 2026". Topics covered here include the need for a strong rule, the weakness of the proposed rule, clarifications that are needed, how a stronger rule is achievable, and our recommendations for the final rule. If EPA has any questions, please do not hesitate to contact Peter Huether at phuether@aceee.org or Avi Mersky at amersky@aceee.org

I. The US needs strong vehicle standards

The United States will need to greatly reduce light-duty vehicle greenhouse gas emissions if it is to have any chance of meeting the Biden Administration's emissions reduction goal of 50% by 2030 and to stave off the worst impacts of climate change. The central aim of Title II of the Clean Air Act, which establishes the authority and obligation for the Environmental Protection Agency (EPA) to set vehicle standards, is "the protection of public health and welfare." After a summer of severe forest fires and flooding, the EPA cannot miss an opportunity to make significant progress on emission reductions from the 2023 to 2026 vehicle model years (MY). These standards must also set the foundation for further efficiency gains and electrification beyond model year 2026 and ambitious targets will help to meet President Biden's 2030 goal of 50% zero emission new vehicles sales (White House 2021). The stringency and structure of these standards will have lasting impacts and it is crucial that

EPA gets them right. Electric vehicles (EVs) are widely recognized as the future of the automotive industry and post-2026 standards should be consistent with this future (NAS 2021a).

Transportation is now the largest source of greenhouse gas emissions in the United States and the light-duty sector makes up 58% of those emissions (EPA 2020b). Reducing carbon emissions is critical to tackling climate change but increasing light-duty vehicle efficiency will also have significant benefits to air quality and reduce driver fueling costs. Vehicles are a significant contributor to local air pollution and the associated health impacts, such as increased rates of asthma, increased risk of heart attacks or strokes, and lung cancer (Doyle 2021). These impacts are particularly bad in low-income communities and communities of color, which bear a disproportionate air pollution burden (American Lung Association 2020). Greater efficiency can also provide significant cost savings for drivers when they refuel their vehicles. Low-income households are especially burdened by fueling costs, paying three times more than their higher-income counterparts on gasoline, as a percent of their total income (Vaidyanathan, Huether, and Jennings 2021).

II. EPA's proposal is weak

The proposed targets for MY 2023-2026 fall far short of what is needed to make significant progress on addressing GHG emissions from light-duty vehicles. EPA has chosen to move forward with standards that do not maximize the social and environmental net present benefit (NPB) and fails to justify its reasoning for this decision. Of the various scenarios considered by EPA in the NPRM, Alternative 2 is shown to have the highest NPB.

The weakness of the proposal is further supported by EPA's own analysis that shows that the proposed rule will only lead to an EV market share of 8% by MY 2026, far short of what is needed by then to make progress towards the White House's goal of a of 50% new EV sales by calendar year 2030 (White House 2021). ACEEE discusses key areas of concern in additional detail below.

EFFECTS OF DISCRETIONARY PROPOSED PROVISIONS

EPA has included many provisions that would change the effective stringency of the proposed rule. While some of these changes are improvements over the SAFE rule, many of the proposed credit provisions would have the effect of weakening the standards for model years 2023-2026.

Off-cycle credit provisions

a) Menu cap changes

EPA proposes to increase the credit cap for uses of off-cycle menu credits from 10 g/mi to 15 g/mi. They justify this increase with, among other reasons, proposed definition changes to two menu credit technologies to emphasize that certain implementations that have previously been awarded menu credits will no longer be considered eligible (EPA 2021b). EPA claims the current definitions are too vague and allow for underperforming technologies to earn full menu credits. We support EPA in this decision. EPA should continue to scrutinize menu credits to ensure that definitions only allow for technologies that have been researched and tested and not others that may be superficially similar.

That said, EPA has also proposed that the 5 g/mi increase in credit cap be applied retroactively to MY 2020-2022 vehicles, if all claimed credits fall under the new technology definitions. This proposal fails to account for the fact that these vehicles have already been designed, with the current rules in mind, and no new menu technologies are going to be added to such vehicles. This proposal would not lead to any reductions in actual emissions. Instead, it would effectively reduce the stringency of the proposed rule by giving automakers credits for decisions that they have already made and implemented. ACEEE opposes this retroactive increase in the credit cap. ACEEE estimates that if automakers were to take advantage of the entire 5 g/mi retroactive cap increase, emission savings from the proposed standards would be reduced by 19%.

The credit cap increase is also concerning as applied to future model years, as the off-cycle credit system already over awards credits. Any increase in the cap would exacerbate this element of the off-cycle program and further weaken the rule stringency. Research has shown that some technologies area awarded up to 100% more credits than appropriate, equaling up to 3 g/mi of credits per technology (Gonder et al. 2016; Kreutzer et al. 2017). Another concern is that technologies that qualify for menu credits have not been evaluated for redundancies or overlaps in benefits (Lutsey and Isenstadt 2018). A vehicle that has more than one of these technologies addressing the same inefficiencies may not achieve the sum of the benefits of the individual technologies. A vehicle that adopts both solar panels and ventilation improvements may see no additional improvement over solar panels alone, if the extra power from the solar panels was already sufficient to cover and used for the ventilation system. However, because the credits in the off-cycle program are simply additive, this could

lead to the awarding of up to 2 g/mi[1] in additional credits that do not correspond to reductions in actual emissions. EPA should not increase the cap on menu credits until after it has reviewed the literature on the effects of the current menu credits and has tested these technologies for synergistic effects and ensured that any overlaps are sufficiently accounted for. ACEEE estimates that, if only half of the additional off-cycle credits, or 2.5 g/mi per year, for model years 2023-2026 led to real emissions reductions, the proposed rule's emissions savings would be reduced by 14%.

b) Off-cycle credits and automated vehicles

The NPRM does not propose any changes in the off-cycle credit program in anticipation of emerging technologies. These emerging technologies including automated vehicle (AV) technologies, have the potential to substantially affect vehicle emissions but are not detectable under current emissions testing protocols. The current off-cycle credit program is unable to adequately account for the changes in emissions that this technology causes. The growth of the AV market has been rapid. In 2021 Level 1 automated vehicles reached a market share of 26% of all new vehicles, while Level 2 AVs grew from just 2%, in 2018, of the market to over 10%, in 2019 (Xie et al. 2020; NAS 2021; Low et al. 2019). The effect of these technologies is both highly uncertain and dependent on design decisions that are being made now. These design decisions are directly influenced by emission regulations and the current off-cycle program provides no incentive for automakers to design their AVs for fuel efficiency. Mersky 2021 has shown that near term AV technologies could increase fuel economy by up to 46% but could also decrease it by up to 14%, depending on automaker design decisions. ACEEE suggests that EPA investigate the how the off-cycle program can account for AV emission changes and to encourage efficient AV design.

[1] A solar system that charges batteries and provides power to active ventilation provides 0.8 g/mi credits less than battery charging alone, to attempt to account for this, but this change is non-variable. The ventilation credits are still worth up to 2.8 g/mi, which would be unearned if the solar system was sufficient to cover all ventilation and climate control needs.

ADVANCED TECHNOLOGY MULTIPLIERS

a) PLUG-IN HYBRID AND BATTERY ELECTRIC VEHICLES (PHEV AND BEVS)

The current regulations allow for a multiplier[2] to be applied for BEVs and PHEVs through MY 2021. EPA proposes to extend these multipliers through MY 2025, albeit with a cap of 2.5 g/mi per fleet year. Automakers can additionally take advantage of up to 10g/mi per fleet year, so long as the sum of the credit for MYs 2023-2026 is not greater than 10 g/mi. This incentive awards credits for EVs in excess of actual emission reductions, with the result that each EV sold serves to reduce the emissions benefit of the standards. Keeping these provisions in the final rule would reduce the actual stringency of the rule by almost 3 g/mi annually for the four years it would be extended if manufactures take full advantage of the multipliers.

EPA initially adopted multipliers to encourage the development and deployment of EV technology. Circumstances have changed since then; almost every major automaker has announced plans to have a full range of EV options, produced at scale, in the next decade. Many of these automakers have committed to moving to a fully electric vehicle line-up and phasing out conventional vehicles. EV technology is clearly no longer in its infancy and extending the life of the EV multiplier will only serve to increase total emissions. EPA, in this NPRM, even admits that this incentive has only improved EV sales by approximately 0.5% a small benefit that is clearly not worth the increase in emissions (EPA 2021b)[3].

Research has even shown that providing generous EVs credits can actually depress the market for EVs (Gillingham 2021). This is because the increased pool of accumulated credits, earned from the production of a small number of vehicles, lessens the need to produce more efficient vehicles to meet assigned targets. This can be seen in a simple mathematical example where an automaker plans to produce four vehicles and needs to meet a goal of 125 g/mi. If their EVs are treated as having zero emissions and the automaker's conventional vehicles have emissions of 200 g/mi, then they need to make two EVs to be in compliance without the presence multipliers. If EVs are given a multiplier of two, as is currently

[2] This multiplier allows an electric vehicle to be counted as multiple vehicles for fleetwide average emission calculations and credit purposes. A multiplier of 2 allows one ZEV to be counted as 2 vehicles.

[3] Page 110 of the NPRM "We have also analyzed the impact of the advanced technology multipliers on BEV and PHEV penetration rates and have found that the impact on the fleet is less than 0.5 percent in any MY 2023 through 2026 (see RIA Chapter 4.1.3)"

proposed, then the automaker only needs to make one EV to sell three conventional vehicles. While the real automotive market is more complex, the reality remains that treating advanced efficiency technologies, like EVs, as more than one vehicle artificially reduces the manufacturer's average emissions rate and allows the manufacturer to comply with the standard with fewer efficient vehicles. For these reasons, ACEEE strongly opposes the extension of the EV and PHEV multiplier credits.

b) Lack of upstream accounting

EPA proposes to continue treating electric vehicles as entirely zero emission vehicles (ZEVs). While it is true that EVs generate no emissions at the tailpipe, charging these vehicles does create emissions upstream. Treating electric, and other similar zero-tailpipe emission vehicles, as true ZEVs leads to a situation where the creation and sale of these vehicles actually increases fleetwide emissions (Jenn, Azevedo, and Michalek 2016; A. C. Mersky and Samaras 2020). This is because ZEVs are credited with emissions reductions in excess of their real reductions, which allows for a higher number of high-emitting vehicle sales. Additionally, as noted above, over-awarding emissions credits to EVs can depress EV sales (Gillingham 2021).

Another major flaw with ignoring refueling emissions is that EPA loses the opportunity to influence the efficiency of a growing component of the vehicle market. EPA is both empowered and required to regulate the emissions from on-road light duty vehicles. If 50% of all new vehicle sales are EVs by 2030, EPA cannot fulfill its obligations while ignoring the upstream emissions of these vehicles, which are directly tied to how effectively EVs convert kilowatt hours into miles traveled. While the White House also plans to significantly reduce emissions from the power sector in the long-run, emissions from electricity generation are expected to still exist into the next decade. This makes the emissions of EVs sold under the current rules significant, even in the face of other regulations in the power sector.

Additionally, ignoring upstream emissions may have the counterproductive effect of encouraging sales of larger vehicles. If all EVs are treated as having zero emissions then automakers are encouraged to focus efforts on those vehicles with the highest emission limits, in order to generate the most credits and reduce compliance costs for the rest of the fleet. This leads to an increase in total energy consumption and emissions, as well as increased wear and tear on our roads and congestion, compared to a scenario where upstream emissions are accounted for, and automakers have no incentive to increase EV footprint.

ACEEE research shows that accounting for upstream emissions for ZEVs, based on an average national grid over the life of the vehicle, would increase the annual effective

stringency of the proposed standards by 1-3 g/mi and lead to an additional emissions savings of 9% for the MY 2023-2026 standards. Given the significant reduction in rule stringency that this zero-upstream emissions accounting causes ACEEE believes that it is necessary to revert to counting those emissions, as provided for in the MY 2017-2025 standards.

c) Full-sized pick-up incentives

EPA proposes to extend the Advanced Technology Incentives for Full-size Pickups introduced in the 2012 standards. This is another instance of awarding credits in excess of actual emission reductions, which reduces the stringency of the standards. This specific incentive is also problematic because it could encourage production of full-sized pickup trucks at the expense of smaller vehicles. It also provides a loophole to the 2.5g/mi EV multiplier credit limit, by creating an alternative pathway for EV pickup trucks to earn unwarranted credits after the fleetwide EV multiplier limit has been reached. ACEEE estimates that this provision alone could reduce stringency by up to 2 g/mi by MY 2025 and reduce emissions savings by up to 1% for the entire period of the proposed rule.

Credit lifetime extension

Currently any credits that automakers earn for overcompliance with a given model year's emission standards may be banked for up to 5 years. This limited lifetime is essential to ensure that any early miscalibration in emission standards does not propagate too far into the future. Credits that don't expire would effectively tie EPA's hands in setting future standards, as the agency would have to design standards that are both feasible for new entrants but also strong enough to force those automakers with extensive banked credits to make real improvements in emissions.

EPA proposes to retroactively extend the lifetime of MY 2016 credits to 7 years and MY 17-20 credits to 6 years (EPA 2021b)[4]. ACEEE strongly opposes this retroactive extension of credit lifetimes. Not only have automakers have already designed and sold these vehicles under the expectation of a 5-year credit lifetime, they additionally lobbied for a decrease in the 2012-rule stringency under the prior administration. Automakers should not be further rewarded with additional credit extensions.

[4] Page 31 of the NPRM

Automakers generated credits worth 20.5 million metric tons (MMT) of CO2in MY 2016. The extension of MY 2016 credits is particularly significant as those credits are set to expire in MY 2021, along with over 100 million earned early action credits from MYs 2009-2011 (EPA 2020a; 2021a). The existing pool of early action credits is more than sufficient to cover compliance for MY 2021 and this extension, therefore, allows all the MY 2016 credits to be carried forward to MY 2023, rather than expiring unused. The adjustment to the MY 2022 standards as part of the SAFE rule adopted in 2020, after MY 2022 vehicles had already been designed, also makes it unlikely that any of these credits will be needed for compliance before MY 2023. The reduction in stringency for MY 2021, under the same conditions, will also provide a large number of credits to use for MY 2022. If all these credits were applied to MY 2023, these credits would reduce the stringency of the proposed 2023 standard by over 6 g/mi per vehicle[5].

The proposed lifetime extensions for MY 2017-2020 credits would also substantially weaken the proposed standards. Extending the lifetime of the 21.8 MMT of credits generated in MY 2017 would allow up to a 7 g/mi increase in average emissions rate in MY 2023, beyond the increase due to the 2016 credit extension. Together, the 2016 and 2017 credits would allow a reduction in improvement in MY 2023 from 10% to just 4%[6].

The MY 2018-2020 credit extensions would allow up to a 10 g/mi increase in emissions in MYs 2024 and 7 g/mi in MYs 2025-2026[7]. This is summarized in Table 1.

Table 1: Summary of Effects from Proposed Credit Banking Extension (g/mi)

	MY 2022[8]	MY 2023	MY 2024	MY 2025	MY 2026
Proposed Target Fleet Standard	220	199	189	180	171
Extended Credits per Vehicle Used	N/A	12.9	10.3	6.7	6.7[9]
Effective Fleet Requirement	N/A	212	199	187	178

Source: EIA 2020; EPA 2020a; 2021a

[5] Assuming AEO2020 baseline light-duty car and truck sale forecasts

[6] Idem

[7] Idem. Assuming MY 2020's earned credits are similar to MY 2019's

[8] MY 2022 emission target is unchanged from SAFE rule. All credits extended into MY 2022 are also extended to MY 2023 and credit usage and changes in achieved fleet emissions are assumed to take place then.

[9] Idem

This scenario is made even more likely by the increase in MYs 2021 and 2022 credits earned due to the SAFE rule. The weak standards for MYs 2021 and 2022 should lead to an increased credit balance in those years, given that vehicles for those model years were designed prior to the adoption of the SAFE rule. These additional credits could be used for MYs 2023-2026/2027 or saved until MYs 2026 and 2027. As a result, EPA is enabling automakers to save the credits earned during the SAFE rule, instead of spending them in the early years of compliance with the proposed rule, furthering the damage associated with the SAFE rule. Overall, ACEEE found that the credit extensions would reduce the emissions savings from the proposed rule by 22%.

Natural gas vehicle incentives

EPA proposes removing the 0.15 multiplier for natural gas vehicles. ACEEE agrees supports this move. This multiplier does not accurately reflect the emissions of such vehicles. EPA should continue to focus on encouraging the adoption of light-duty zero emission technology, while reducing emissions from petroleum- fueled vehicles.

Understanding the impacts of the proposed incentives on stringency and emissions

Tables 2 and 3 highlight the estimated impacts of the above incentive proposals on the effective stringency of the rule. Year-by year-changes are presented in table 2. The individual impacts of the incentives and the change in the level of emissions savings compared to the proposed rule are presented in table 3.

Table 2: Annual Stringency Impact from Incentives (g/mi)

	MY 2022	MY 2023[10]	MY 2024	MY 2025	MY 2026
Proposed Target Effective Fleet Standard, No Incentives[11]	227	202	193	183	175

[10] Retroactive off-cycle credits applied in MY 2020, MY 2021, and MY 2022, equivalent to 5 g/mi are carried forward to and applied in MY 2023.

[11] Our annual stringency figures for the proposed rule are different than those of EPA due to differing assumptions we make regarding footprint and the split between cars and light trucks. We project a larger share of light-duty vehicles will be light trucks than the 50-50 split used in the NPRM and therefore our modelling of the proposed standard is less stringent. These annual stringency figures also differ from those in Table 1 where we use EPA's stringency figures.

	MY 2022	MY 2023[10]	MY 2024	MY 2025	MY 2026
Proposed Target Effective Fleet Standard, All Incentives	229	235	208	195	184
Difference	2.2	32.6	15.0	11.4	9.2

Table 3: Summary of Effects from Proposed Incentives

	Annual decrease in stringency (g/mi)[12]	Percent reduction in emissions savings[13]	Percent of savings from MY 2017-2025 rule[14]
Proposed Rule, no incentives	-	-	73%
Increase in off-cycle cap	2.5	14%	63%
Retroactive off-cycle cap increase	5	19%	59%
EV multiplier	2.8	9%	67%
Upstream accounting for EVs	-1.7	-6%	78%
Full-sized pickup incentive	1.1	1%	73%
Credit lifetime extension	9.2	22%	57%
Proposed rule, all incentives	**11.3**	**46%**	**39%**

III. Stronger standards are achievable

Standards that go above and beyond the proposed standards are achievable, without resorting to any of the counterproductive incentives previously discussed. Fuel efficiency and electrification technology has advanced significantly since the MY 2017-2025 standards were finalized in 2012 and electric vehicles are now a mature technology. EPA itself also makes the claim in the NPRM that automakers are more than prepared to meet the proposed standards; noting that they have continued to invest in new technology and have been

[12] Average annual reduction for years with incentive compared to proposed rule without any incentives. Positive figures indicate less stringency

[13] Percent reduction in savings compared to proposed rule without any incentives. Positive figures indicate more emissions

[14] Percent of the savings of the MY 2017-2025 rule compared to no stringency increase starting in MY 2021

doing so since the 2012 Final Rule (2021b, p. 177-178). We believe that due to the availability of banked credits, existing electrification options, and declining costs of electrification stronger standards are achievable. We also believe stronger standards will set the United States up to meet 2030 goals and continue to advance fuel efficiency technology.

BANKED CREDITS

The existing pool of banked credits makes reaching standards substantially more stringent than the EPA proposal much easier than the nominal gram-per-mile targets would suggest. Even ignoring EPA's proposed extension of credit lifetimes, automakers earned over 56 million MMT of credits in MYs 2018 and 2019, which could be applied toward meeting the proposed 11% increase in stringency for MY 2023 under Alternative 2. This is a realistic scenario because none of these credits would need to be spent before MY 2021, given that the available early action credits earned in MY 2009-2011 greatly exceed the need for banked credits in those model years. Automakers would also have access to the earned credits of MYs 2016 and 2017 and could use them to meet targets for MYs 2021 and 2022 meaning that they would not need to use the later MY credits. MYs 2018 and 2019 credits alone would be worth over 17 g/mi for MY 2023[15]. If all of MY 2018 and just 60% of MY 2019 credits are used toward MY 2023 compliance, the proposed 9.5% reduction in the average gram-per-mile target could actually be achieved with under a 3% reduction in that year. For Alternative 2 this would reduce the 11% target reduction in emissions to a 4.8% reduction in emissions.

Automakers are also more likely to save all their banked credits or even earn more credits before MY 2023 because of the SAFE rule's decrease in stringency for MYs 2021 and 2022. Should the automakers simply manage to preserve their 56 million MY 2018-2019 credits until MY 2023 and earn only an additional 22 million MMT of credits[16] over MYs 2020, 2021, or 2023, then automakers would need to produce no actual improvement in MY 2023 to comply with the new standards. In all likelihood, automakers could exceed this and enter MY 2024 with banked credits as well. Even without extending credit lifetimes, as EPA proposes to do, the existing stock of banked credits make compliance with the Alternative 2 MY 2023 target achievable, contrary to what the 11% reduction in emissions headline would suggest.

[15] Assuming 2020 AEO estimated sales in MY 2023

[16] The same number of credits earned for MY 2019

MORE ELECTRIFICATION

Since the 2012 rule was finalized, electric vehicle technology has progressed rapidly and battery prices have fallen. More people are buying EVs, and automakers are rapidly expanding their EV lineups. However, hybrids and electric vehicles still only represent a fraction of new vehicle sales and are ripe for rapid growth. They can play a considerable role in meeting stricter standards due to their superior emissions performance. Full battery electric vehicles and plug-in hybrids, as well as conventional hybrids, all have significantly lower fuel use and emissions than their conventional internal combustion engine counterparts. The proposed rule assumes plug-in vehicles reach about 8% by MY 2026 but we believe that automakers could reach even higher levels of penetration, leading to greater efficiency of the fleet.

Greater levels of electrification would allow automakers to meet standards based on EPA's Alternative 2, which proposes an additional increase in stringency of 10 g/mi in MY 2026, and the rule can and should advance that outcome. Increasing the share of non-plug-in vehicles that are strong hybrids from 6-7% in 2023 to 18% by MY 2026 and increasing the share of vehicles that are plug-ins to 14% by MY 2026, while maintaining the same growth in efficiency of gasoline-only vehicles as in the proposed standard, for example, would allow automakers to reach this higher standard. This level of ambition is also essential to put automakers on a path to reach long-term electrification goals and set the market up for further electrification post-MY 2026.

COSTS TO ELECTRIFY

The cost to manufacture electric vehicles has also fallen significantly in recent years, making electric vehicles an attractive option for automakers. Many vehicle manufacturers have made announcements about expanding their EV offerings in 2021. Advances in battery technologies, in particular, have played a major role in reducing the cost to electrify, as the cost of lithium-ion batteries has fallen by over 80% since 2012 (IHS Markit 2020). As a result, the market has seen a steady rise in the number of offerings that are hybrids or battery electric vehicles. Plug-in vehicle sales increased from less than .5% in 2012 to 4% in 2020 while hybrid sales increased from about 3% to over 6% in the same period (EPA 2020). These advances mean that automakers have the technology available to them today to allow them to meet more ambitious standards. These advances are not adequately reflected in the proposed rule. Battery cost assumptions in the NRPM are too high and do not consider the manufacturing and technological advancements of the past few years. EPA uses the same cost figures used in the SAFE rule, which are based on 2017 data, effectively inflating the costs of vehicle electrification (EPA 2021b, p. 145). This limits the role stronger standards can play to drive electrification. The incremental cost of hybrids is also higher than it should be,

limiting the role of hybridization can play as a compliance pathway. The incremental hybridization costs used in SAFE and in this rule range from $3,000 to $6,000, almost double what is reasonable (NHTSA and EPA 2020; NAS 2021).

PAVING THE WAY FOR THE ADMINISTRATION'S 2030 GOALS

A stronger standard is achievable but also necessary to meet the administration's 2030 goals. EPA estimates that EV sales will reach 8% by MY 2026, for the proposed rule, and even less, for Alternative 2. The White House has set a goal of 50% EV market share for new vehicles by calendar year 2030 (White House 2021). Current EV sales are about 4% of new vehicles, as of MY 2020 (EPA 2020a). EPA therefore expects EV sales share to grow by about 12% per year during the proposed rule. Should EV sales follow EPA's projection, fulfilling the Whitehouse goal would require a growth in EV sales share to grow 44% per year between the end of the proposed rule and 2030. This jump in growth is unrealistic. Either EPA is underestimating the rate of EV sales growth during the rule, and therefore pushing standards that may well be achieved with no improvements in ICV emissions, or EPA is planning for a scenario where the administrations goals will be unachievable. The better approach is clearly to plan for a more gradual growth in EV market share. An even annual growth in EV market share, between MY 2020 and 2030, would suggest an annual growth rate of roughly 26% per year, with EVs having a market share of 16% in MY 2026, double EPA's projections. As discussed above over-awarding credits to EVs is not the best way to accomplish this. Setting a higher standard is.

DRIVING TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

Historically vehicle standards have pushed the adoption of numerous fuel efficiency technologies in internal combustion engine vehicles and helped mainstream hybrid technology. Since the MY 2017-2025 rule was adopted in 2012, vehicle technology has continued to advance in no small part due to the efficiency targets set by that rule. EPA has the authority under the Clean Air Act to set technology-forcing standards. At this critical juncture, it is imperative that EPA adopt emissions standards to catalyze investments in technological advancements and accelerate electrification beyond what is likely to occur in the absence of new standards. To reach 2030 and 2035 climate and vehicle electrification goals, the MY 2023-2026 targets need to be considerably stronger than proposed and push faster growth in EV penetration. Post-MY 2026 standards need to both be ambitious enough to meet our goals but also need to adapt to a new, more electrified automotive market. This includes accurately accounting for the emissions of electric vehicles and updating the off-cycle credit process.

IV. Recommendations

EPA has built a good framework for the MY 2023-2026 emissions regulations. However, the rule needs improvements. As discussed above the proposed rule is weakened by counterproductive and discretionary credit provisions. Even without these credits the proposed rule is not stringent enough to pave the path towards the White House's goal of 50% EV market share by 2030 (White House 2021). ACEEE proposes the following recommendations for the final rule.

Alternative 2 with an additional 10 g/mi in MY 2026 is the minimum starting point for the SAFE replacement standards

EPA requests comment on Alternative 2, which adds 10g/mi to the stringency of targets for model year 2026 (EPA 2021b). This scenario should be the absolute minimum stringency that EPA considers when setting emission limits. This is the most stringent option that EPA puts forward and yet it only achieves 84% of the emission reductions for MYs 2021-2026 as the 2012 rule (plus another year of growth in MY 2026) and achieves a fleetwide average compliance of 160 g/mi in our modelling. The proposed standard, on the other hand, even without any incentive provisions, only achieves about 73% of the emission reductions as the 2012 rule. Also, by EPA's own calculations, Alternative 2 has the highest net present benefits (NPB) of any option that EPA investigated. The NPB of Alternative 2 ranges from $110 to $180 billion compared to $86-140 billion for the rule as proposed. EPA has not shown, or even asserted, that the proposed rule is the strongest and most reasonable rule possible, and indeed their own analysis finds that Alternative 2 has greater net benefits.

One benchmark for the SAFE replacement rule should be achieving at least the net carbon savings of the 2012 rule. To recapture these savings, ACEEE estimates that the rule would need to increase in stringency linearly from the proposed MY 2023 target to 155 g/mi in MY 2026. Making these changes would not only ensure that we capture back the losses from the SAFE rule, but also better position the nation to set post-2026 standards in line with the White House's 2030 goals.

Eliminate all counterproductive incentives

Incentives counterproductive to the primary goal of reducing emissions should not be included in EPA rule. ACEEE recommends that EPA:

- Keep the total off-cycle menu credit cap at the current 10 grams/mile and ensure that no retroactive changes in the credit cap are built into the final rule
- Eliminate the advanced technology multipliers for plug-in vehicles and full-sized pick-up trucks
- Restore upstream accounting for zero tailpipe emission vehicles

- Retain the 5-year lifetime for MY 2016-2020 credits
- Remove natural gas vehicle multipliers

Add new or clarify proposed provisions

ACEEE recommends the following clarification and additions that do not strictly change rule stringency. EPA should:

- Place a firm time limit on automaker applications to the non-menu off-cycle credit program, in line with the National Highway Transportation Safety Administration (NHTSA) proposal. This program has long been plagued by automaker applications for technologies implemented on old vehicle models. These retroactive requests have no bearing on OEM technology decisions and also cost a significant amount of time to process. Lastly, they make setting future standards difficult, as actual contemporary compliance is not set in stone. Requiring automakers to submit their requests for off-cycle credits in a timely manner would improve the effectiveness of the off-cycle program.
- Clarify what a "significant" reduction in emissions is in order to determine eligibility for off-cycle menu technologies for other credit pathways. ACEEE proposes a definition of at least 1g/mi greater than those currently assigned by the menu. Additionally, EPA should ensure that menu technologies that are granted credits through another pathway still count towards the menu cap.
- Begin considering how the GHG standards encourage efficient AV design by accounting of the emissions impacts of automated vehicles

EPA's light-duty vehicle emission standards are a vital tool to protecting vehicle owners, the environment, and the public. Standards that push technology forward help consumers save on fuel costs, reduce environmental damage, and reduce dangerous pollution that increases the risk of breathing-related illness. ACEEE believes that EPA has built a good framework for the SAFE replacement rule, but believes it needs to be more ambitious to reflect the White House's new goals for emission reductions by 2030 and EV market development. ACEEE thanks EPA for the opportunity to contribute these comments and improve the final rule.

References

American Lung Association. April 2020. "Disparities in the Impact of Air Pollution." https://www.lung.org/clean-air/outdoors/who-is-at-risk/disparities

Doyle, Kevin. 2021. "How Your Car Can Make the Air Cleaner." Consumer Reports. February 18, 2021. https://www.consumerreports.org/emissions/how-your-car-can-make-the-air-cleaner/

EIA. 2020. "Annual Energy Outlook 2020." US Energy Information Administration. 2020. https://www.eia.gov/outlooks/aeo/

EPA. 2020a. "The 2020 EPA Automotive Trends Report." EPA-420-R-21-00. Environmental Protection Agency. https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P1010U68.pdf

———. 2020b. "Fast Facts on Transportation Greenhouse Gas Emissions." Overviews and Factsheets. US EPA. June 2020. https://www.epa.gov/greenvehicles/fast-facts-transportation-greenhouse-gas-emissions

———. 2021a. "Explore the Automotive Trends Data." Data and Tools. Compliance Data: Credits and Deficits Generated by Manufacturer and Modal Year. 2021. https://www.epa.gov/automotive-trends/explore-automotive-trends-data

———. 2021b. "Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards." Federal Register Vol. 86 (No. 151). https://www.federalregister.gov/documents/2021/08/10/2021-16582/revised-2023-and-later-model-year-light-duty-vehicle-greenhouse-gas-emissions-standards

Gillingham, Kenneth T. 2021. "Designing Fuel-Economy Standards in Light of Electric Vehicles." In Environmental and Energy Policy and the Economy, Volume 3. University of Chicago Press. https://www.nber.org/books-and-chapters/environmental-and-energy-policy-and-economy-volume-3/designing-fuel-economy-standards-light-electric-vehicles

Gonder, Jeffrey, Eric Wood, Larry Chaney, Jacob Holden, Matthew Jeffers, and Lijuan Wang. 2016. "Analyzing Real-World Light Duty Vehicle Efficiency Benefits." Presented at the Vehicle Technologies Office (VTO) Annual Merit Review and Peer Evaluation, Washington DC, June 8. https://www.nrel.gov/docs/fy16osti/66268.pdf

Jason Low, Rushabh Doshi, Ishan Dutt, Chris Jones, and Marcy Ryan. 2019. "Canalys: 10% of New Cars in the US Sold with Level 2 Autonomy Driving Features." Canalys. September 9, 2019. https://www.canalys.com/newsroom/canalys-level-2-autonomy-vehicles-US-Q2-2019?time=1611158196

Jenn, Alan, Inês M. L. Azevedo, and Jeremy J. Michalek. 2016. "Alternative Fuel Vehicle Adoption Increases Fleet Gasoline Consumption and Greenhouse Gas Emissions under United States Corporate Average Fuel Economy Policy and Greenhouse Gas Emissions

Standards." Environmental Science & Technology 50 (5): 2165–74. https://doi.org/10.1021/acs.est.5b02842

Kreutzer, Cory J, Bidzina Kekelia, John P Rugh, and Eugene V Titov. 2017. "US Light-Duty Vehicle Air Conditioning Fuel Use and the Impact of Four Solar/Thermal Control Technologies." Presented at the SAE 2017 Thermal Management Systems Symposium, Plymouth, October. https://www.nrel.gov/docs/fy18osti/69047.pdf

Lutsey, Nic, and Aaron Isenstadt. 2018. "How Will Off-Cycle Credits Impact U.S. 2025 Efficiency Standards?" White Paper. International Council on Clean Transportation. https://theicct.org/publications/US-2025-off-cycle

Mersky, Avi. 2021. "Near-Term Impacts of Automated Vehicle Technologies." Washington DC: American Council for an Energy-Efficient Economy. www.aceee.org/white-paper/2021/06/near-term-impacts-automated-vehicle-technologies

Mersky, Avi Chaim, and Constantine Samaras. 2016. "Fuel Economy Testing of Autonomous Vehicles." Transportation Research Part C: Emerging Technologies 65 (April): 31–48. https://doi.org/10.1016/j.trc.2016.01.001

———. 2020. "Environmental and Economic Trade-Offs of City Vehicle Fleet Electrification and Photovoltaic Installation in the U.S. PJM Interconnection." Environmental Science & Technology 54 (1): 380–89. https://doi.org/10.1021/acs.est.9b04299

NAS. "Assessment of Technologies for Improving Light-Duty Vehicle Fuel Economy—2025-2035." Washington, DC: National Academies of Sciences, Engineering, and Medicine. https://doi.org/10.17226/26092

NHTSA and EPA. 2020. "Final Regulatory Impact Analysis: The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Year 2021 – 2026 Passenger Cars and Light Trucks." National Highway Traffic Safety Administration. https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/final_safe_fria_web_version_200701.pdf.

Vaidyanathan, Shruti, Peter Huether, and Ben Jennings. 2021. "Understanding Transportation Energy Burdens." Washington DC: American Council for an Energy-Efficient Economy. https://www.aceee.org/white-paper/2021/05/understanding-transportation-energy-burdens

White House. 2021. "FACT SHEET: President Biden Announces Steps to Drive American Leadership Forward on Clean Cars and Trucks." The White House. August 5, 2021. https://www.whitehouse.gov/briefing-room/statements-releases/2021/08/05/fact-sheet-

president-biden-announces-steps-to-drive-american-leadership-forward-on-clean-cars-and-trucks/

Xie, Johnny, Rushabh Doshi, Jermaine Tan, Chris Jones, and Marcy Ryan. 2020. "US Automotive Market Q1 2020." Canalys. June 4, 2020. https://www.canalys.com/newsroom/Canalys-US-intelligent-vehicle-analysis-Q1-2020?time=1611158459