ORAL ARGUMENT NOT YET SCHEDULED

No. 22-1031

(Consolidated with Nos. 22-1032, 22-1033, 22-1034, 22-1035, 22-1036, and 22-1038)

UNITED STATES COURT OF APPEALS
FOR THE DISTRICT OF COLUMBIA CIRCUIT

STATE OF TEXAS et al.,

Petitioners,

v.

U.S. ENVIRONMENTAL PROTECTION AGENCY and MICHAEL S. REGAN, in his official capacity as Administrator of the U.S. Environmental Protection Agency,

Respondents.

On Petitions for Review of Final Action
by the U.S. Environmental Protection Agency

BRIEF OF AMICUS CURIAE INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION IN SUPPORT OF RESPONDENTS

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CERTIFICATE AS TO PARTIES, RULINGS, AND RELATED CASES

Pursuant to Circuit Rule 26.1, amicus curiae International Council on Clean Transportation ("ICCT") certifies that it is an independent nonprofit organization that provides unbiased and internationally recognized research and technical and scientific analysis to policymakers regarding the transportation sector. ICCT is not organized as a for-profit corporation, association, joint venture, syndicate, or similar entity. ICCT has no parent company, and no other company has an ownership interest in ICCT.

All parties have consented to ICCT's participation as amicus curiae in these consolidated cases. All parties, intervenors, and other amici appearing in these consolidated cases are listed in the Initial Brief for Private Petitioners (ECF No. 1972107) and EPA's Proof Answering Brief (ECF No. 1987499), except for amici not yet known.

The ruling under review is the final action taken by Michael S. Regan, Administrator, U.S. Environmental Protection Agency, entitled *Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards*, 86 Fed. Reg. 74,434 (Dec. 30, 2021).

There are no related cases within the meaning of Circuit Rule 28(a)(1)(C). These consolidated cases have been designated for argument on the same day and before the same panel as *NRDC v. National Highway Traffic Safety Administration*, Case No. 22-1080 and consolidated cases. Order (Sept. 22, 2022).

RULE 29 STATEMENTS

Pursuant to Federal Rule of Appellate Procedure 29(a)(4)(E), amicus curiae ICCT represents that its counsel drafted this brief. No party or its counsel made a monetary contribution intended to fund the preparation or submission of this brief, and no person other than amicus curiae or their counsel contributed money that was intended to fund the preparation or submission this brief.

Pursuant to Circuit Rule 29(d), amicus curiae ICCT certifies that a separate brief is necessary to provide its technical expertise and unique perspective and analysis of the analytical model that EPA formulated in devising its standards. No other brief, to its knowledge, will provide this perspective and analysis.

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GLOSSARY

EPA	U.S. Environmental Protection Agency
EV	Electric vehicle
ICCT	International Council on Clean Transportation
Private Pet'rs' Br.	Petitioners American Fuel & Petrochemical Manufacturers, et al., Initial Brief
State Pet'rs' Br.	Petitioners State of Texas, et al., Proof Brief

IDENTITY AND INTEREST OF AMICUS CURIAE

The International Council on Clean Transportation ("ICCT") is an independent nonprofit organization that provides unbiased and internationally recognized research and technical and scientific analysis to policymakers. ICCT staff include scientific experts on the control of pollutants and greenhouse gas emissions from light-duty vehicles.

ICCT staff members have authored or co-authored more than 68 reports, working papers, and information papers related to baseline analyses, technology feasibility, cost-benefit analyses, and policy updates related to the development of fuel-efficiency and greenhouse gas standards in the United States. They have also authored or co-authored more than 94 papers to support the development of similar standards in Australia, Brazil, Canada, China, the European Union, India, Indonesia, New Zealand, South Africa, and Turkey.

ICCT has a strong interest in ensuring that the Court's decision in these consolidated cases affirms EPA's authority to further the development and use of sound, science-based decision-making in regulating greenhouse gas emissions from the transportation sector. This amicus brief will assist the Court by discussing the technological

feasibility of EPA's standards, including by demonstrating that the arguments made by Petitioners' State of Texas, et al. ("Petitioners") rest on a mistaken assumption about the required market penetration of electric vehicles in relation to EPA's Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards.

SUMMARY OF ARGUMENT

At the end of 2021, EPA finalized federal greenhouse gas emissions standards for passenger cars and light-duty trucks for model years 2023 through 2026 ("Revised 2023 Standards"). *Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards*, 86 Fed. Reg. 74,434 (Dec. 30, 2021). The Standards revised and replaced those set by the Safer Affordable Fuel-Efficient Vehicles Rule, which had significantly weakened the standards that were in place before it. *See The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks*, 85 Fed. Reg. 24,174 (Apr. 30, 2020). The Standards set more stringent emissions targets in light of automakers' rapid development and deployment of emission-reduction technologies, as well as similarly dramatic advances in vehicle electrification technologies. According to

EPA, both trends indicated that "more stringent near-term standards are feasible at reasonable cost and would achieve significantly greater [greenhouse gas] emissions reductions and public health and welfare benefits than the existing program." 86 Fed. Reg. at 74,435.

The Petitioners—a group that includes states, oil and gas companies, and their related trade organizations—now challenge EPA's rulemaking on the theory that the Revised 2023 Standards force automakers to shift towards the production of electric vehicles ("EVs") and thus constitute an EV mandate.[1] The Petitioners allege that this purported mandate exceeds EPA's statutory authority, and they therefore ask the Court to invalidate the Revised 2023 Standards.

The factual premise underlying the Petitioners' argument is false. The standards are not an EV mandate, nor do they force automakers to

[1] For the purposes of this brief, "electric vehicles" ("EVs" for short) includes plug-in hybrid electric vehicle, battery-only electric vehicle, and fuel-cell vehicle technologies. The term does not include many widespread, emissions-reducing technologies like conventional hybrids. *See* EPA's Proof Answering Br. at 8 (describing the spectrum of vehicle electrification technologies). Although it would be most accurate to describe vehicles powered by plug-in hybrid technology, battery-only transmissions, and fuel cells as "zero-emission vehicles," the Petitioners use the phrase "electric vehicles," and this brief will do the same for the sake of clarity.

achieve specific levels of EV production. As we explain below, ICCT—an independent, nonprofit expert in transportation analysis—used the same analytical model that EPA employed in developing the Revised 2023 Standards to test three different scenarios restricting EV market penetration—the proportion of EVs that automakers produce and that consumers buy—in light-duty vehicle fleets. Apart from these restrictions, the model otherwise uses all of the same inputs that EPA employed in its own analysis. The results reveal that automakers will be able to achieve the Revised 2023 Standards even if EV penetration increases less than the Standards presume—or even if EV penetration stays flat in a manner that defies contemporary market trends.

ICCT's analysis demonstrates the flexibility inherent in the Revised 2023 Standards. Automakers can achieve the Standards through any combination of several different compliance strategies, and the Standards deliver significant net benefits, even with varying restrictions on EV penetration. ICCT's analysis also shows, however, that EV production remains a cost-effective strategy for reducing greenhouse gas emissions, which may explain why many of the world's largest automakers have already committed to electrifying their vehicle

fleets by 2035, even absent the Revised 2023 Standards. Contrary to the Petitioners' arguments, the Standards' projections regarding EV penetration are the result of cost-effective strategic choices to meet emissions targets, not a mandate that forces automakers to achieve a specific level of EV production.

In short, ICCT's analysis demonstrates that the Revised 2023 Standards are in fact achievable through technology improvements and flexible compliance mechanisms. The Petitioners' arguments lack merit, and the Court should uphold the Revised 2023 Standards.

BACKGROUND

I. Transportation's outsized greenhouse gas emissions

The transportation sector is the largest source of greenhouse gas emissions in the United States. U.S. Dep't of Energy et al., *The U.S. National Blueprint for Transportation Decarbonization: A Joint Strategy to Transform Transportation* 28 (2023). It is responsible for a third of the nation's overall greenhouse gas emissions, and half of those emissions come from light-duty vehicles, a category that includes cars and sport utility vehicles as well as most vans and pickup trucks. *Id.*

More than 97 percent of greenhouse gas emissions from light-duty vehicles are carbon dioxide, with methane, nitrogen oxide, and

hydrofluorocarbons constituting the remainder. *Id.* at 28-29. The increased concentration of these gases—particularly carbon dioxide—in the atmosphere is the main cause of global climate change. Intergovernmental Panel on Climate Change, *Climate Change 2021: The Physical Science Basis—Summary for Policymakers* 21 (2021).

II. Technological advances across the auto industry

Automakers can reduce—and have reduced—greenhouse gas emissions from their vehicles in a number of ways. These improvements have included everything from designing more aerodynamic vehicle bodies to reducing vehicle weight to making internal combustion engines more efficient. 86 Fed. Reg. at 74,485. Automakers have developed these kinds of technological innovations at a higher frequency in recent years, and they have incorporated them into their vehicles at a similarly rapid clip. *Id.* at 74,435.

At the same time, the electrification of light-duty vehicles has advanced at a remarkable pace in the past few years. The number of EV models available on the market more than doubled between the 2015 and 2021 model years (from 24 to 60), and the number of available

models is expected to further grow by more than a third between the 2021 and 2023 model years (from 60 to 80). *Id.* at 74,486-87.

These increases reflect deeper shifts in the market. Many of the world's largest automakers have committed to significantly expanding EV production in the next few years. *Id.* at 74,486; *see also* Zifei Yang, *Beyond Europe: Are There Ambitious Electrification Targets Across Major Markets*, Int'l Council on Clean Transp. Staff Blog (Nov. 15, 2022).[2] Ford, GM, BMW, Volkswagen, and Stellantis (which owns brands like Chrysler, Jeep, and Ram) have all committed to fleets half comprised of zero-emission vehicles by 2030. *Id.* By 2035, Mercedes-Benz's fleet will be entirely zero-emission. *Id.* And Volvo, which has the most ambitious electrification commitment of any automaker, has announced that its fleet will be 100 percent electric by 2030. *Id.*

The increase in demand for EVs has been similarly significant. EV sales accounted for nearly five percent of all new light-duty vehicle sales in the United States in 2021. Ilma Fadhil et al., *Electric Vehicles Market Monitor for Light-Duty Vehicles: China, Europe, United States,*

[2] Available at https://theicct.org/global-oem-targets-cars-ldvs-nov22/.

and India, 2020 and 2021 6 (2022). Sales grew by a further 40 percent in 2022. Noah Gabriel, *$210 Billion of Announced Investments in Electric Vehicle Manufacturing Headed for the U.S.*, EV Hub (Jan 12. 2023).[3] In California, nearly one out of every five new cars sold last year was an EV. Anne Mulkern, *Calif. Zero-Emission Vehicle Sales Hit Record High*, E&E News (Jan 23. 2023).[4]

III. The Revised 2023 Standards

On August 10, 2021, EPA issued a proposed rule setting forth new light-duty-vehicle standards for greenhouse gas emissions. *Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards*, 86 Fed. Reg. 43,726 (Aug. 10, 2021). Given EPA's statutory obligation to provide automakers sufficient lead time to achieve the standards, 42 U.S.C. § 7521(a)(2), EPA chose to revise the standards for model years 2023 through 2026, 86 Fed. Reg. at 43,728.

[3] Available at https://www.atlasevhub.com/data_story/210-billion-of-announced-investments-in-electric-vehicle-manufacturing-headed-for-the-u-s/.

[4] Available at https://subscriber.politicopro.com/article/eenews/2023/01/23/calif-zero-emission-vehicle-sales-hit-record-high-00078890.

EPA published its final Revised 2023 Standards on December 30, 2021. 86 Fed. Reg. at 74,434. The Revised 2023 Standards set increasingly stringent benchmarks over time, tightening standards by 10 percent for the 2023 model year, 5 percent for 2024, 6.6 percent for 2025, and 10 percent again for 2026. *Id.* at 74,438. EPA projected that these benchmarks would translate to industry-wide targets of 202 grams per mile in 2023, 191 grams per mile in 2024, 179 grams per mile in 2025, and 161 grams per mile in 2026. *Id.* at 74,440.

Automakers may choose from any combination of a variety of strategies to comply with the Revised 2023 Standards. They may implement new technologies to improve vehicle efficiency and reduce greenhouse gas emissions. *See id.* at 74,438. They may reduce emissions from internal combustion engines by manufacturing hybrid powertrains or incorporating technologies like start-stop systems. *Id.* And they may choose to produce EVs. *Id.* Automakers also have options beyond their vehicle fleets. They may use flexible compliance mechanisms to achieve the Standards in individual model years, such as emissions credits that can be applied proactively or retroactively. *Id.* at 74,453. They may also use multiplier incentives that allow a low-

emitting vehicle "to 'count' as more than one vehicle in the manufacturer's compliance calculation." *Id.* at 74,459. Automakers regularly take all of these strategies into account in determining the most cost-effective compliance strategy.

As a part of its proposed rulemaking, EPA conducted a technical analysis to determine how automakers would likely choose among these different compliance strategies to achieve the Revised 2023 Standards. 86 Fed. Reg. at 43,474. EPA's modeling simulates the decision-making processes of automakers as they pursue emissions reductions across their respective fleets. *Id.* at 43,443. It analyzes the projected costs of different technologies and their respective abilities to reduce greenhouse gas emissions to determine the most-cost effective strategy for each automaker in complying with the Standards. *Id.* at 43,770.

IV. The current dispute

On February 28, 2022, a number of states, oil and gas companies, and the companies' related trade organizations, among others, challenged the Revised 2023 Standards in part on the theory that they are impossible to achieve without continued, significant EV production. *See, e.g.,* Proof Brief for State Petitioners ("State Pet'rs' Br.") 2 (arguing

that the Standards "functionally force vehicle manufacturers to start shifting their fleet production to an ever-increasing share of electric vehicles."); Initial Brief for Private Petitioners ("Private Pet'rs' Br.") 2-3 (EPA "made the emissions standards so stringent that they amount to a *de facto* electric vehicle mandate").

Such a mandate, the Petitioners argue, is outside EPA's authority under the Clean Air Act and therefore unlawful. *See, e.g.*, State Pet'rs' Br. 2 ("EPA had no authority to promulgate the Standards and functionally force vehicle manufacturers to produce more electric vehicles."); Private Pet'rs' Br. 17 ("Because Congress nowhere provided clear authorization for EPA to effectively mandate electrification of the Nation's vehicles, the rule cannot stand.").

ARGUMENT

I. EPA has promulgated flexible standards that automakers can achieve through different pathways.

The Petitioners' arguments rest on a central factual premise: that the only way for automakers to achieve the Revised 2023 Standards is to make and sell more and more EVs between 2023 and 2026. This premise is incorrect. Automakers do not need to produce EVs to comply

with the Standards, and the Standards are not a mandate to achieve a specific level of EV production.[5]

To evaluate the feasibility of minimizing EVs as a compliance strategy for achieving the Revised 2023 Standards, ICCT commissioned an analysis from an engineering consultant with over 40 years of experience in air quality modeling, particularly in the transportation sector.[6] At ICCT's direction, the consultant employed the same analytical model and inputs that EPA employed in developing the Revised 2023 Standards (again, to evaluate compliance pathways that automakers could use to meet the standards under different technological scenarios).

In addition to analyzing a baseline scenario that replicated EPA's assumptions (and results), ICCT's consultant tested three different scenarios, again using the same methodology that EPA employed. The three scenarios restricted—to differing levels—EV market penetration,

[5] ICCT does not concede that, even if the Revised 2023 Standards were a mandate that automakers make and sell more EVs, they would therefore be an impermissible exercise of EPA's authority.

[6] The consultant's analysis is attached hereto as Appendix A and his biography as Appendix B.

which reflects both automakers' production and consumers' purchases of EVs. For each scenario, the consultant limited the EV penetration rate and used the model to identify the least-cost compliance pathway for achieving the Revised 2023 Standards in each year between 2023 and 2029. Given that automakers may apply credits forward and backward for up to three years, running the model through 2029 is necessary to provide analysis across the full timeframe for compliance.

Overall, the results demonstrate that automakers can—and will—achieve EPA's Revised 2023 standards even if EV penetration increases less than EPA predicts—and indeed, even if EV penetration remains flat. Sections I.A through I.C (pages 14 to 22) discuss these scenarios and their results in greater detail.

Importantly, all the scenarios modeled in ICCT's analysis are highly unlikely. Current market trends indicate that EV penetration will grow significantly—even absent federal regulation—rather than constrict or remain stagnant, as the various scenarios predict. However, the scenarios show that automakers can still meet the Revised 2023 Standards even if they reject electrification as a light-duty vehicle market strategy. They may choose to make and sell more EVs,

but they need not do so to achieve the Standards, a fact that EPA recognized in its rulemaking. 86 Fed. Reg. at 74,484 ("The standards are performance-based and do not mandate any specific technology for any manufacturer or any vehicles.").

In short, ICCT's analysis shows that the Revised 2023 Standards do not constitute a mandate to produce a specific level of EVs. The Standards are easily achievable under contemporary market conditions, and the Court should uphold the Revised 2023 Standards accordingly.

A. ICCT used EPA's model to run three scenarios restricting EV penetration.

Table 1: EV Penetration Rates

	Model Year						
	2023	2024	2025	2026	2027	2028	2029
Scenario Zero: Revised 2023 Standards							
Cars	10%	12%	16%	17%	20%	22%	22%
Light Trucks	5%	9%	11%	17%	17%	18%	18%
Fleet (Cars and Light Trucks)	7%	10%	14%	17%	19%	20%	20%
Scenario One: Curtailment at 2020 Rates							
Cars	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%
Light Trucks	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Fleet	2.6%	2.7%	2.6%	2.7%	2.7%	2.7%	2.7%
Scenario Two: Curtailment at 2022 Rates							
Cars	10.2%	10.3%	10.3%	10.3%	10.3%	10.4%	10.4%
Light Trucks	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Fleet	8.0%	8.0%	8.0%	8.0%	8.1%	8.1%	8.1%

Scenario Three: Curtailment outside of Advanced Clean Cars[7]							
Cars	6.5%	6.7%	7.3%	7.4%	7.4%	7.4%	7.5%
Light Trucks	1.0%	2.0%	2.3%	2.3%	2.3%	2.3%	2.3%
Fleet	3.6%	4.2%	4.6%	4.7%	4.7%	4.7%	4.7%

In its analysis, ICCT employed EPA's technical model to predict how automakers would comply with the Revised 2023 Standards if EV penetration were curtailed. In addition to a baseline scenario that replicated EPA's analysis, ICCT evaluated three scenarios with varying levels of EV penetration (see Table 1 above). Apart from changing EV penetration levels, ICCT did not change any other input in the model.

To ensure that its scenarios were directly comparable to EPA's, ICCT first ran the model with the exact same parameters that EPA used. The first scenario—Scenario Zero—produced results identical to those published as part of the final Revised 2023 Standards. *Compare* App. B, Table 24/25/26 *with* Table 26—Combined Fleet Achieved Levels, 86 Fed. Reg. at 74,482. Under Scenario Zero, EV penetration steadily increases by three to four percentage points every model year, ultimately reaching 20 percent by 2029.

[7] In this context, "Advanced Clean Cars" refers to the regulatory program adopted by California and the states that follow that program pursuant to Section 177 of the Clean Air Act. *See* 42 U.S.C. § 7507.

Scenario One curtails EV penetration to the maximum extent possible by essentially locking it in at the model's 2020 rate. Under this scenario, EV penetration remains locked in at 2.6 or 2.7 percent for every model year between 2023 and 2029.

Scenario Two forecasts EV penetration through the 2022 model year and then curtails EV sales thereafter. In this way, Scenario Two projects what would happen if the EV market froze not at 2020 levels, but instead at 2022 levels, the year before the Revised 2023 Standards go into effect. Under these conditions, EV penetration stays constant at 8.0 or 8.1 percent through 2029, reflecting the projected growth of EVs between 2020 and 2022.

Scenario Three curtails EV penetration outside of California and the states that have adopted California's regulations pursuant to Section 177 of the Clean Air Act. *See* 42 U.S.C. § 7507. In this scenario, penetration rates increase in the relevant states with the implementation of California's regulatory program but are frozen everywhere else at the 2020 Rate. The scenario thus simulates greenhouse gas emission reductions in the absence of both the Revised 2023 Standards and market-driven growth in states that do not follow

California's regulatory program. Here, EV penetration steadily increases, rising to 3.6 percent in 2023, 4.2 percent in 2024, and 4.6 percent in 2025, before plateauing at 4.7 percent through 2029.

Notably, the penetration rates for all three scenarios are highly unlikely, given contemporary market trends. Scenarios One and Three are especially unlikely, as they would require EV penetration rates to *decrease* below 2020 levels, even as EVs become increasingly popular among automakers and consumers.

B. The three scenarios demonstrate that automakers can achieve compliance with the Revised 2023 Standards even with restricted EV penetration.

Table 2: Achieved Levels (Carbon dioxide equivalent in grams per mile)

	Model Year						
	2023	2024	2025	2026	2027	2028	2029
Scenario Zero: Revised 2023 Standards							
Cars	160	148	140	134	141	136	136
Light Trucks	230	211	203	178	186	182	181
Fleet	197	181	173	157	165	160	159
Scenario One: Curtailment at 2020 Rate							
Cars	160	145	138	133	136	135	134
Light Trucks	230	214	206	190	186	183	181
Fleet	198	182	175	164	163	160	159
Scenario Two: Curtailment at 2022 Rate							
Cars	156	142	138	132	138	136	135
Light Trucks	221	207	201	185	187	184	183
Fleet	191	177	172	160	164	161	160
Scenario Three: Curtailment outside of Advanced Clean Cars							
Cars	158	145	138	133	138	135	135
Light Trucks	231	214	206	190	187	184	183
Fleet	197	182	175	163	164	161	160

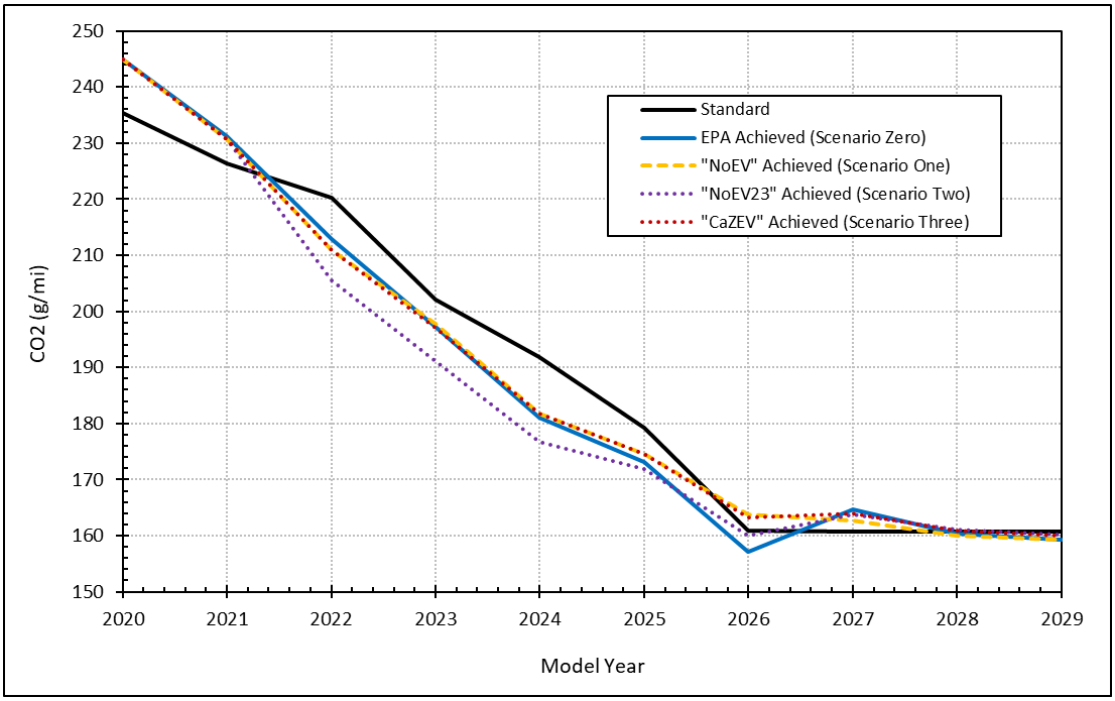
ICCT's modeling indicates that automakers can achieve compliance with the Revised 2023 Standards for every model year across all three scenarios (see Table 2 above). In addition, by 2029—the year in which the model can fully evaluate the impact of the Standards on the 2026 model year—all scenarios produce equivalent emissions levels. The analysis therefore shows that the U.S. automobile industry can and will achieve the Standards, even with significant restrictions on EV penetration. The Revised 2023 Standards therefore do not constitute an industry-wide mandate to produce a specific level of EVs.

While fleetwide averages fall marginally above the Revised 2023 Standards in some years under some scenarios, that difference is inconsequential for two reasons. First, just like previous emissions standards, the Revised 2023 Standards include flexible compliance mechanisms that help automakers close minor gaps in individual years. 86 Fed. Reg. at 74,463. Every scenario accounts for the fact that automakers often use these mechanisms in their compliance strategies. The automakers' choice to do so, and their resulting achievement of the Standards, is exactly what EPA contemplates in its rulemaking. *Id.* at

74,438; *see also infra* Section II.C (pages 25 to 27) (discussing flexible compliance mechanisms in greater detail).

Second, as Table 2 demonstrates, all four scenarios achieve identical reductions in greenhouse gas emissions by 2029. Figure 1 makes this fact even more apparent:

Figure 1: Standards versus Achieved Levels through 2029



Regardless of the choices automakers make in the next few years, they all can achieve the same levels of emissions reductions in their light-duty-vehicle fleets.

C. The Revised 2023 Standards deliver significant net benefits even with restricted EV production.

Table 3: Monetized Discounted Costs, Benefits, and Net Benefits of the Final Program for Calendar Years Through 2050 (Billions of 2018 Dollars)

	Present Value		Annualized Value	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Scenario Zero: Revised 2023 Standards				
Costs	$300	$180	$15	$14
Fuel Savings	$320	$150	$16	$12
Benefits	$170	$150	$8.6	$8.1
Net Benefits	$190	$120	$9.5	$6.2
Scenario One: Curtailment at 2020 Rates				
Costs	$460	$270	$23	$22
Fuel Savings	$380	$190	$19	$15
Benefits	$230	$180	$12	$11
Net Benefits	$160	$100	$8.0	$4.4
Scenario Two: Curtailment at 2022 Rates				
Costs	$370	$220	$19	$18
Fuel Savings	$360	$180	$18	$15
Benefits	$220	$170	$11	$9.9
Net Benefits	$210	$130	$11	$6.8
Scenario Three: Curtailment outside of Advanced Clean Cars				
Costs	$440	$260	$22	$21
Fuel Savings	$360	$180	$18	$14
Benefits	$220	$170	$11	$10
Net Benefits	$150	$95	$7.5	$4.0

In determining compliance pathways, EPA's model produces the cost, fuel savings, benefits, and net benefits of each scenario (see Table 3 above). The model also estimates the average compliance cost per vehicle for each scenario in comparison to Scenario Zero (the Revised 2023 Standards) (see Table 4 below). ICCT's analysis indicates that all

three scenarios yield significant net benefits while producing only modest cost increases, and the Revised 2023 Standards would be a cost-effective regulatory program even with EV penetration restricted.

Table 3 demonstrates this fact clearly. Scenarios One, Two, and Three all produce benefits that far exceed their costs under either a three percent or seven percent discount rate. Overall, the three scenarios would deliver net benefits between $95 billion and $210 billion between now and 2050, which translates to net benefits between $4 billion and $11 billion per year on an annualized basis.

These benefits are significant even though modest cost increases arise with constraints on EV penetration (see Table 4 below). These results indicate that EVs are a particularly cost-effective means of reducing greenhouse gas emissions compared to other technologies. The EV growth reflected in the compliance modeling for the Revised 2023 Standards is the logical result of this reality.

Table 4: Average Cost Per Vehicle in 2018 Dollars

	Model Year						
	2023	2024	2025	2026	2027	2028	2029
Scenario Zero: Revised 2023 Standards							
Cars	$150	$288	$586	$596	$802	$908	$839
Light Trucks	$485	$732	$909	$1,356	$1,469	$1,462	$1,381
Fleet	$330	$524	$759	$1,000	$1,159	$1,207	$1,132

Scenario One: Curtailment at 2020 Rate							
Cars	$663	$1,058	$1,276	$1,381	$1,373	$1,422	$1,396
Light Trucks	$569	$938	$1,113	$1,513	$1,556	$1,607	$1,602
Fleet	$614	$996	$1,194	$1,459	$1,481	$1,531	$1,516
Scenario Two: Curtailment at 2022 Rate							
Cars	$318	$622	$820	$952	$986	$1,058	$1,013
Light Trucks	$753	$989	$1,092	$1,393	$1,424	$1,420	$1,384
Fleet	$553	$820	$970	$1,194	$1,229	$1,260	$1,220
Scenario Three: Curtailment outside of Advanced Clean Cars							
Cars	$627	$881	$1,098	$1,227	$1,226	$1,299	$1,259
Light Trucks	$605	$914	$1,150	$1,526	$1,585	$1,626	$1,612
Fleet	$616	$900	$1,129	$1,391	$1,424	$1,479	$1,453

II. The Revised 2023 Standards provide automakers with a number of potential compliance pathways.

The results of ICCT's analysis are unsurprising given that EPA provided significant flexibility for automakers to achieve the Revised 2023 Standards. The Standards empower automakers to develop emissions-reduction strategies that combine a wide range of efficiency improvements, a shift towards vehicle electrification, and flexible compliance mechanisms.

A. EPA designed standards that are achievable through widely available technologies.

Though the Private Petitioners claim that "EPA has asserted the power to phase out conventional vehicles," Private Pet'rs' Br. 24, such vehicles remain at the center of the Revised 2023 Standards. EPA decided to revise its prior standards in large part because of the pace of

innovation and implementation in reducing vehicle greenhouse gas emissions—e.g., improving the efficiency of internal combustion engines or producing more hybrid powertrains. EPA designed the Revised 2023 Standards to be achievable primarily through such improvements. 86 Fed. Reg. at 74,438. In fact, EPA "believes the technological achievements already developed and applied to vehicles within the current new vehicle fleet will enable the industry to achieve the final standards even without the development of new technologies beyond those already widely available." *Id.* at 74,493.

This possibility is more than just theoretical. EPA's analysis predicts that one automaker, Subaru, will achieve the Revised 2023 Standards despite EV penetration rates of zero percent through 2025 and one percent in 2026. *See id.* at 74,485 (listing fleet penetration rates for each manufacturer by model year).

B. EPA's penetration rates for EVs are in line with current market trends.

The Private Petitioners are similarly incorrect in arguing that "natural market forces would not produce" the EV growth rate that the Revised 2023 Standards anticipate. Private Pet'rs' Br. 15. In the context of industry estimates, EPA's projection of 17 percent EV

penetration by 2026 is both reasonable and in line with current market trends. EPA projected this level of EV penetration would be the most cost-effective way for automakers to meet the Revised 2023 Standards.

Between growing consumer demand and pre-existing manufacturer commitments, EV penetration rates are expected to grow at an unprecedented pace over the next few years. Before the passage of the Inflation Reduction Act in 2022, industry forecasts projected EV penetration rates ranging from 15 percent to over 24 percent by 2026. *See* 86 Fed. Reg. 74,438 nn.12-14 (citing respective estimates of 15 percent, 19 percent, and 24.3 percent in 2026). Following the Inflation Reduction Act's passage, those forecasts have risen even further. For example, a separate analysis conducted by ICCT predicts that EV penetration could go as high as 35 percent in 2026, even without the implementation of the Revised 2023 Standards. Peter Slowik et al., *Analyzing the Impact of the Inflation Reduction Act on Electric Vehicle Uptake in the United States* 13 (2023).

Given this context, EPA's projection of 17 percent market share is consistent with industry forecasts and reflects the ongoing and organic changes currently occurring in the light-duty-vehicle market. Rather

than forcing EV production, EPA developed light-duty-vehicle emissions standards that match, and likely underestimate, the increased deployment of EVs that automakers have voluntarily chosen to pursue.

C. The Revised 2023 Standards give automakers additional flexibility through multipliers and credit trading mechanisms.

Efficiency improvements and vehicle electrification give automakers ample room to achieve the Revised 2023 Standards in a flexible and cost-effective manner. To provide even more room, the Standards also allow flexible compliance mechanisms, like multipliers and credit trading, that help automakers to meet the Standards should they not achieve the targets in a given model year. Automakers have already taken advantage of these mechanisms to achieve compliance in recent years, and EPA expects automakers to "continue to take advantage of the compliance flexibilities and crediting programs to their fullest extent." 86 Fed. Reg. at 74,497.

The reason is simple: flexible compliance mechanisms help automakers achieve emissions standards during strategic transition periods. *See id.* at 74,494 ("EPA believes that credit trading will continue to be an important compliance flexibility that manufacturers

will take advantage of, especially when differences and timing of product strategies are likely to persist across manufacturers."). For example, if automakers have an excess of passenger cars that achieve emissions standards but light-duty trucks that do not, they can use the surplus from their passenger car fleet to offset the deficit from their light-duty truck fleet. *Id.* at 74,453. Automakers similarly can, and regularly do, trade their credits with other automakers to help each other achieve compliance. *Id.*

Together, these three pathways—technological efficiency improvements, EVs, and flexible compliance mechanisms—provide automakers with great discretion to decide how to achieve the Revised 2023 Standards. Given prevailing trends in the auto industry, EPA reasonably notes that the Standards "are achievable primarily through the application of advanced gasoline vehicle technologies but with a growing percentage of electrified vehicles." *Id.* at 74,438. In this way, the Revised 2023 Standards do not force automakers to develop new technologies or to produce EVs at greater rates beyond they have already announced.

Rather, the Revised 2023 Standards account for recent advances across the industry and provide significant flexibility, thereby allowing automakers to meet the Standards by whatever strategy they choose to pursue. Many, if not most automakers, will choose to produce—or are already producing—EVs as a part of those efforts. Others will not. The bottom line is that the Revised 2023 Standards provide effective and flexible pathways to reduce greenhouse gas emissions in a rapidly evolving industry that is already doing much to serve that goal.

CONCLUSION

ICCT's expert analysis demonstrates that EPA's Revised 2023 Standards do not force EV production. Rather, ICCT's analysis proves that the Standards are achievable even if EV penetration rates never exceeded 2020 levels, a situation that would require EV sales to decrease in defiance of current market trends. For these reasons, the Court should deny the petitions for review.

March 3, 2023

Respectfully submitted,

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Appendix A

Analysis Prepared by ICCT Consultant Dan Meszler

To: Stephanie Searle and Zifei Yang, ICCT

From: Dan Meszler, Meszler Engineering Services

Subject: Results of EPA Modeling Review

Date: January 16, 2023

As requested by the ICCT, I have undertaken a review of the U.S. Environmental Protection Agency's (EPA's) technical analysis for its December 30, 2021 rulemaking entitled "Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards" (86 FR 74434). This review consisted of estimating the impacts of the EPA rule with varying levels of electric vehicle technology. To ensure comparability, the methodology employed in the review utilized the same modeling tools and the same modeling assumptions utilized by the EPA,[1] except as otherwise indicated to accommodate the evaluated alternative technology assumptions. Accordingly, the initial analysis step consisted of exercising the model to ensure that results identical to those published in December 30, 2021 rulemaking were obtained. This confirmatory step was successful.

The primary focus of the review was to evaluate the sensitivity of the rulemaking impacts to varying levels of electric vehicle technology. Such technology, as defined for this review, includes plug-in hybrid electric vehicle (PHEV), battery-only electric vehicle (BEV), and fuel cell vehicle (FCV) technology. In terms of the technology definitions in EPA's modeling tool, this includes PHEV20, PHEV50, PHEV20T,[2] PHEV50T, PHEV20H,[3] PHEV50H, BEV200, BEV300, and FCV technology.

As estimated by the EPA and as confirmed in this analysis, electric vehicle (PHEV+BEV) sales are estimated to comprise 17 percent of new vehicle sales in model year 2026 under the adopted regulations (Table 33, 86 FR 74485). For convenience, I refer to the modeling and associated

[1] Consisting of the "Corporate Average Fuel Economy (CAFE) Compliance and Effects Modeling System (CCEMS)" computer model and associated input files, as well as an associated EPA-produced post-processing tool (EPA_CCEMS_PostProcessingTool) and related Excel spreadsheets, all of which are available in the docket for the December 30, 2021 rulemaking. In all cases, the modeling approach employed by the EPA was maintained such that separate modeling runs were performed for vehicle manufacturers participating in the California "Framework Agreement" and for vehicle manufacturers not participating in the California Agreement, with the post-processing tool serving to aggregate the results from the separate modeling runs.

[2] T indicates turbocharger technology.

[3] H indicates high compression ratio technology.

set of input data that underlie this impact estimate as Scenario Zero. To determine the impact of limiting electric vehicle sales, this analysis includes impact estimates for three additional modeling scenarios. Scenario One presents impacts for a "minimal electric vehicle" scenario, in which electric vehicle sales are curtailed to the maximum extent possible. Scenario Two presents "middle ground" impacts for a scenario in which electric vehicle sales are allowed to respond to market conditions prior to vehicle model year 2023, the effective model year of the adopted regulations, and are fully restricted thereafter. Scenario Three approximates the national electric vehicle population if the California ZEV program is in effect in California and all 177 states and electric vehicle technology is maximally curtailed elsewhere. All three alternative scenarios evaluate the impacts of a future in which electric vehicles are not associated with compliance under the adopted model year 2023 through 2026 regulatory standards – and are directly comparable to Scenario Zero in which electric vehicles are fully available for regulatory compliance.

Before presenting impact estimates, it is important to understand the constraints that affect electric vehicle technology in the EPA model and its associated input data. For example, it is not possible to set electric vehicle sales to absolute zero as there are electric vehicles in the baseline (i.e., model year 2020) fleet upon which the impact model is based. In fact, the baseline electric vehicle market share is 2.35% (0.50% PHEV and 1.85% BEV), so that this serves as the effective floor for future electric vehicle market share. In addition, even though electric vehicle technology can be "turned off" from future availability in the impact model, the overall market share of electric vehicles can still vary by a marginal amount due to both changes in vehicle sales over time[4] and the limited propagation of previously adopted electric vehicle technology across vehicles related to those that were defined as having such technology in the baseline fleet. Thus, some minor change in electric vehicle market share will be evidenced even when additional technology adoption is restricted. In the case where the technology restriction is implemented only beginning in model year 2023, the electric vehicle market response will vary across regulatory scenarios (i.e., the market share estimated with and without the model year 2023 through 2026 regulations) as the impact model has a forward looking compliance algorithm. Thus, since the future standards vary, the electric vehicle market response in years prior to model year 2023 is dependent on the model year 2023 and later standards so that the baseline and "with standards" market shares are not identical even though further adoption after model year 2023 is prohibited.

It is also important to recognize that regulatory impacts reflect the differential between a baseline (i.e., no action) program and the adopted model year 2023 through 2026 standards. Electric vehicle technology can be incentivized under either program, so it is not reasonable to restrict electric vehicle technology under one program and not the other. Thus, in all scenarios where such technology is restricted, it is restricted under both baseline (i.e., no action) and alternative conditions, allowing for a meaningful apples-to-apples comparison.

[4] The model estimates sales based on costs. As technology costs change, sales respond accordingly, resulting in slightly different sales figures for different technology paths.

As stated above, EPA post-processing tools were utilized to the maximum extent possible to ensure comparability to published baseline data. This includes a series of spreadsheets used to aggregate post-processor outputs. One of those sheets, "compliance_report_FRM_PrimaryRuns.xlsx," contains links to an external file of an EPA user instead of links to an internal data table. This has been corrected for this analysis to ensure that reported data properly reflects modeling run results.

Finally, while EPA published model year-specific data for vehicle model years 2023 through 2026 only, the tables that follow present data for model years 2023 through 2029. I extend the presented data for three additional model years to ensure that idiosyncrasies associated with the CCEMS model employed by the EPA do not lead to invalid comparisons across evaluation scenarios when viewed in the context of an overly narrow evaluation window. Given that the CCEMS model recognizes that CAFE compliance is based on model year averaging and that vehicle manufacturers are allowed to both carry forward early credits and make up deficits by earning credits for three model years after each applicable standard year, the use of an evaluation window that extends at least three model years beyond the applicability date of the latest adopted (or proposed) standard (i.e., the model year 2026 standard in the case of this evaluation) is common practice. For example, in their latest CAFE rulemaking for vehicle model years 2023 through 2026, the National Highway Transportation Safety Administration (NHTSA), the developers of the CCEMS model employed by the EPA, states that:

> *The bulk of our analysis considers a ''model year'' perspective that considers the lifetime impacts attributable to all vehicles produced prior to MY* [model year] *2030, … This approach emphasizes the role of MYs 2024–2026, while accounting for the potential that it may take manufacturers a few additional years to produce fleets fully responsive to the final MY 2026 standards,*[12] *…* (87 FR 25725)
>
> [12] *The fact that manufacturers have up to three model years to ''settle'' compliance for a given model year is a function of statutory flexibilities—namely, that overcompliance credits may be ''carried back'' up to three model years—and does not in any way imply that NHTSA believes that the MY 2026 standards are not feasible in MY 2026.* (87 FR 25725)

> *NHTSA estimates that this final rule would increase the eventual*[30] *average of manufacturers' CAFE requirements to about 49 mpg by 2026 …* (87 FR 25735)
>
> [30] *Here, ''eventual'' means by MY 2029, after most of the fleet will have been redesigned under the MY 2026 standards. NHTSA allows the CAFE Model to continue working out compliance solutions for the regulated model years for three model years after the last regulated model year, in recognition of the fact that manufacturers do not comply perfectly with CAFE standards in each model year.* (87 FR 25735)

As available technology changes (in this evaluation as a result of restrictions placed on electric vehicle technology), the CCEMS model may estimate variations in model year-specific emissions levels for scenarios with equally stringent standards (as is the case here). This variation results from changes in the technologies applied to specific vehicles across scenarios and the sensitivity of subsequent technology adoption to vehicle redesign and refresh schedules. Thus, comparing emissions levels for only a single model year can lead to an incorrect assumption of inequality. All scenarios evaluated in this analysis produce equivalent emissions levels by model year 2029, by which time the CCEMS model is able to fully evaluate the impacts of model year 2026 standards.

With this approach and the stated constraints in effect, the following tables present the estimated electric vehicle market shares and associated impacts for the four evaluated scenarios.

Table 31/32/33 presents the electric vehicle model year sales fractions for the EPA published scenario and the three evaluated alternative scenarios. As indicated, model year 2026 electric vehicle market shares decline from 17% under the EPA evaluated scenario to about half that under the model year 2023 and later restricted scenario to baseline market shares under the "minimal electric vehicle" scenario. Electric vehicle market shares under the California ZEV program scenario are modestly above those of the "minimal electric vehicle" scenario. The analysis applies the same restrictions to BEV, PHEV, and FCV technology in each of the scenarios, but only PHEV+BEV penetration data is reported in order to match the reporting format employed by the EPA. Under Scenarios Zero, One, and Two, FCV penetrations are less than 0.01% through MY2029, and about 0.2% in that same timeframe under Scenario Three.

Table 24/25/26 presents the achieved level of CO_2 emissions for the EPA published scenario and the three evaluated alternative scenarios. While the targeted standards are identical under all four scenarios, achieved emission levels in any given model year vary modestly (generally on the order of ±5%, for reasons as described above) in accordance with differential electric vehicle shares. Figure 1 is a graphical depiction of the achieved emissions levels versus the effective standard. As shown, while there is variation in achieved emissions levels for a given model year, all evaluated scenarios result in emissions below the applicable model year 2026 standard by model year 2029, by which time the CCEMS model has fully evaluated the effects of the differential technology compliance paths.

Table 4 presents the costs, fuel savings, benefits, and net benefits[5] of the adopted model year 2023 through 2026 standards (evaluated through calendar year 2050, as defined in the EPA rulemaking). As indicated, the net benefits of the program range from $95-$210 billion (2018) dollars on a net present value basis and from $4.0-$11 billion (2018) dollars on an annualized basis regardless of the electric vehicle market share.

Table 5 presents the average compliance cost per vehicle[6] for the evaluated electric vehicle technology scenarios. As indicated, compliance costs increase rather significantly when electric vehicle technology is constrained, but it is nevertheless clear that the adopted model year 2023 through 2026 standards can be achieved using less cost-effective internal combustion engine technology should vehicle manufacturers elect to undertake such a compliance strategy.

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[5] *Costs* include changes in foregone consumer sales surplus, technology costs, congestion costs, noise costs, fatality costs, and non-fatal crash costs. *Fuel Savings* include changes in non-tax fuel outlay. *Benefits* include changes in refueling time costs, petroleum externality costs, drive value, NO_x damage costs, PM damage costs, SO_2 damage costs, CO_2 damage costs, CH_4 damage costs, and N_2O damage costs. *Net Benefits* equal *Fuel Savings* plus *Benefits* minus *Costs*.

[6] *Compliance Cost* is the retail technology cost plus fines, if any.

Table 31/32/33. BEV+PHEV Penetration Rates Under the Final Standards. (86 FR 74484-74485)

	Model Year						
	2023	2024	2025	2026	2027	2028	2029
Scenario Zero							
Cars	10%	12%	16%	17%	20%	22%	22%
Light Trucks	5%	9%	11%	17%	17%	18%	18%
Fleet (Cars + Lt. Trucks)	7%	10%	14%	17%	19%	20%	20%
Scenario One							
Cars	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%	5.2%
Light Trucks	0.4%	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Fleet (Cars + Lt. Trucks)	2.6%	2.7%	2.6%	2.7%	2.7%	2.7%	2.7%
Scenario Two							
Cars	10.2%	10.3%	10.3%	10.3%	10.3%	10.4%	10.4%
Light Trucks	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Fleet (Cars + Lt. Trucks)	8.0%	8.0%	8.0%	8.0%	8.1%	8.1%	8.1%
Scenario Three							
Cars	6.5%	6.7%	7.3%	7.4%	7.4%	7.4%	7.5%
Light Trucks	1.0%	2.0%	2.3%	2.3%	2.3%	2.3%	2.3%
Fleet (Cars + Lt. Trucks)	3.6%	4.2%	4.6%	4.7%	4.7%	4.7%	4.7%

Scenario Zero is EPA rulemaking scenario. Scenario One maximally curtails electric vehicle technology adoption. Scenario Two curtails model year 2023 and later electric vehicle technology adoption. Scenario Three approximates the national electric vehicle population if the California ZEV program is in effect in California and all 177 states and electric vehicle technology is maximally curtailed elsewhere. Table numbering coincides with that of the EPA rulemaking at 86 FR 74484-74485.

Table 24/25/26. Achieved Levels [CO_2 g/mile]. (86 FR 74481-74482)

	Model Year						
	2023	2024	2025	2026	2027	2028	2029
Scenario Zero							
Cars	160	148	140	134	141	136	136
Light Trucks	230	211	203	178	186	182	181
Fleet (Cars + Lt. Trucks)	197	181	173	157	165	160	159
Scenario One							
Cars	160	145	138	133	136	135	134
Light Trucks	230	214	206	190	186	183	181
Fleet (Cars + Lt. Trucks)	198	182	175	164	163	160	159
Scenario Two							
Cars	156	142	138	132	138	136	135
Light Trucks	221	207	201	185	187	184	183
Fleet (Cars + Lt. Trucks)	191	177	172	160	164	161	160
Scenario Three							
Cars	158	145	138	133	138	135	135
Light Trucks	231	214	206	190	187	184	183
Fleet (Cars + Lt. Trucks)	197	182	175	163	164	161	160

Scenario Zero is EPA rulemaking scenario. Scenario One maximally curtails electric vehicle technology adoption. Scenario Two curtails model year 2023 and later electric vehicle technology adoption. Scenario Three approximates the national electric vehicle population if the California ZEV program is in effect in California and all 177 states and electric vehicle technology is maximally curtailed elsewhere. Table numbering coincides with that of the EPA rulemaking at 86 FR 74481-74482.

Figure 1. Effective Standard and Achieved Emission Levels [CO_2 g/mile].

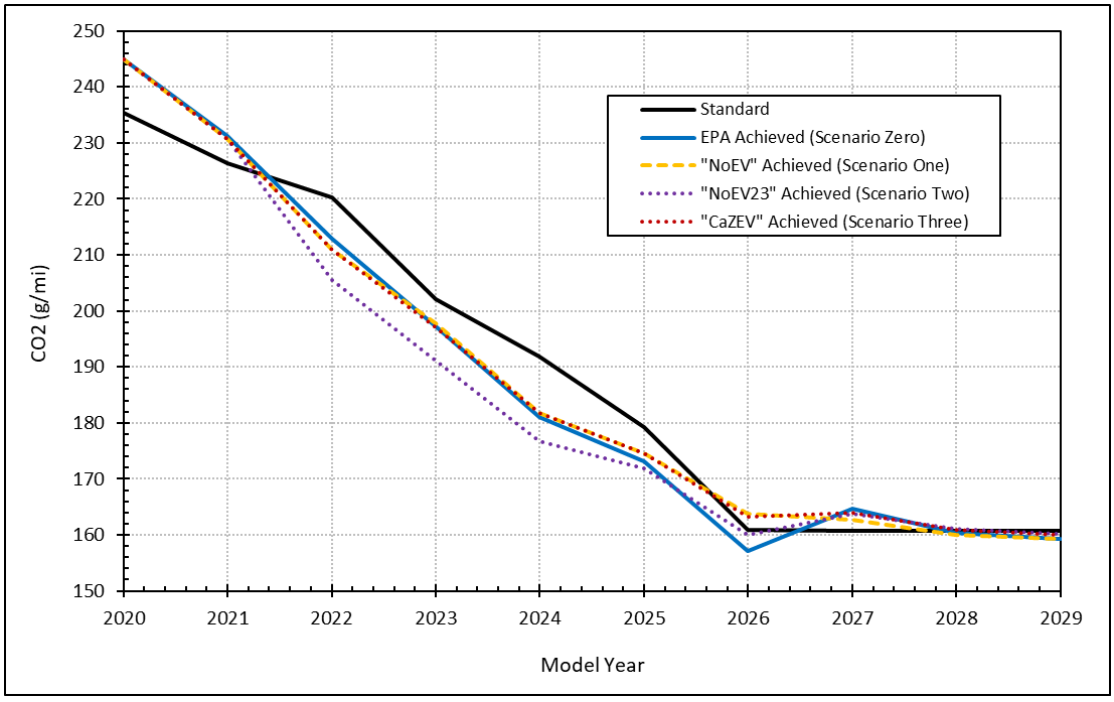

Table 4. Monetized Discounted Costs, Benefits, and Net Benefits of the Final Program for Calendar Years Through 2050 (billions of 2018 dollars). (86 FR 74443)

	Present Value		Annualized Value	
	3% Discount Rate	7% Discount Rate	3% Discount Rate	7% Discount Rate
Scenario Zero				
Costs	$300	$180	$15	$14
Fuel Savings	$320	$150	$16	$12
Benefits	$170	$150	$8.6	$8.1
Net Benefits	$190	$120	$9.5	$6.2
Scenario One				
Costs	$460	$270	$23	$22
Fuel Savings	$380	$190	$19	$15
Benefits	$230	$180	$12	$11
Net Benefits	$160	$100	$8.0	$4.4
Scenario Two				
Costs	$370	$220	$19	$18
Fuel Savings	$360	$180	$18	$15
Benefits	$220	$170	$11	$9.9
Net Benefits	$210	$130	$11	$6.8
Scenario Three				
Costs	$440	$260	$22	$21
Fuel Savings	$360	$180	$18	$14
Benefits	$220	$170	$11	$10
Net Benefits	$150	$95	$7.5	$4.0

Scenario Zero is EPA rulemaking scenario. Scenario One maximally curtails electric vehicle technology adoption. Scenario Two curtails model year 2023 and later electric vehicle technology adoption. Scenario Three approximates the national electric vehicle population if the California ZEV program is in effect in California and all 177 states and electric vehicle technology is maximally curtailed elsewhere. Table numbering coincides with that of the EPA rulemaking and additional footnotes as stated at 86 FR 74443 continue to apply.

Table 5. Average Cost Per Vehicle Relative to the No Action Scenario [2018 dollars]. (86 FR 74444)

	Model Year						
	2023	2024	2025	2026	2027	2028	2029
Scenario Zero							
Cars	$150	$288	$586	$596	$802	$908	$839
Light Trucks	$485	$732	$909	$1,356	$1,469	$1,462	$1,381
Fleet (Cars + Lt. Trucks)	$330	$524	$759	$1,000	$1,159	$1,207	$1,132
Scenario One							
Cars	$663	$1,058	$1,276	$1,381	$1,373	$1,422	$1,396
Light Trucks	$569	$938	$1,113	$1,513	$1,556	$1,607	$1,602
Fleet (Cars + Lt. Trucks)	$614	$996	$1,194	$1,459	$1,481	$1,531	$1,516
Scenario Two							
Cars	$318	$622	$820	$952	$986	$1,058	$1,013
Light Trucks	$753	$989	$1,092	$1,393	$1,424	$1,420	$1,384
Fleet (Cars + Lt. Trucks)	$553	$820	$970	$1,194	$1,229	$1,260	$1,220
Scenario Three							
Cars	$627	$881	$1,098	$1,227	$1,226	$1,299	$1,259
Light Trucks	$605	$914	$1,150	$1,526	$1,585	$1,626	$1,612
Fleet (Cars + Lt. Trucks)	$616	$900	$1,129	$1,391	$1,424	$1,479	$1,453

Scenario Zero is EPA rulemaking scenario. Scenario One maximally curtails electric vehicle technology adoption. Scenario Two curtails model year 2023 and later electric vehicle technology adoption. Scenario Three approximates the national electric vehicle population if the California ZEV program is in effect in California and all 177 states and electric vehicle technology is maximally curtailed elsewhere. Table numbering coincides with that of the EPA rulemaking at 86 FR 74444.

Appendix B

Biographical Information for ICCT Consultant Dan Meszler

Dan Meszler, the sole proprietor of Meszler Engineering Services, is a registered Professional Engineer and an independent contractor with over 40 years of experience and expertise in a wide range of energy and air quality issues, with particular emphasis on transportation sources. Mr. Meszler has been self-employed for the last 20 years, prior to which he was employed by Energy and Environmental Analysis, Inc. (since acquired by ICF International) and the Maryland Department of the Environment (where he was the head of the mobile sources control program). Mr. Meszler has four decades of modeling and emissions experience, two decades of which address motor vehicle CO_2 emissions (a period that coincides with the entirety of efforts to control such emissions). Mr. Meszler was a key consultant during the California Air Resources Board's development of the first CO_2 emission standards in the U.S. Mr. Meszler has expert knowledge of the CAFE and CO_2 emissions models employed by U.S. regulators and has used (and at times revised) such models in support of projects for multiple

clients. Mr. Meszler has written an average of five or so technical reports annually for the last several decades.

CERTIFICATE OF COMPLIANCE

I certify that the foregoing brief is complies with the type-volume limitations of the Court's order filed September 22, 2022 (ECF Dkt No. 1965631) because, according to the Microsoft Word word-processing program on which it was created, it is proportionately spaced, has a Century Schoolbook typeface of 14 points, and contains 4,966 words, excluding those parts of the brief exempted under Federal Rule of Appellate Procedure 32(f) and Circuit Rule 32(e)(1).

/s/ Matthew J. Sanders
Matthew J. Sanders

CERTIFICATE OF SERVICE

I hereby certify that, on March 3, 2023, I electronically filed the foregoing with the Clerk of the Court for the United States Court of Appeals for the District of Columbia Circuit using the appellate CM/ECF system, which served a copy of the document on all counsel of record in the case.

March 3, 2023 Respectfully submitted,

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