

MJB&A Summary ■ August 10, 2021

Summary of EPA’s Proposed Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards

On August 5, 2021 the Environmental Protection Agency (EPA) released the proposed Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (Proposed Rule).¹ The Proposed Rule fulfills in part Executive Order 13990, “Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis,” directing the EPA to consider suspending, revising, or rescinding standards under the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule promulgated in April 2020.

The Proposed Rule would revise greenhouse gas (GHG) standards for light duty vehicles to be more stringent than the SAFE rule standards for model year (MY) 2023 through 2026. The EPA is proposing to increase the stringency of the standards from the average annual 1.5 percent increase in stringency of the SAFE rule standards to a proposed 10 percent stringency increase for MY 2023, followed by an approximate 5 percent stringency increase for each MY from MY 2024 through 2026.

The EPA is proposing several flexibility provisions to incentivize the production and sale of zero and near-zero emission vehicles in part by reducing compliance costs and lead times of the proposed standards. Lastly, EPA is proposing technical amendments to clarify and streamline regulations.

Key Takeaways

- The Proposed Rule would establish standards for passenger cars and light trucks that increase in stringency by 10 percent for MY 2023, followed thereafter by approximately a 5 percent stringency increase in each MY 2024–2026.
- The Proposed Rule maintain compliance flexibility provisions such as averaging, banking, and trading (ABT) provisions and expand and extend additional manufacturer flexibilities like off-cycle credits, air conditioning credits, multiplier incentive for advanced technology and natural gas vehicles (NGVs), and full-size pick-up truck incentives.
- EPA estimates that the proposed standards would avoid 2.2 billion metric tons of carbon dioxide (CO₂), 2.7 million metric tons of methane (CH₄), and 71,543 metric tons of nitrous oxide (N₂O) between 2023 and 2050.
- EPA provides estimates of net benefits under multiple discount rate scenarios, illustrating the full range of potential economic benefits over the 2021–2050 period, finding “the total benefits of the proposed

¹ EPA, Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (August 5, 2021). Available online at: [Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards—Notice of Proposed Rulemaking \(July 29, 2021\) \(epa.gov\)](https://www.epa.gov/vehicles/epa-revised-2023-and-later-model-year-light-duty-vehicle-greenhouse-gas-emissions-standards-notice-proposed-rulemaking-july-29-2021).

program far exceed the costs and would result in a net present value of benefits that ranges between \$17–330 billion, depending on which [social cost of greenhouse gas] and discount rate is assumed.”

- EPA estimates that to achieve compliance under the Proposed Rule, the electric vehicle (EV) penetration rate may increase from 3.6 percent to 7.8 percent over the MY 2023–2026 period; however, penetration rates could exceed this level based on other manufacturer commitments and market forces.
- In this Proposed Rule, EPA is proposing to revise the vehicle emissions standards in a separate rulemaking from National Highway Transportation Safety Administration (NHTSA), who will propose their own revision to the Corporate Average Fuel Economy (CAFE) standards.

Background

In 2009, EPA and NHTSA announced a joint rulemaking to adopt federal vehicle GHG emissions standards. This announcement was the result of an agreement among EPA, NHTSA, California, and the auto industry for the federal agencies to harmonize their GHG and CAFE standards for MY 2012–2016 light-duty vehicles, as well as California’s agreement to revise its program for MY 2012–2016 such that compliance with the Federal GHG standards would be deemed in compliance with California’s GHG standards. In 2010, EPA and NHTSA issued their final rule for these standards. In addition, in 2012, EPA and NHTSA issued final emission and CAFE standards for model year 2017 to 2025 light-duty vehicles.

Both programs included a Mid-term Evaluation to assess the continued appropriateness of the programs. Under the Obama Administration, EPA and California completed their reviews in early January of 2017, and determined that their respective standards remained appropriate and that no rulemaking to modify regulations was required. However, in April of 2018, the Trump Administration released its reconsideration of the Mid-term Evaluations for the GHG standards for MY 2021 and MY 2022–2025,² and in August 2018, EPA and NHTSA released the proposed SAFE Rule, proposing to significantly reduce the stringency of vehicle emissions standards.

On April 30, 2020, EPA and NHTSA jointly issued the final SAFE Vehicle Rule: Part Two, which became effective on June 29, 2020. Part Two sets CAFE standards, under the jurisdiction of NHTSA, and GHG emissions standards, under the jurisdiction of EPA, to increase in stringency by 1.5 percent per year above MY 2020 levels for MYs 2021–2026. The standards set a fleet-wide CAFE equivalent of 40.6 miles per gallon and an emission standard of 199 grams of CO_{2e} per mile for passenger and light-duty vehicles by MY 2026.³

In response to the rollback of vehicle emission stringency standards in 2020, California and a group of automakers (Ford, Honda, BMW of North America, Volkswagen Group of America, and Volvo) agreed to a voluntary framework that 1) supported the continued annual reduction of GHG emissions through MY 2026, 2) encouraged innovation and acceleration in EV transition, and 3) provided certainty within the industry to invest. The “California Framework Agreement” extended the current MY 2025 standard to 2026 with an annual 3.7 percent increase in GHG reduction over the course of five years, slightly under the 5 percent increase standard finalized by the Obama Administration in 2012 and more than the 1.5 percent increase finalized in the SAFE

² For more information on EPA’s Mid-Term Evaluation of GHG Emissions Standards for MY 2022–2025, please see MJB&A’s April 2018 summary, available here: [MJBA MidTerm-Evaluation-Summary April032018 0.pdf \(mjbradley.com\)](#)

³ For more information on EPA and NHTSA’s SAFE Rule: Part Two, please see MJB&A’s April 2020 summary, available here: [MJBA-Summary-SAFE-Vehicles-Rule-Part-II-Final 2020-04-30.pdf \(mjbradley.com\)](#)

Rule. For companies who chose to participate in the California Framework Agreement, California accepted the Framework’s voluntary terms as compliance with the state’s GHG standards.⁴

On his first day in office, January 20, 2021, President Biden issued Executive Order 13990, “Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis.”⁵ This Order directed NHTSA and EPA to consider whether to propose suspending, revising, or rescinding the SAFE Rule standards for MYs 2021–2026.

Summary of Proposed Standards

EPA is proposing more stringent light-duty vehicle GHG emissions standards for MY 2023–2026. EPA is proposing to revise the GHG emissions standards in a separate rulemaking from NHTSA, who will propose their own revisions to the CAFE standards later this year (more detail provided below).

The Proposed Rule would set standards for CO₂ emissions on a gram per mile (g/mile) basis. The proposed industry-wide average emissions target is modeled to be 171 g/mile in MY 2026, based on EPA’s current fleet mix projections for MY 2026 consisting of 50 percent cars and 50 percent trucks. Actual fleet-wide average g/mile will depend on actual production of vehicles for that year along with the use of various credit and ABT provisions. EPA will continue to evaluate tailpipe-only values to determine emissions and will not consider upstream emissions.

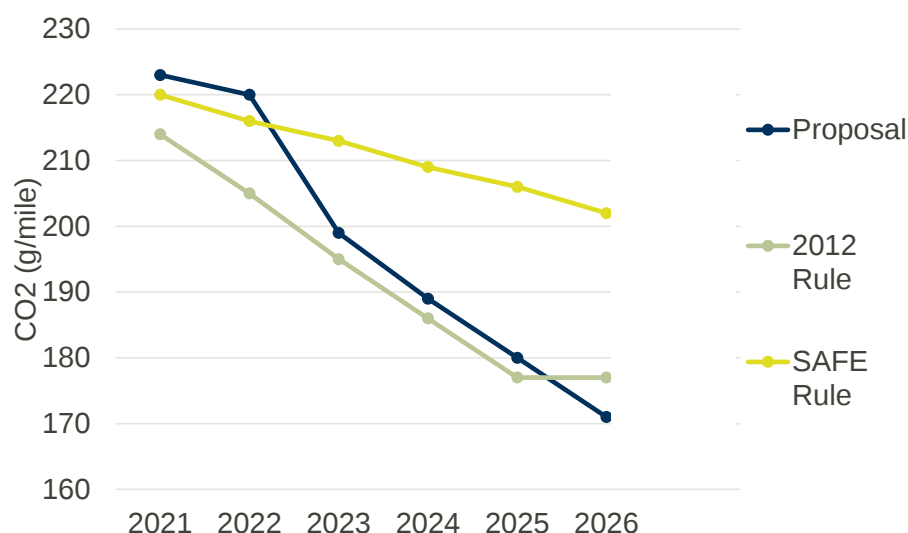
The proposed standards are designed to reach the same stringency as the California Framework Agreements for MY 2023 and decrease in a linear fashion with a year-over-year stringency increases of 4.7–5.0 percent. For passenger cars, the proposed standards would reduce CO₂ emissions by 8.3 percent in MY 2023 followed by year-over-year reductions of 4.7–5.1 percent from MY 2024–2026. Light-duty truck standards would reduce emissions by 10.8 percent in MY 2023 decreasing an additional 4.7–5.2 percent for each MY 2024–2026.

For both passenger cars and light-duty trucks from MY 2026, the proposal goes beyond the 2012 stringency level for MY 2025 by about 3 percent. Figure 1 shows the Proposed Rule standards compared to the 2012 finalized standards and the SAFE rule finalized standards. EPA states that the MY 2026 standard would be the most stringent vehicle GHG emission standard that the EPA has ever proposed. EPA stated it is confident that the proposed CO₂ emissions reductions standards are achievable through the application of available control technology at a reasonable cost and program flexibilities.

⁴ California Air Resources Board, “California and major automakers reach groundbreaking framework agreement on clean emission standards.” Available online at: [California and major automakers reach groundbreaking framework agreement on clean emission standards | California Air Resources Board.](#)

⁵ Executive Order 13990, “Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis.” Available online at: [https://www.federalregister.gov/documents/2021/01/25/2021-01765/protecting-public-health-and-the-environment-and-restoring-science-to-tackle-the-climate-crisis.](https://www.federalregister.gov/documents/2021/01/25/2021-01765/protecting-public-health-and-the-environment-and-restoring-science-to-tackle-the-climate-crisis)

Figure 1: Proposed Standards Compared to 2012 Rule and SAFE Rule



Flexibility Provisions

ABT is an important compliance flexibility tool that allows EPA to consider new standard stringency levels by resolving lead time and feasibility issues. EPA notes that ABT is built into various highway engine and vehicle programs, and nonroad engines and equipment programs to support emissions standards through the introduction of new technologies. Under the Proposed Rule, for example, the standards are imposed on a fleet-wide basis, allowing an automaker to demonstrate compliance across its entire portfolio of light duty vehicles. Automakers can also generate extra credits by over complying with the standards in a given year; these credits can then either be banked for future use or traded to other manufacturers who need additional credits for compliance.

EPA states that it understands the stringency increase from MY 2022 and MY 2023 have limited lead time. Therefore, the agency will propose limited amount of additional manufacturer flexibilities to carry-forward credits into the 2023–2026 MYs. EPA proposes to temporarily increase the number of years that MY 2016–2020 vintage credits may be carried-forward, generally extending the period by one year. There will be no modifications for credits generated later than MY 2021, reverting to the standard 5-year usage period.

In addition, the Proposed Rule includes other provisions that would allow manufacturers to generate credits or use additional incentives to reward advanced emissions reduction technologies. Proposed provisions that EPA proposes to modify in the Proposed Rule include:

- *Off-cycle Credits:* Credits generated using technology that reduces emissions not captured during EPA testing. Manufacturers who provide CO₂-reducing technology that is not chosen as a GHG control strategy will receive an appropriate level of CO₂ credits. For example, manufacturers that install high efficiency lighting—not measured on the EPA 2-cycle test but does reduce CO₂ emissions by decreasing the electrical load on the alternator and engine—will receive “off-cycle” credit.
- *Increase Use of Menu-based Credits:* Values that are established by the EPA to be used across a fleet rather than specific vehicles. This credit is to be capped from the current 10 g/mile to 15 g/mile beginning MY 2020. Manufactures who want to claim menu credits must meet all technology definitions across both car and truck fleets.

- *Multiplier Credit Cap:* EPA has proposed to extend the multiplier incentive for EVs, plug-in hybrid vehicles (PHEV), and fuel cell vehicles (FCV) with a cumulative cap on credits. This credit would allow low-emitting vehicles to count as more than one vehicle in a manufacturer’s compliance calculations. Unlike the 2012 ruling, the EPA has proposed to cap this credit to “limit the magnitude of resulting emissions reduction losses and to provide a means to more definitively project the impact of the multipliers on the overall stringency of the program.”

Additionally, EPA would eliminate a SAFE rule multiplier incentive for NGVs after MY 2022. EPA stated it believed it is no longer appropriate to incentivize the vehicles because NGVs are not near-zero emissions technology. Any NGV multiplier credits for MY 2022 will be included under the proposed multiplier cap.

- *Streamline Onboard Diagnostics (OBD):* To streamline California Air Resource Board’s (CARB) onboard diagnostic regulations with federal regulations, EPA is proposing a limited regulatory change to OBD requirements by allowing manufacturers to meet OBD requirements for EPA certifications if they can show that vehicles meet CARB OBD regulations newer than 2013 CARB regulations. This proposal would ensure manufactures produce vehicles with one OBD system certified for all 50 states.
- *Reinstate Full Size Pick-up Truck Incentive:* EPA proposes to “reinstate full size pick-up truck incentives through MY 2025 for vehicles that meet efficiency performance criteria or include strong hybrid technology at a minimum level of production volume.” This incentive for MY 2022–2025 was removed under the SAFE rule.

EPA has listed programs that they will not change from the previous SAFE rule. Components the Proposed Rule will not change include:

- Fundamental structure of the standards, which are based on footprint attribute, with separate footprint curves for cars and trucks;
- Existing CH₄ and N₂O emission standards;
- Program structure in terms of vehicle certification, compliance, and enforcement;
- Current program opportunities to earn credit toward fleet-wide average CO₂ standards for improvements in air conditioning systems; and
- Existing ABT program elements except for proposed limited extension for credit carry-forward credits

Technical Assessment, Costs, and Benefits of Proposed Standards

Overview of Methodology

In developing the proposed standards, EPA followed similar methodology as used in prior rules and evaluations. A few key points on methodology are summarized below:

- *Model choice:* To allow for direct comparison between the SAFE rule standards, EPA chose to use the NHTSA CAFE Compliance and Effects Modeling System (CEMS) with updates to certain inputs that “value the effects of emissions on public health.”⁶

⁶ For future vehicle standards analyses, EPA is in the processing of developing OMEGA2, an updated version of the OMEGA model use in analyses prior to the SAFE rule.

- *Scenarios:* The model includes “No Action” and “action” scenarios. The “No Action” scenario assumes roughly 29 percent of the nationwide fleet meets the California Framework emissions reduction targets and the remaining 71 percent of the fleet meets the SAFE standards. The action scenario assumes the entirety of the fleet meets the proposed standards for each model year.
- *Emissions factors:* EPA uses CAFE CEMS to estimate the GHG and non-GHG emissions from light-duty cars and trucks, including tailpipe emissions and upstream emissions associated with the fossil fuels and or electricity use to power the vehicles. For the Proposed Rule, EPA used the same upstream emissions factors as used for the SAFE rule.

Summary of Net Benefits

In evaluating the costs and benefits of the proposed standards against the “No Action” scenario (i.e., one in which the SAFE rule standards remained in place), EPA considered a broad range of impacts, such as safety, emissions, and consumer impacts.

Costs of the Proposed Standards

- *Consumer Impacts:* EPA evaluates the foregone consumer sales surplus, which measures the loss in benefits attributed to consumers who would have purchased a new vehicle in the absence of the proposed standards. EPA estimates that while the average cost of a new MY 2026 would increase by \$1,044 due to the Proposed Rule, over time, reduction in fuel costs will exceed the increase in vehicle costs by \$883. The full financial impact on consumers will depend on how much each person drives and whether the vehicle is new or used.
- *Vehicle Sales Impacts:* EPA models the value of additional fuel economy and its impacts on vehicle sales using different assumptions on the demand elasticity, noting that sales could decrease or increase depending on how highly consumers value fuel economy improvements.
- *Additional Driving:* The rebound effect of fuel efficiency suggests that as a result of lower cost per mile of driving, people may drive more, thus creating additional costs (i.e., traffic congestion and noise) and benefits (i.e., added social and economic opportunities).
- *Safety Considerations:* Fleet mix, scrappage rates, vehicle mass, and distribution of vehicle miles traveled across the fleet all can impact the risk of injury during travel. EPA assessed safety risk and estimates that the proposed standards would lead to a 0.07 percent increase in annual fatalities per billion miles driven.

Benefits of the Proposed Standards

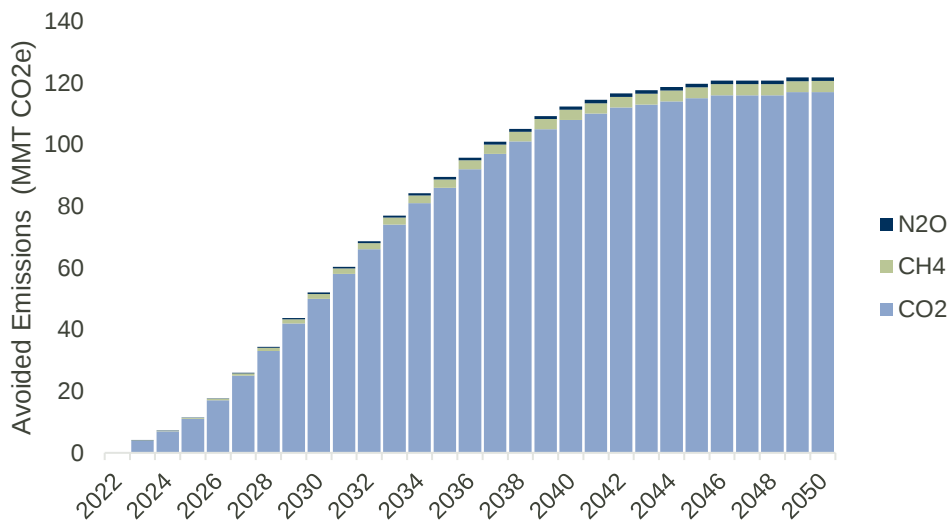
- *Changes in Fuel Consumption:* EPA assesses how the proposed standards would impact fuel consumption from the light duty fleet. The Proposed Rule would decrease gasoline consumption by nearly 10 percent and only modestly increase electricity consumption assuming that 8 percent of the national fleet would consist of EVs or PHEVs by MY 2026. EPA also calculates the economic benefits of less time being spent on refueling.
- *Greenhouse Gas Emission Reduction:* EPA quantifies the economic benefits of GHG emissions reductions through the application of the social cost of GHGs. The social cost of each gas is “the monetary value of the net harm to society associated with a marginal increase in emissions in a given year, or the benefit of avoiding that increase,” and includes impacts on agricultural productivity, human health, property, energy systems, conflict, environmental migration, and ecosystem services.

- *Non-Greenhouse Gas Health Impacts:* EPA quantifies and monetizes the health impacts of the Proposed Rule’s potential impacts on ambient air quality. In lieu of air quality modeling, EPA uses “a reduced-form benefit-per-ton (BPT) approach” to inform assessment of health impacts of non-GHG emissions reductions. This approach, which conveys the health benefits of the proposed policy in fine particulate (PM_{2.5})-related BPT values, is consistent with the approach EPA has taken for prior standards.
- *Energy Security:* The proposed standards would benefit U.S. energy security by reducing U.S. petroleum imports, thereby mitigating financial and strategic risks of disruption to petroleum supply.

GHG and Non-GHG Emissions Under the Proposed Standards

EPA estimated the CO₂, CH₄, and N₂O emissions reductions that could be achieved under the more stringent proposed standards as compared to the SAFE rule standards. In total, the MY 2023–2026 standards would avoid cumulatively 2.2 billion metric tons of CO₂, 2.7 million metric tons of CH₄, and 71,543 metric tons of N₂O between 2023 and 2050. Figure 2 below illustrates the avoided GHG emissions over time.

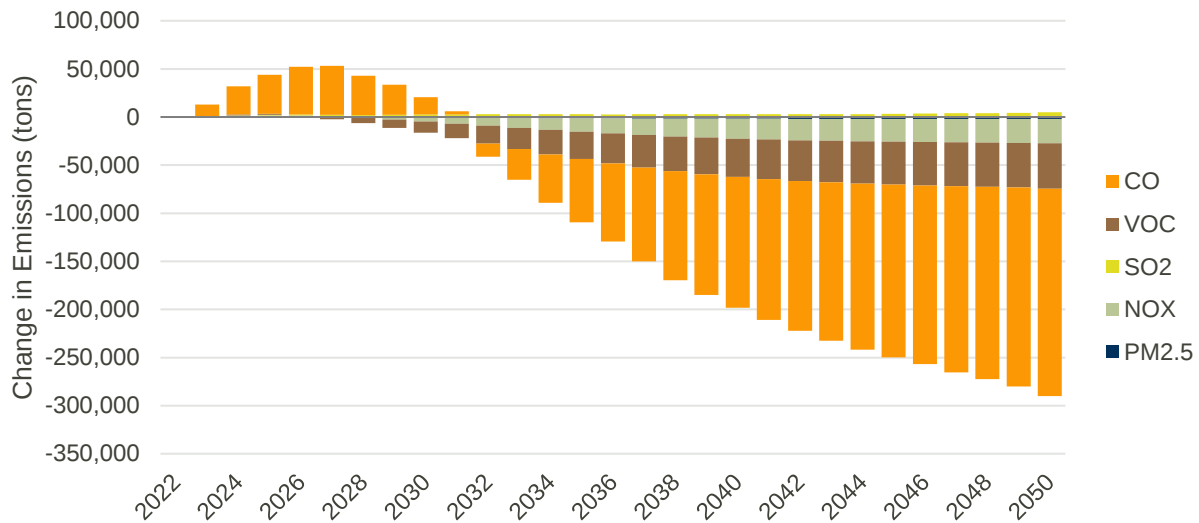
Figure 2: Projected GHG Emissions Reductions from Proposed Standards



Source: Prepared by MJB&A based on data from EPA’s Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, Table 43: Estimated GHG Impacts of the Proposed Standards Relative to the No Action Scenario, pg. 165. N₂O and CH₄ converted to CO₂e using AR4 global warming potential.

With respect to non-GHG emissions, EPA estimated PM_{2.5}, nitrogen oxide (NO_x), volatile organic compounds (VOCs), carbon monoxide (CO) and sulfur dioxide (SO₂) emissions reductions that could be achieved under the more stringent proposed standards. The chart below illustrates the increase and decrease of emissions over time. Overall, EPA projects “reductions in emissions of non-GHG pollutants from upstream sources, except for SO₂. For tailpipe emissions we project initial increases from most non-GHG pollutants, except SO₂, followed by decreases in all non-GHG pollutants over time” (see Figure 3). EPA expects that new standards would only generate minor changes in ambient air quality in most places.

Figure 3: Projected Changes in Non-GHG Emissions from Proposed Standards



Source: Prepared by MJB&A based on data from EPA's Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, Table 45: Estimated Non-GHG Emission Impacts of the Proposed Standards Relative to the No Action Scenario, pg. 173.

Table 1 presents the annual net benefits estimated by EPA, taking into consideration the GHG emissions benefits, the non-GHG emissions benefits, fuel cost savings, and the costs of the Proposed Rule as summarized above. EPA provides estimates of net benefits under multiple discount rate scenarios, illustrating the full range of potential economic benefits over the 2021–2050 period, finding “the total benefits of the proposed program far exceed the costs and would result in a net present value of benefits that ranges between \$17–330 billion, depending on which [social cost of greenhouse gas] and discount rate is assumed.”

Table 1: Net Benefits of the Proposed Rule (billions \$USD2018) ^{7,8}

Calendar Year	Net benefits with Climate Benefits based on 5% discount rate	Net benefits with Climate Benefits based on 3% discount rate	Net benefits with Climate Benefits based on 2.5% discount rate	Net benefits with Climate Benefits based on 3% discount rate, 95 th percentile SC-GHG
2023	-\$6.6	-\$6.5	-\$6.4	-\$6.1
2026	-\$14	-\$14	-\$13	-\$12
2030	-\$5.8	-\$3.7	-\$2.3	\$2.7
2035	\$7.6	\$12	\$14	\$24
2040	\$17	\$22	\$26	\$39
2050	\$23	\$30	\$34	\$51
2021–2050 PV, 3%	\$73	\$140	\$190	\$330
2021–2050 PV, 7%	\$17	\$86	\$140	\$270
2021–2050 Annualized, 3%	\$4.1	\$7.3	\$9.4	\$17
2021–20150 Annualized, 7%	\$1	\$4.2	\$6.3	\$14

Source: EPA’s Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, Table 56: Net Benefits (Emission Benefits + Non-Emission Benefits + Fuel Savings – Costs) Associated with the Proposed Program (billions of 2018 dollars), pg. 225.

Additional Considerations

Though not modeled in depth, in the Proposed Rule, EPA briefly discusses additional impacts that are difficult to quantify, including employment impacts, environmental justice (EJ), climate change-related health impacts, effects on populations of concern, and affordability and equity impacts. With respect to EJ, EPA is seeking comment on “how to conduct an environmental justice analysis of the non-GHG impacts associated with mobile source rulemakings, including how EV penetration in the future fleet would affect these impacts.”

⁷ EPA note to Table 1: “The present value of reduced GHG emissions is calculated differently than other benefits. The same discount rate used to discount the value of damages from future emissions (SC-GHG at 5, 3, 2.5 percent) is used to calculate present value of SC-GHGs for internal consistency, while all other costs and benefits are discounted at either 3% or 7%. Annual costs and benefits shown are undiscounted values. b Note that the non-GHG impacts associated with the standards presented here do not include the full complement of health and environmental effects that, if quantified and monetized, would increase the total monetized benefits. Instead, the non-GHG benefits are based on BPT values that reflect only human health impacts associated with reductions in PM_{2.5} exposure.”

⁸ EPA note to Table 1: “Note that the non-GHG impacts associated with the standards presented here do not include the full complement of health and environmental effects that, if quantified and monetized, would increase the total monetized benefits. Instead, the non-GHG benefits are based on BPT values that reflect only human health impacts associated with reductions in PM_{2.5} exposure.”

Fleet Compliance Targets and Manufacturer Cost of Compliance

Within the rule, EPA lays out fleet average GHG targets for each automobile manufacturer based on their sale weighted footprints. These targets are unique to each manufacturer. In comparing the targets to achieved values⁹ calculated for each manufacturer, EPA observes “some manufacturers are projected to have achieved values that are over target (higher emissions) on trucks, and under target (lower emissions) on cars, and vice versa for other manufacturers,” and notes that “an achieved value for a manufacturer’s combined fleet that is above the target in a given model year does not indicate a likely failure to comply with the standards, since the model includes the GHG program credit banking provisions that allow credits from one year to be carried into another year.”

EPA also conducted analysis of the estimated costs per vehicle for manufacturers to meet the proposed standards. Projected costs per vehicle increase as the standards become more stringent, but vary between manufacturers. Specifically, while the industry average cost to comply with the standards for MY 2026 is estimated at \$1,044 per vehicle; for the California Framework Agreement manufacturers, average costs for MY 2026 are lower, ranging from \$500–850 per vehicle.

Technological Feasibility and Availability

The Proposed Rule notes that “emission standards set by EPA under Clean Air Act (CAA) section 202(a)(1) are technology-based, as the levels chosen must be premised on a finding of technological feasibility.” With regard to the technological feasibility of meeting the proposed standards:

“EPA believes that the proposed program is technologically feasible based on our projection that the standards can be met largely with the kinds of advanced gasoline vehicle technologies already in place in vehicles within today’s new vehicle fleet and relies on a penetration of plug-in electric vehicles into the fleet during the 2023–2026 model years that is commensurate with current trends in the industry.”

EPA expects that EVs, including PHEVs, will contribute to manufacturer compliance with standards. The modeling assumes that as the proposed standards become more stringent, the EV penetration rate will increase from 3.6 percent to 7.8 percent over the MY 2023–2026 period. The assumption is similar to that used when NHTSA reevaluated the 2012 standards for comparison alongside the revised standards in the final SAFE rulemaking—that analysis demonstrated that the 2012 standards could be met primarily through improvements to gasoline and hybrid vehicle technologies, and with just 6 percent EV and PHEV penetration. EPA notes that based on current growth in sales of EV and PHEV models, as well as the expressed commitment from manufacturers, it is possible that the market penetration of EVs and PHEVs could exceed 8 percent within the MY 2023–2026 period.

Authority for the Proposed Standards

EPA states that, after consideration of a number of relevant factors, given the technical feasibility of the proposed standards, the moderate costs per vehicle, the savings to consumers in fuel costs over the lifetime of the vehicle, the very significant reductions in GHG emissions and fuel consumption, and the significantly greater quantified

⁹ The achieved values modeled for each manufacturer “represent the projected certification emissions values for possible compliance approaches with the proposed standards for each manufacturer. These achieved values, shown as averages over the respective car, truck and combined fleets, include the 2-cycle tailpipe emissions based on the modeled application of emissions-reduction technologies minus the modeled application of off-cycle credit technologies and the full A/C efficiency credits. The values also reflect any application of the proposed advanced technology multipliers, up to the cap.”

benefits compared to quantified costs, EPA believes that the proposed standards are appropriate under EPA’s section 202(a) authority.

Overview of Authority

Title II of the CAA provides for comprehensive regulation of mobile sources, authorizing EPA to regulate emissions of air pollutants from all mobile source categories. EPA states that in setting these standards, pursuant to this title, it has “taken a comprehensive, integrated approach.” It notes that Title II emission standards have “stimulated the development of a broad set of advanced automotive technologies,” and that in response to emission standards for GHGs from light-duty vehicles in 2010 and later, “manufacturers have continued to significantly ramp up their development and application of a wide range of new and improved technologies, including more fuel-efficient engine designs, transmissions, aerodynamics, and tires, air conditioning systems that contribute to lower GHG emissions, and various levels of electrified vehicle technologies.”

Section 202(a)(1) of the CAA, 42 U.S.C. 7521(a)(1), states that “the Administrator shall by regulation prescribe (and from time to time revise)...standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles...which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.”

Emission standards set by EPA under CAA section 202(a)(1) are technology-based, as the levels chosen must be premised on a finding of technological feasibility. EPA is afforded considerable discretion under section 202(a) when assessing issues of technical feasibility and availability of lead time to implement new technology. In addition, although standards under CAA section 202(a)(1) are technology-based, they are not based exclusively on technological capability: EPA has the discretion to consider and weigh various factors along with technological feasibility, such as the cost of compliance, lead time necessary for compliance, safety and other impacts on consumers, and energy impacts associated with use of the technology. EPA also states that it has clear authority to set standards under CAA section 202(a) that are technology-forcing when EPA considers that to be appropriate, but EPA is not required to do so.

In the Proposed Rule, EPA states that it has considered the technological feasibility and cost of the proposed standards, available lead time for manufacturers, and other relevant factors under section 202(a) of the CAA. Based on its analyses, EPA believes that the proposed standards are “reasonable and appropriate” and that the analysis “supports the conclusion that the proposed model years 2023–2026 standards are technologically feasible and the costs of compliance for manufacturers are reasonable.”

Consideration of Key Factors

In the preamble of the Proposed Rule, EPA discusses five key categories of factors that it considered in setting the standards:

1. *Technological Feasibility and Lead Time.* EPA states that the technological achievements already developed and applied to vehicles within the current new vehicle fleet will enable the industry to achieve the proposed standards even without the development of new technologies beyond those already widely available. However, the standards are likely to necessitate greater implementation and pace of technology penetration through MY 2026 using existing GHG reduction technologies.

EPA notes that automakers’ past comments regarding product plan development and the regulatory and litigation history of the GHG standards since 2012 support EPA’s expectation that automakers remain largely on track in terms of technological readiness within their product plans to meet the approximate

trajectory of increasingly stringent standards initially promulgated in 2012. Another important factor in considering the feasibility of the proposed standards is the fact that five automakers voluntarily entered into the California Framework Agreements with the California Air Resources Board.

EPA explains that, in the SAFE rulemaking, EPA concluded that the projected level of advanced technologies was “too high from a consumer-choice perspective” and ultimately could lead to automakers changing the vehicle types they offer. EPA currently does not believe this is an accurate assessment or one that deserves weight that could overcome EPA’s expert assessment of the appropriate standards under section 202 of the CAA

Finally, EPA notes that it expects manufacturers to continue to take advantage of the compliance flexibilities and crediting programs to their fullest extent, including the averaging allowed under fleet-average based standards. EPA states that the fleet average standard approach of the light duty vehicle GHG combined with the credit banking and trading provisions of the program will allow manufacturers to design a compliance strategy relying on overcompliance and undercompliance in different years, or even by different manufacturers.

2. *Vehicle Costs of Compliance.* In its analysis of the Proposed Rule, EPA finds that the average per-vehicle cost for a MY 2026 vehicle is \$1,044 compared to the No Action scenario, lower than the costs projected in the analysis of the 2012 standards. As part of these cost estimates, EPA projects significant increases in the use of advanced gasoline technologies (including mild and strong hybrids), comprising more than 92 percent of the fleet.
3. *Impacts on Consumers.* EPA calculates that lower operating costs from significant fuel savings would offset the upfront vehicle costs. Total fuel savings for consumers through 2050 are estimated at \$120 billion to \$250 billion. The Administrator also carefully considered the affordability impacts of these proposed standards, especially considering Executive Order 14008 and EPA’s increasing focus on EJ and equity. EPA notes that lower operating costs and reductions in total cost of ownership may be particularly important for lower income vehicle owners.

EPA also noted that, in the SAFE rulemaking, it placed greater weight on the upfront costs of vehicles, and little weight on total cost of ownership. In part, that rulemaking explained that approach on the ground that “[n]ew vehicle purchasers are not likely to place as much weight on fuel savings that will be realized by subsequent owners.” However, in light of changes in policy priorities (including concern about accounting for benefits to lower-income households), EPA now believes in assessing the benefits of these standards it is more appropriate to consider the total fuel savings of the vehicle, over its lifetime, including those fuel savings that may accrue to later owners.

4. *Emissions of GHGs and Other Air Pollutants.* EPA states that an essential factor that it considered in determining the appropriate level of the proposed standards is the reduction in emissions that would result from the program. This primarily includes reductions in vehicle GHG emissions, given the increased urgency of the climate crisis. EPA also considered the effects of the proposed standards on criteria pollutant and air toxics emissions and associated public health and welfare impacts. These benefits are discussed in more detail above.
5. *Energy, Safety, and Other Factors.* EPA also considered additional factors. For example, it calculated that the energy security benefits of the proposal in 2050 at \$6.1 billion to \$13 billion (7 percent and 3 percent

discount rate, see Section VII.H. Table 37). EPA considers this proposal to be beneficial from an energy security perspective.

EPA also considered safety impacts of the rule, which are a strong focus of the SAFE rule. EPA states that the “relationship between GHG emissions standards and safety is multi-faceted, and can be influenced not only by control technologies, but also by consumer decisions about vehicle ownership and use.” EPA finds that under this proposal, the estimated risk of fatal and non-fatal injuries per distance traveled will remain virtually unchanged. This proposal also projects that as the costs of driving declines due to the improvement in fuel economy, consumers overall will choose to drive more miles (i.e., the vehicle miles traveled, VMT, “rebound” effect). As a result of this personal decision by consumers to drive more due to the reduce cost of driving, EPA also projects this will result in an increase in accidents, injuries, and fatalities. EPA recognizes that in the SAFE rulemaking EPA placed emphasis on the estimated total number of fatal and non-fatal injuries. However, EPA currently believes it is more appropriate to consider the risk of injuries per mile traveled. EPA requests comment on what role these negative impacts due to consumers’ decision to drive additional miles should play in EPA’s standard-setting decision-making.

Balancing of Factors under CAA 202(a)

EPA recognizes that the cost and technology penetration estimates in this rule are similar to the estimates in the SAFE rulemaking and that the Administrator is balancing the factors considered differently than in the SAFE rule to reach his conclusion about what standards are appropriate to propose.

In the Proposed Rule, the EPA notes that the purpose of adopting standards under that provision of the CAA is to address air pollution that may reasonably be anticipated to endanger public health and welfare and reducing air pollution has traditionally been the focus of such standards. In this action, the Administrator is proposing more stringent standards based on a balancing of the factors under consideration different from that in the SAFE rulemaking, a balancing that the Administrator believes is more consistent with Congressional intent and the goals of the CAA.

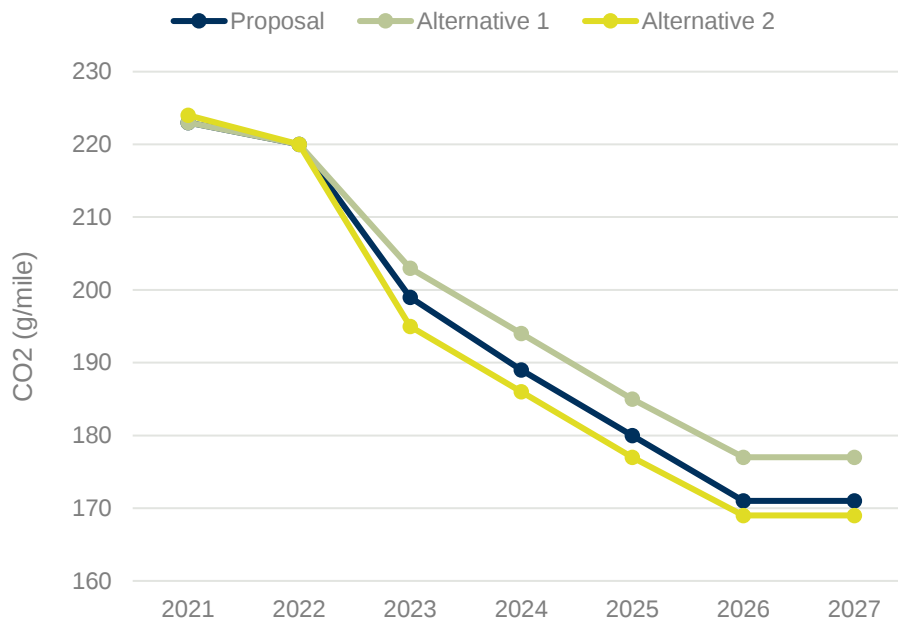
Alternatives Considered

Along with the proposed standards, EPA analyzed both a more stringent and a less stringent alternative:

- Alternative 1 is a less stringent alternative where the MY 2023 stringency level is aligned with the California Framework, and the MY 2026 stringency level is based on the 2012 rule’s standard for MY 2025.
- Alternative 2 is a more stringent approach wherein the 2012 stringency levels are adopted in MY 2023 and followed through MY 2025, and the same linear trajectory is followed through MY 2026.

Figure 4 below compares the two alternatives to the proposed standards. The range of alternatives that EPA is considering is fairly narrow, with the proposed standard targets differing from the alternatives in any given MY in MYs 2023–2026 by 2 to 6 g/mile. EPA believes this approach is reasonable and appropriate considering the relatively short lead time for the proposed standards.

Figure 4: Comparison of EPA’s Proposed Standards and Alternatives



Source: EPA’s Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, Figure 2: Proposed Standards Fleet Average Targets Compared to Alternatives, pg. 50.

In discussing the selection of alternatives, and in particular the less stringent Alternative 1, EPA noted that five manufacturers have already committed to the California Framework level of stringency and further stated:

“Given our conclusion that standards more stringent than those in Alternative 1 are clearly feasible considering available technology and compliance costs, and in light of the critical national need to quickly and substantially reduce light-duty GHG emissions, we believe at this time that a program of the stringency of Alternative 1 (and any less stringent alternative) would not be appropriate given EPA’s consideration of the public health and welfare benefits of potential standards.”

Regarding Alternative 2, EPA notes that they while reaching the 2012 levels in 2023 may be feasible, they have chosen to propose standards are less stringent than Alternative 2 “to provide a more gradual transition to the 2012 trajectory.”

In addition, EPA is requesting comment on standards for MY 2026 that would result in fleet average target levels that are in the range of 5–10 g/mile lower (i.e., more stringent) than the levels for MY 2026. EPA is requesting specific comment on whether the level of stringency for MY 2026 should be greater in keeping with the additional lead time available for this out-year compared to MYs 2023–2025, and because EPA may determine that it is appropriate, particularly in light of the accelerating transition to electrified vehicles, to require additional reductions in this timeframe. EPA also requests comments on all aspects of Alternatives 1 and 2 or other alternatives roughly within the stringency range of the proposal and the alternatives.

Other Considerations

Interaction with Federal Fuel Economy Standards

In Executive Order 13990, President Biden directed NHTSA and EPA to consider whether to propose suspending, revising, or rescinding the SAFE Rule standards for MYs 2021–2026. Both agencies have determined that it is appropriate to propose revisions to their respective standards; EPA is proposing to revise its GHG standards and, in a separate rulemaking action, NHTSA will propose to revise its CAFE standards. NHTSA issued this rulemaking, *Notice of Proposed Rulemaking regarding Corporate Average Fuel Economy Standards for Model Years 2024–2026 Passenger Cars and Light Trucks*, on August 10, 2021.¹⁰

EPA has concluded that, while it remains committed to ensuring that GHG emissions standards for light duty vehicles are coordinated with fuel economy standards for those vehicles, it is unnecessary for EPA to do so specifically through a joint rulemaking. EPA notes that the agencies have different statutory mandates and their respective programs have always reflected those differences; the agencies have recognized these different mandates, and the fact that they have produced different analytical approaches and standards reflects this approach. EPA notes that it has consulted significantly with NHTSA in the development of this proposal.

Interaction with California’s Program

In the Proposed Rule, EPA is proposing standards that are equivalent to the stringency of the California Framework Agreements emission reduction targets in MY 2023. The standards are set to become increasingly more stringent than the Framework Agreements from MY 2024 through 2026.

EPA notes that it has considered California standards in past vehicle standards rules as it considered the factors of feasibility, costs of compliance, and lead time. Regarding the Proposed Rule, EPA states that the California Framework Agreement provisions, and that five automakers representing about a third of U.S. vehicle sales voluntarily committed to them, at a minimum provide a clear indication of manufacturers’ capabilities to produce cleaner vehicles than required by the SAFE rule standards.

In a separate but related action, on April 28, 2021, EPA issued a Notice of Reconsideration for the previous withdrawal of the waiver for California’s GHG emission standards under the Advanced Clean Cars rule (which 16 other states have adopted or are in the process of adopting under Section 177 of the CAA). EPA is requesting comments on whether the withdrawal should be rescinded, which would reinstate the waiver. EPA is currently reviewing comments, after which EPA plans to take final action.

Environmental Justice

Executive Orders 12898 (59 Federal Regulation [FR] 7629, February 16, 1994) and 14008 (86 FR 7619, February 1, 2021) direct federal agencies, to the greatest extent practicable and permitted by law, to make achieving EJ part of their mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations in the United States.

EPA notes that EJ concerns may arise in the context of the Proposed Rule in two key areas. First, minority populations and low-income populations may be especially vulnerable to the impacts of climate change. Second,

¹⁰ NHTSA, *Advanced Notice of Proposed Rulemaking regarding Corporate Average Fuel Economy Standards for Model Years 2024–2026 Passenger Cars and Light Trucks* (August 10, 2021). Available at <https://www.nhtsa.gov/sites/nhtsa.gov/files/2021-08/CAFE-NHTSA-2127-AM34-Preamble-Complete-web.pdf>

in addition to significant climate-change benefits, the proposed standards would also impact non-GHG emissions; numerous studies have found that environmental hazards such as air pollution are more prevalent in areas where minority populations and low-income populations represent a higher fraction of the population compared with the general population.

Regarding non-GHG impacts, EPA expects small non-GHG emissions reductions from the combination of “upstream” emissions sources related to extracting, refining, transporting, and storing petroleum fuels. EPA also expects small increases in emissions from upstream electricity generating units. A possible increase in emissions from coal- and natural gas-fired electricity generation to meet increased EV electricity demand could result in adverse EJ impacts. For light duty vehicles, the proposed standards would reduce total non-GHG emissions, though EPA expects small increases in some non-GHG emissions in the years immediately following implementation of the proposal, followed by growing decreases in emissions in later years, due to the rebound VMT effect. EPA states that there is evidence that communities with EJ concerns are disproportionately impacted by the non-GHG emissions associated with the Proposed Rule.

EPA states that it intends to develop a future rule to control emissions of GHGs as well as criteria and air toxic pollutants from light-duty vehicles for MYs beyond 2026. EPA is considering how to project air quality impacts from the changes in non-GHG emissions for that future rulemaking.

Additional Actions and Commitments

On August 5, President Biden signed an executive order with the target of making half of all new vehicles sold in 2030 zero-emissions vehicles (ZEVs), including battery electric, plug-in hybrid electric, or fuel cell EVs.

On August 5, in alignment with President Biden’s executive order, the aforementioned automakers issued a joint statement in support of the new ZEV target and “a strong nationwide greenhouse gas standard.”¹¹ In addition, industry groups, including the United Auto Workers and Alliance for Automotive Innovation, and automakers also commented in support of the ZEV target and the Proposed Standards.¹²

Next Steps

EPA is soliciting comments on the Proposed Rule. A public meeting will be held on Wednesday, August 25, 2021. An additional meeting session may be held on Thursday, August 26, 2021 if needed to accommodate additional testifiers. Written comments are due on or before Friday, September 27, 2021.

In a separate rulemaking issued August 10, 2021, NHTSA proposed to revise its CAFE standards. Additionally, EPA will consider reinstating the waiver for California’s Advanced Clean Cars Program.

¹¹ [Statements on the Biden Administration’s Steps to Strengthen American Leadership on Clean Cars and Trucks | The White House](#)

¹² Id.

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