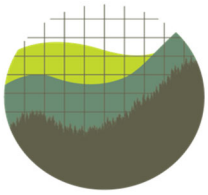

Institute *for*
Policy Integrity
NEW YORK UNIVERSITY SCHOOL OF LAW

July 5, 2023

To: Environmental Protection Agency

Re: Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles, 88 Fed. Reg. 29,184 (proposed May 5, 2023)

The Institute for Policy Integrity at New York University School of Law (Policy Integrity)[1] respectfully submits this comment letter on the Environmental Protection Agency's (EPA) multi-pollutant emissions standards for model years 2027–2032 light-duty and medium-duty vehicles (Proposed Rule).[2] Policy Integrity is a non-partisan think tank dedicated to improving the quality of government decisionmaking through advocacy and scholarship in the fields of administrative law, economics, and public policy.

The Proposed Rule represents a sensible approach to cost-effectively reducing motor vehicle pollution that contributes to climate change and harms public health. EPA can, however, take numerous additional steps to robustly support the regulation and ensure a complete presentation of benefits and costs in its regulatory impact analysis (RIA).[3] Specifically, Policy Integrity makes these recommendations:

- **EPA should catalog regulatory antecedents for its approach to considering vehicle electrification and provide additional context about the economic significance of the Proposed Rule.** Doing so would demonstrate that the Proposed Rule does not trigger the major questions doctrine as articulated in *West Virginia v. EPA* and *Biden v. Nebraska* because the Proposed Rule lacks the indicators of history and breadth that have previously triggered the doctrine. Adding additional nuance regarding economic significance—especially describing the Proposed Rule's effect on the full U.S. vehicle fleet, as opposed to only new sales—may also help to contextualize the rule's impacts and diffuse major questions objections.

- **EPA should conduct additional economic analysis around key parameters to ensure robust consideration of analytical uncertainties and enable the agency to make the most informed choice between alternatives.** This includes conducting additional analysis using climate-damage valuations and social discount rates from draft guidance documents that reflect the best available science and economics. Additionally, EPA should conduct additional analysis to ensure that its baseline, rebound, and safety modeling fully and robustly

[1] This document does not purport to represent the views, if any, of New York University School of Law.
[2] Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light- Duty and Medium-Duty Vehicles, 88 Fed. Reg. 29,184 (proposed May 5, 2023) [Proposed Rule].
[3] EPA, Draft Regulatory Impact Analysis: Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light- Duty and Medium-Duty Vehicles (Apr. 2023) [RIA].

incorporate the growing share of electric vehicles. Moreover, EPA should provide additional analysis around energy security to ensure analytical completeness and offer further support for its approach.

- **EPA should more clearly affirm that these standards help correct market failures that prevent consumers from optimizing fuel savings and that this "energy efficiency gap" remains even as electric vehicles become more prominent.** In particular, EPA should reconsider or clarify language that could be read to question the continued relevance of the energy efficiency gap, as economic literature strongly indicates that this phenomenon will continue as electric vehicles become more common. EPA should also highlight additional market failures contributing to the energy efficiency gap—some of which it recognized in its last tailpipe standards.

- **EPA should select the alternative that will maximize net social welfare, barring a compelling reason otherwise.** Currently, EPA's modeling concludes that the more stringent alternative (Alternative 1) would result in greater net benefits than the proposed program. This gap widens further with economic modeling improvements, such as updating the social discount rate and social cost of greenhouse gases consistent with recent draft guidance.

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Background

The Proposed Rule, which EPA published in May 2023, would strengthen tailpipe emissions standards for greenhouse gas and criteria pollutants for both light-duty and medium-duty vehicles. The standards apply to vehicle model years beginning in 2027 and would increase in stringency through model year 2032.

The Proposed Rule follows a series of prior EPA tailpipe regulations under Section 202 of the Clean Air Act (CAA). EPA has issued prior greenhouse gas emissions standards in 2010 (2010 Rule),[4] 2012 (2012 Rule),[5] 2020 (2020 Rule),[6] and 2021 (2021 Rule),[7] the last of which is currently being challenged in the U.S. Court of Appeals for the D.C. Circuit.[8] EPA has issued criteria pollutants standards on numerous prior occasions, most recently in 2014.[9] The Proposed Rule adopts many of the same regulatory approaches from prior regulations (such as the continued use of fleetwide averaging, banking, and trading), and EPA assesses the proposal's regulatory impacts using many of the same methods and models that it has developed for prior standards. For instance, EPA assesses the Proposed Rule's benefits and costs using an updated version of the Optimization Model for Reducing Emissions of Greenhouse Gases from Automobiles (OMEGA) that it applied in the 2010[10] and 2012 rules.[11]

Using the OMEGA model, EPA presents the Proposed Rule's regulatory impacts in the RIA. According to EPA, the regulation would accelerate the transition to electric vehicles—and, in particular, battery-electric vehicles (BEV)—which present an attractive compliance option for automakers.[12] The agency concludes that the Proposed Rule would produce considerable benefits primarily by reducing greenhouse gas and criteria pollution and saving consumers in fuel, repair, and maintenance costs.[13] EPA also projects that the Proposed Rule would produce costs such as increased investment in vehicle technology and charging infrastructure.[14] In total, EPA concludes that the Proposed Rule will result in $85–120 billion in annualized net benefits for

[4] Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, 75 Fed. Reg. 25,324 (May 7, 2010) [2010 Rule].
[5] 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 77 Fed. Reg. 62,624 (Oct. 15, 2012) [2012 Rule].
[6] 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) [2020 Rule].
[7] Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, 86 Fed. Reg. 74,434 (Dec. 30, 2021) [2021 Rule].
[8] Texas v. Env't Prot. Agency, Case No. 22-1031 (D.C. Cir. filed Feb. 28, 2022).
[9] Control of Air Pollution From Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards, 79 Fed. Reg. 23,414 (Apr. 28, 2014).
[10] *See* 2010 Rule, 75 Fed. Reg. at 25,446.
[11] 2012 Rule, 77 Fed. Reg. at 62,842. EPA did not use OMEGA in the 2020 or 2021 rules. 2021 Rule, 86 Fed. Reg. at 74,474.
[12] Compare RIA at 13-35 tbl.13-67 (projecting 39% penetration of BEVs in model year 2032 under the status quo) *with id.* at 13-37 tbl.13-73 (projecting 67% of BEVs in model year under the Proposed Rule).
[13] *Id.* at xlvii tbl.5. EPA monetizes PM2.5-related health benefits, but other benefits related to reductions in criteria pollutants and air toxics are unmonetized. *See id.*; *id.* at 7-45 tbl.7-3.
[14] *Id.* at xlvii tbl.5 (projecting vehicle technology costs and EVSE port costs).

calendar years 2027 through 2055 when using a 3% discount rate for all regulatory effects.[15] This equates to a total net benefit of $1.6–2.3 trillion.[16]

In addition to the Proposed Rule, EPA also considers three regulatory alternatives: one that is more stringent (Alternative 1), one that is less stringent (Alternative 2), and one that results in the same standards but has a different phase-in schedule (Alternative 3).[17] Of the options evaluated, EPA finds that Alternative 1 would result in the greatest monetized net benefits. Specifically, EPA projects that Alternative 1 would produce $93–130 billion in annualized net benefits using a consistent 3% discount rate[18] or $1.8–2.5 trillion in total net benefits.[19] This is approximately $10 billion more per year than the Proposed Rule[20] and about $200 billion more in total. EPA considers numerous factors under Section 202 and considers its net-benefits estimates to be relevant to its decisionmaking, but not dispositive.[21]

I. EPA Should More Extensively Document Why the Proposed Rule Does Not Trigger the Major Questions Doctrine

Litigation over the 2021 Rule has focused primarily on the major questions doctrine, and some opponents of the Proposed Rule have raised similar objections. Petitioners in the ongoing D.C. Circuit litigation argue that the 2021 Rule triggered the major questions doctrine primarily because, in their words, "[t]he rule effectively mandates that a decreasing percentage of the fleet be gasoline-powered, and an increasing percentage be electric."[22]

Challenges to both the 2021 Rule and this rule under the major questions doctrine lack merit. Nonetheless, as explained in this section, EPA could provide more extensive legal analysis rebutting these challenges. Specifically, EPA should catalog regulatory antecedents for its approach to considering vehicle electrification and provide additional context about the economic significance of the Proposed Rule. We begin, however, with a brief description of the major questions doctrine.

A. Economic and Political Significance Are Not Sufficient to Trigger the Major Questions Doctrine—The Agency's Action Must Also Be Unlike Anything It Has Done Before and Represent a "Transformative Expansion" of Its Authority

Litigants and commenters invoking the major questions doctrine—including challengers in the ongoing litigation over the 2021 Rule—often invoke the major questions doctrine without

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[15] *Id*. This range exists because EPA provides two different estimates of climate benefits using a 3% discount rate. EPA also applies two additional estimates of climate benefits using discount rates of 2.5% and 5%, respectively, and also discounts all non-climate impacts at an annual rate of 7%. In total, EPA presents eight estimates of annualized net benefits, which range from $48–120 billion. *Id.*

[16] *Id.* The full range of all eight estimates is $610 billion–2.3 trillion. *Id.*

[17] Proposed Rule, 88 Fed. Reg. at 29,201.

[18] RIA at liii tbl.16. The eight estimates that EPA presents (*see supra* note 15) range from $52–130 billion. *Id.*

[19] *Id.* The full range of all eight estimates is $660 billion–2.5 trillion.

[20] EPA finds that Alternative 2 and Alternative 3 would result in similar or slightly lower net benefits than the Proposed Rule. *See id.* at liv tbl.17 (projecting annualized net benefits of $78–110 billion for Alternative 2 using a consistent 3% discount rate); *id.* at lv tbl.18 ($82–120 billion for Alternative 3 using a consistent 3% discount rate).

[21] *See* Proposed Rule, 88 Fed. Reg. at 29,347 (explaining that results of cost-benefit analysis "reinforces [EPA's] view that the proposed standards are appropriate").

[22] Brief for Private Petitioners at 24, *Texas v. EPA* (D.C. Cir. filed Nov. 3, 2022).

properly describing its contours. To provide legal context, this section describes how the Supreme Court has articulated the doctrine.

In *West Virginia v. EPA*, the Supreme Court stressed that only "extraordinary cases" trigger the major questions doctrine—"cases in which the 'history and the breadth of the authority that the agency has asserted,' and the 'economic and political significance' of that assertion, provide a 'reason to hesitate before concluding that Congress' meant to confer such authority."[23] The bulk of *West Virginia*'s legal analysis of the doctrine's triggers examined whether EPA had "'claim[ed] to discover in a long-extant statute [1] an unheralded power' [2] representing a 'transformative expansion in [its] regulatory authority.'"[24] In other words, the Supreme Court focused on (1) regulatory history and (2) the transformative nature of the agency's asserted authority. In *Biden v. Nebraska*, the Supreme Court again reiterated the importance of "the 'history and the breadth of the authority that the agency had asserted,'" in addition to "the 'economic and political significance' of that assertion."[25] For example, the Court stressed that "[t]he Secretary [of Education] has never previously claimed powers of this magnitude under" the statute at issue in *Nebraska* and, "[u]nder the Government's reading of [that statute], the Secretary would enjoy virtually unlimited power to rewrite" it.[26] Both *West Virginia* and *Nebraska* reveal that an agency action does not trigger the major questions doctrine unless its history *and* breadth *and* economic and political significance provide a reason for a court to be skeptical of the agency's action.

To trigger the major questions doctrine, regulatory history must reveal that an agency action is unlike anything the agency has ever done. Of course, the agency need not identify an identical regulatory antecedent, because new regulations will rarely, if ever, be identical to previous ones as they would then be unnecessary. Rather, *West Virginia*'s and *Nebraska*'s analyses suggest that the relevant regulatory antecedent must be an analogous exercise of authority. The cases cited in *West Virginia* similarly focus on the unprecedented nature of the agency's action.[27] And the Court reaffirmed the centrality of "past practice under the statute" in *Nebraska*, both in terms of the "scope" of prior agency actions and the "size" of those actions' effects.[28]

To trigger the major questions doctrine, the breadth of the agency action must also suggest the agency is dramatically changing its authority. In *West Virginia*, the Supreme Court explained that the challenged Clean Power Plan represented a "transformative expansion [of EPA's]

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[23] West Virginia v. EPA, 142 S. Ct. 2587, 2608 (2022) (quoting FDA v. Brown & Williamson Tobacco Corp., 529 U.S. 120, 159–60 (2000)) (alteration omitted).
[24] *Id.* at 2610 (quoting Util. Air Regul. Grp. v. EPA (*UARG*), 573 U.S. 302, 324 (2014)).
[25] Biden v. Nebraska, --- S. Ct. ---, 2023 WL 4277210, at *12 (June 30, 2023) (quoting *West Virginia*, 142 S. Ct. at 2608) (alterations omitted).
[26] *Id.* at *12–*13.
[27] For example, *UARG* notes that EPA's newfound statutory interpretation would have "swept" many sources under the agency's control that it had "not previously regulated." 573 U.S. at 310. *Alabama Association of Realtors v. Department of Health and Human Services* (*Alabama Realtors*) also highlights that the "expansive authority" asserted was "unprecedented." 141 S. Ct. 2485, 2489 (2021) (per curiam). And *National Federation of Independent Business v. Occupational Safety & Health Administration* likewise focused on the "lack of historical precedent" for the agency's action. 142 S. Ct. 661, 666 (2022) (per curiam) (cleaned up). In contrast, the Supreme Court rejected a challenge to a vaccine mandate from the Department of Health and Human Services for certain healthcare workers because "the Secretary routinely imposes conditions of participation that relate to the qualifications and duties of healthcare workers." *Biden v. Missouri*, 142 S. Ct. 647, 653 (2022) (per curiam).
[28] Nebraska, 2023 WL 4277210, at *12 (quoting *Alabama Realtors*, 141 S. Ct. at 2489)); *see also id.* at *14 (describing the action as "unprecedented").

regulatory authority."[29] In other words, the Supreme Court concluded that it "effected a 'fundamental revision of the statute, changing it from [one sort of] scheme of . . . regulation' into an entirely different kind."[30] In discussing this factor, the Court focused on whether the challenged action transformed the role of the regulator (i.e., EPA), not the regulated sector.[31] *Nebraska*[32] and the major questions cases cited in *West Virginia*[33] contain similar analyses of whether the agency action represented a transformation of the agency's authority.

The economic and political significance of an agency's action is necessary but insufficient to trigger the major questions doctrine. Although the Supreme Court often references economic and political significance in its major questions cases, these indicators alone have never sufficed to trigger the doctrine. For example, *West Virginia*'s legal analysis omits any references to economic significance, such as regulatory costs or the number of persons or entities affected. Moreover, the Supreme Court has decided numerous recent cases under sizable government programs without resort to the major questions doctrine, including cases involving gargantuan programs like Medicare[34] and myriad other agency actions implicating the energy, utility, and telecommunications industries.[35] And although *Nebraska* discusses economic and political significance, it does so only after reviewing regulatory antecedents and the transformation of the regulatory scheme.[36] Much of *Nebraska*'s economic discussion also focused on the relative costs of the challenged action compared to prior agency actions under the same statute, highlighting how this aspect of the regulatory history demonstrated the action was unlike anything the Secretary of Education had done before.[37]

In short, economic significance[38] and political significance are sometimes relevant but have never been sufficient by themselves to trigger the major questions doctrine, which instead also requires examining whether the agency action at issue is of sufficient novelty and breadth to counsel skepticism. Only when the doctrine is so triggered must the agency point to "clear congressional authorization" for the agency's approach.[39] But this is not the same as a "clear

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[29] *West Virginia*, 142 S. Ct. at 2610.
[30] *Id.* at 2612 (citation omitted).
[31] *See id.*; *see also Mayes v. Biden*, 67 F.4th 921, 934–35 (9th Cir. 2023) (focusing not on whether the government sought "to regulate a significant portion of the American economy," but on whether its action "*represent[ed]* an 'enormous and transformative expansion in [its] regulatory authority'" (quoting *UARG*, 573 U.S. at 324)).
[32] *Nebraska*, 2023 WL 4277210, at *13 ("[The Government's reading of the [statute] . . . would 'effect a "fundamental revision of the statute, changing it from one sort of scheme of regulation" into an entirely different kind . . . .'" (quoting *West Virginia*, 142 S. Ct. at 2596) (alterations omitted)).
[33] *See, e.g., UARG*, 573 U.S. at 312, 325 (noting that EPA's action "would radically expand" the programs at issue, "making them both unadministrable and 'unrecognizable to the Congress that designed' them" (citation omitted)); MCI Telecom. Corp. v. Am. Tel. & Tel. Co., 512 U.S. 218, 225, 229, 234 (1994) (finding that the agency action had effected a "basic and fundamental" change that went to the "heart" of the statute and constituted "effectively the introduction of a whole new regime of regulation").
[34] *See, e.g.*, Becerra v. Empire Health Found., 142 S. Ct. 2354 (2022); Am. Hosp. Ass'n v. Becerra, 142 S. Ct. 1896 (2022); Azar v. Allina Health Servs., 139 S. Ct. 1804 (2019).
[35] *See, e.g.*, EPA v. EME Homer City Generation, L.P., 572 U.S. 489 (2014); Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967 (2005); New York v. FERC, 535 U.S. 1 (2002).
[36] *Nebraska*, 2023 WL 4277210, at *12–*13.
[37] *Id.* at *12 (noting that "past waivers and modifications issued under the Act have been extremely modest and narrow in scope").
[38] As discussed above, *relative* economic significance as compared to regulatory antecedents is also relevant and is most appropriately considered when evaluating whether the action is sufficiently novel in scope or size.
[39] *West Virginia*, 142 S. Ct. at 2614 (quoting *UARG*, 573 U.S. at 324).

statement rule"—a phrase found nowhere in the majority opinions in either *West Virginia* or *Nebraska* (or any the Court's other major question precedents).[40] Or, as Justice Barrett explained in her concurrence in *Nebraska*, the necessary clear congressional authorization should not be equated with "'an "unequivocal declaration"' from Congress authorizing the *precise* agency action under review, as [the Court's] clear-statement cases do in their respective domains."[41] This explanation of "clear Congressional authorization" reflects the Court's interpretive approach in *West Virginia*.[42]

B. EPA Should More Thoroughly Document Regulatory Antecedents for Vehicle Electrification

EPA thoroughly documents antecedents for certain aspects of the Proposed Rule, such as the treatment of upstream emissions and the application of averaging, banking, and trading.[43] But EPA should do more to emphasize that its current treatment of vehicle electrification (the issue at the heart of the major questions challenge to the 2021 Rule) is not of sufficient novelty or breadth to trigger the doctrine. Although it is not legally required for EPA to provide regulatory antecedents to survive a major questions challenge, relevant antecedents provided in the regulation itself would assist in a future defense of the rule.[44]

The Proposed Rule includes only a limited discussion of how EPA's current approach to electrification continues that of prior rulemakings.[45] EPA should say more. EPA's brief in the D.C. Circuit defending the 2021 Rule presents a table of greenhouse gas vehicle regulations that considered electrification, complete with pincites.[46] At a minimum, EPA should incorporate this table by reference (as the Proposed Rule already does for the same brief's discussion of the regulatory antecedents for averaging, banking, and trading[47]).

EPA could also provide more detail on these antecedents. For instance, EPA might describe specific features and provide quotations demonstrating that EPA has consistently exercised its power to consider and incentivize electrification.[48] For example, the 2012 Rule was projected to

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[40] Natasha Brunstein & Donald L. R. Goodson, *Unheralded and Transformative: The Test for Major Questions After West Virginia*, 47 WM. & MARY ENV'T L. & POL'Y REV. 47, 95–100 (2022).
[41] *Nebraska*, 2023 WL 4277210, at *17 (Barrett, J., concurring) (quoting Financial Oversight and Management Bd. for P. R. v. Centro De Periodismo Investigativo, Inc., 143 S. Ct. 1176, 1183 (2023)).
[42] Brunstein & Goodson, *supra* note 40, at 99–100 ("[A]lthough a court must approach an agency's assertion of authority with 'skepticism' after having determined it is 'unheralded' and represents a 'transformative' change, if the most natural reading of the statute would permit the agency action, the agency has 'clear congressional authorization' for the action.").
[43] Proposed Rule, 88 Fed. Reg. at 29,245 (averaging, banking, and trading); *id.* at 29,252 (treatment of upstream emissions).
[44] *See* Richard L. Revesz & Max Sarinsky, *Regulatory Antecedents and the Major Questions Doctrine*, GEO. ENV'T L. REV. (forthcoming 2023) (manuscript at 29).
[45] *E.g.*, Proposed Rule, 88 Fed. Reg. at 29,297 (noting that "[i]n EPA's 2021 rule that set GHG emission standards for MYs 2023 through 2026, we projected that manufacturers would comply with the 2026 standards with about 17 percent PEVs at the industry-wide level"); *id.* at 29,243 (describing the history of advanced technology credits for hybrid powertrains, all-electric vehicles, and fuel cell electric vehicles for heavy-duty vehicles).
[46] Brief for EPA at 16 tbl.1, *Texas v. EPA* (D.C. Cir. filed Feb. 24, 2023).
[47] *See* Proposed Rule, 88 Fed. Reg. at 29,233 n.393.
[48] *See* Revesz & Sarinsky, *supra* note 44, at 24–25.

increase electric vehicle penetration from 0% to 2% by model year 2025,[49] and to increase penetration of mild hybrid electric vehicles from 0% to 26%.[50] And the 2020 Rule was projected to increase fleetwide electric vehicle sales to 7.9% by model year 2029, as compared to 6.9% had EPA not required emissions reductions.[51] (These increases are relatively small in absolute numbers because these rules covered model years in which electric vehicles were at the bottom of an S-shaped curve, which is how adoptions rates are typically represented.[52] But the adoption rate for electric vehicles is now increasing more rapidly after a critical mass has been reached.[53]) In addition to greenhouse gas rules, EPA may also discuss the Tier 2 criteria pollutant standards from 2000, in which the agency established a zero-emissions-vehicles bin and weighted these vehicles double when calculating a manufacturer's fleet average NO_X emissions.[54] EPA retained a zero-emissions bin for the Tier 3 standards in 2014.[55]

Finally, EPA should provide more historical examples of how its standards have caused manufacturers to adopt emerging technologies. For example, just looking at the 2010 and 2012 rules reveals numerous potentially helpful examples:

- The 2010 Rule was projected to boost the penetration of six-speed dual-clutch transmission from 7% to 55% by model year 2016.[56]
- The 2010 Rule was projected to boost the penetration of 42-volt stop-start hybrid system technology from 3% to 42%.[57]
- The 2012 Rule was projected to boost the penetration of high-efficiency gearbox technology from 0% to 95% by model year 2025.[58]
- The 2012 Rule was projected to boost the penetration of exhaust gas recirculation technology from 6% to 68%.[59]
- The 2012 Rule was projected to boost the penetration of lower rolling resistance tires from 0% to 97%.[60]

[49] EPA, REGULATORY IMPACT ANALYSIS: FINAL RULEMAKING FOR 2017–2025 LIGHT-DUTY VEHICLE GREENHOUSE GAS EMISSION STANDARDS AND CORPORATE AVERAGE FUEL ECONOMY STANDARDS 3-48 tbl.3.5-19, 3-54 tbl.3.5-25 (2012) [hereinafter 2012 RIA].
[50] *Compare id.* 3-48 at tbl.3.5-19 *with id.* at 3-54 tbl.3.5-25.
[51] NHTSA & EPA, FINAL REGULATORY IMPACT ANALYSIS: THE SAFER AFFORDABLE FUEL- EFFICIENT (SAFE) VEHICLES RULE FOR MODEL YEAR 2021–2026 PASSENGER CARS AND LIGHT TRUCKS 2018 tbl.VIII-11 (2020).
[52] *E.g.*, Everett M. Rogers, Diffusion of Innovations 344 (5th ed. 2003) (describing S-shaped adoption curve).
[53] Tom Randall, US Crosses the Electric-Car Tipping Point for Mass Adoption, BLOOMBERG (July 9, 2022), https://www.bloomberg.com/news/articles/2022-07-09/us-electric-carsales-reach-key-milestone (discussing the S-shaped technology adoption curve and noting that the United States has crossed the 5% market share "tipping point" that triggers "rapidly accelerating demand").
[54] Brief of Amicus Curiae Margo Oge & John Hannon at 25, *Texas v. EPA* (D.C. Cir. filed Mar. 8, 2023) (citing 65 Fed. Reg. 6,698, 6,734 tbl. IV.B.–2A, 6,746 (Feb. 10, 2000)).
[55] *Id.* at 27 (citing 79 Fed. Reg. 23,414, 23,714 tbl. 2 of § 86.1811-17(b)(4)(i) (Apr. 18, 2014)).
[56] *Compare* EPA, REGULATORY IMPACT ANALYSIS: FINAL RULEMAKING TO ESTABLISH LIGHT-DUTY VEHICLE GREENHOUSE GAS EMISSION STANDARDS AND CORPORATE AVERAGE FUEL ECONOMY STANDARDS 4-22 tbl.4-10 (2010) *with id.* at 4-25 tbl.4-13.
[57] *Id.*
[58] 2012 RIA, *supra* note 49, at 3-48 tbl.3.5-19, 3-54 tbl.3.5-25.
[59] *Id.*
[60] *Id.*

- The 2012 Rule was projected to boost the penetration of engine friction reduction technology from 0% to 95%.[61]

The Proposed Rule's discussion of legal authority already mentions how "EPA's CAA Title II emissions standards have been based on and stimulated the development of a broad set of advanced automotive technologies, such as on-board computers and fuel injection systems."[62] But EPA could further plumb these and other examples to demonstrate that the Proposed Rule's treatment of vehicle electrification would not transform EPA's authority as a regulator. To the extent that EPA regulations have previously considered the adoption of electronic/computerized updates of once-analog vehicle components,[63] EPA should document these especially relevant examples as further support for its current consideration of electric motors.

C. EPA Should Better Contextualize the Proposed Rule's Economic Significance, in Both Relative and Absolute Terms

EPA could better insulate the Proposed Rule from a future major questions challenge by providing a more nuanced discussion of economic effects, both as compared to prior EPA tailpipe rules and in absolute terms.[64] In terms of relative costs, the Proposed Rule already notes that the estimated average cost to manufacturers per vehicle is within the range of costs projected in prior tailpipe rules.[65] EPA could strengthen this point by also providing a table that comprehensively describes annualized costs of prior tailpipe rules updated for inflation.[66] This table would bolster EPA's conclusion that the costs of the Proposed Rule are not exceptional. EPA should further underscore this point by explaining that this cost similarity with prior regulations obtains even though the Proposed Rule would simultaneously establish GHG and criteria pollutant standards, instead of only one or the other.

In terms of absolute economic significance, EPA discusses BEV adoption primarily in terms of the annual percentage of *new* vehicle sales,[67] but an even more useful statistic would be the percentage of BEVs out of *all the vehicles on the road* at a given time. First and foremost, doing so would help the public better comprehend the rule's anticipated effects. It may be easier to conceptualize increased vehicle electrification in terms of the percentage of vehicles on the road, rather than the percentage of new sales. Presenting the data in this way would also help the public to better understand how the Proposed Rule would affect transportation emissions, the

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[61] *Id.*
[62] Proposed Rule, 88 Fed. Reg. at 29,233.
[63] *See* Oge & Hannon, *supra* note 54, at 21–22 (describing how "[m]anufacturers transformed the combustion process from a mechanical one to a sophisticated system with feedback loops, run by computers with electronic sensors and controls," and "[e]lectronic controls were developed to optimize the [catalytic] converter's efficiency"); 2012 Rule, 77 Fed. Reg. at 62,672 (noting that EPA tailpipe standards have "stimulated the development of a much broader set of advanced automotive technologies, such as on-board computers and fuel injection systems, which are the building blocks of today's automotive designs and have yielded not only lower pollutant emissions, but improved vehicle performance, reliability, and durability").
[64] EPA does make clear that the projected BEV penetration rate of 67% by 2032 should be compared to the projected 39% penetration under the No Action case, not today's penetration rate. *Compare* Proposed Rule, 88 Fed. Reg. at 29,329 tbl. 80, *with id.* tbl. 81.
[65] Proposed Rule, 88 Fed. Reg. at 29,343.
[66] Governing for Impact & Evergreen Action, Comment Regarding NPRM "Multi-Pollutant Emissions Standards for Model Years 2027 and Later Light-Duty and Medium-Duty Vehicles" 10–12 (July 5, 2023).
[67] Proposed Rule, 88 Fed. Reg. 29,329 tbl.80.

need for charging infrastructure, the demand for gasoline, and the demand for vehicle repair and maintenance services.

In terms of the major questions doctrine, reporting such data would provide compelling context regarding economic significance. For example, under the proposed program, in 2032, new vehicle sales would be 67% BEVs compared to 39% under the No Action case.[68] But BEVs would comprise only 21.2% of the total fleet compared to 15% for the No Action case.[69]

The RIA provides two figures that relate to this issue: Figure 9-1 depicts the total number of internal combustion engine (ICE) vehicles on the road every year under the proposed program, and Figure 9-2 does the same for BEVs.[70] Using EPA's data underlying these two figures,[71] Policy Integrity generated the table below showing percentage rates by year for the No Action case, EPA's proposed program, and Alternative 1. (For brevity, this table provides figures annually from 2027–2032, and then every five years beginning in 2035.) EPA should provide such a table or similar information in the regulation.

Table 1: Share of BEVs in U.S. Fleet by Year

Year	No Action BEV %	Proposed Program BEV %	Alt. 1 BEV %
2027	5.2%	5.7%	5.7%
2028	6.9%	8.1%	8.3%
2029	8.9%	11.1%	11.2%
2030	11.0%	14.3%	14.6%
2031	13.1%	17.7%	18.0%
2032	15.0%	21.2%	21.6%
2035	19.2%	30.8%	31.7%
2040	24.6%	44.1%	46.0%
2045	27.4%	52.6%	55.3%
2050	28.4%	56.6%	59.8%
2055	29.2%	58.1%	61.5%

As Table 1 illustrates, under both the proposed program and Alternative 1, the share of BEVs out of all cars in the U.S. vehicle fleet compared to the No Action case increases gradually, reaching less than seven percentage points higher than the No Action case by 2032. This difference increases in later years. This relatively slow growth—particularly when viewed in comparison to the share of all vehicles sold per year, which EPA provides in the Proposed Rule—is not

[68] *Id.* & *id.* at 29,329 tbl.81.
[69] This presentation would also enable a more apt comparison to the stock numbers of electricity generation that the Supreme Court noted in *West Virginia*'s background section. *West Virginia*, 142 S. Ct. at 2593.
[70] RIA at 9-2 tbls. 9-1, 9-2.
[71] *Optimization Model for Reducing Emissions of Greenhouse Gases from Automobiles*, EPA (Apr. 2023), https://www.epa.gov/regulations-emissions-vehicles-and-engines/optimization-model-reducing-emissions-greenhouse-gases (download "Light- and medium-duty effects (zip); select "20230315_091353_effects_central"; select "20230315_091353_cost_effects_annual.csv"; refer to "registered_count").

surprising given that cars remain on the road for many years, and the new cars sold in a single year reflect a small percentage of vehicles on the road at that time.

II. While EPA Robustly Analyzes the Proposed Rule's Benefits and Costs, It Should Conduct Additional Analysis Around Key Parameters

Using OMEGA, EPA conducts a thorough and robust analysis of the benefits, costs, and net benefits of the proposed program and its alternatives. EPA's modeling is the product of extensive analysis and reasonably concludes that the benefits of the proposed program and all of its alternatives greatly outweigh their costs.

EPA's analysis is commendable in many ways. The agency estimates many key analytical parameters—such as the rebound rate for ICE vehicles and the elasticity of demand for new vehicles—consistent with the best available evidence. Nonetheless, EPA could perform more analysis around key parameters. For instance, whereas EPA conducted more than sixty sensitivity analyses[72] around numerous parameters in the 2020 Rule,[73] it presents only seven sensitivity analyses for the Proposed Rule.[74] For some key analytical parameters—such as the discount rate and the social cost of carbon—additional valuations reflecting the state-of-the-art economic literature exist and would ensure a more complete presentation of benefits and costs. EPA should conduct additional analysis around these parameters, which generally show that the net benefits of the proposed program and its alternatives are even greater than EPA projects.

Specifically, EPA should conduct additional analysis around the social cost of greenhouse gases, discount rate, analytical baseline, BEV rebound rate, safety modeling, and energy security. This section explores each of these issues in turn.

A. EPA Reasonably Relies on Climate-Damage Estimates from an Interagency Working Group, But Should Conduct Further Analysis With Its Own Estimates

To monetize the Proposed Rule's climate benefits, EPA appropriately relies on four valuations produced by the Interagency Working Group on the Social Cost of Greenhouse Gases ("Working Group"). Those values—though widely agreed to underestimate the full social costs of greenhouse gas emissions[75]—are appropriate to use for now as conservative estimates. They have been applied in dozens of previous rulemakings[76] and upheld in federal court.[77] Policy

[72] In regulatory impact analysis, "sensitivity" analysis refers to analysis that "reveal[s] whether, and to what extent, the results of the analysis are sensitive to plausible changes in the main assumptions and numeric inputs." OFF. OF MGMT. & BUDGET, CIRCULAR A-4: REGULATORY ANALYSIS 3 (2003).
[73] Final Regulatory Impact Analysis The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Year 2021–2026 Passenger Cars and Light Trucks 1769–71 tbl.VII-471 (2020).
[74] RIA at 13-43 to -48 (five sensitivities for light-duty vehicles), 13-54 to 13-55 (two sensitivities for medium-duty vehicles).
[75] Interagency Working Group on the Social Cost of Greenhouse Gases, Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide – Interim Estimates Under Executive Order 13,990 at 4 (2021) [hereinafter 2021 TSD] (acknowledging that current social cost valuations "likely underestimate societal damages from [greenhouse gas] emissions"). Richard L. Revesz et al., *Global Warming: Improve Economic Models of Climate Change*, 508 NATURE 173 (2014) (co-authored with Nobel Prize-winning economist Kenneth Arrow).
[76] Peter Howard & Jason A. Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 COLUM. J. ENV'T L. 203, 270–84 (2017) (listing all uses through mid-2016).
[77] Zero Zone v. Dept. of Energy, 832 F.3d 654, 679 (7th Cir. 2016).

Integrity, along with five other non-profit organizations, has submitted separate comments to this docket in support of the Proposed Rule's use of the Working Group's climate-damage estimates.

As those joint comments further explain, however, EPA should conduct additional analysis using draft climate-damage valuations that EPA recently published.[78] Though the Working Group's valuations relied on the best science available at the time of their initial development in 2010, they are now widely recognized to understate the true costs of climate change. In November 2022, EPA released updated draft climate-damage estimates.[79] EPA's draft valuations faithfully apply recent advances in science and economics on the costs of climate change and implement the roadmap laid out in 2017 by the National Academies of Sciences for updating the social cost of greenhouse gases.[80] And while EPA's draft valuations remain underestimates,[81] they more fully account for the costs of climate change by incorporating the latest available research on climate science, damages, and discount rates.

Unsurprisingly, given the developing state of the science and economics around climate change, EPA's draft valuations find that the incremental cost of greenhouse gas emissions is substantially higher than the Working Group projected. Using these valuations will provide a more complete picture of the climate damages from the Proposed Rule and its alternatives. While EPA should apply the Draft SC-GHG Update in sensitivity analysis if it finalizes this regulation before it finalizes that update, it should consider applying those valuations in its primary analysis (with the Working Group's estimates in sensitivity analysis) should it finalize the SC-GHG Update before this rule.

Table 2 shows the climate benefits of the Proposed Rule and Alternative 1 using EPA's "central" certainty-equivalent near-term discount rate of 2%,[82] which Policy Integrity generated using OMEGA and inputting the climate-damage valuations from the Draft Update. For comparison, Table 2 presents these estimates alongside the four climate-damage estimates from the Working Group that EPA provides in the Proposed Rule.

Table 2: Climate Benefits Using Draft SC-GHG Update (2020$ Billion)

	Proposed Program	**Alternative 1**
Working Group 5% Average	82	91
Working Group 3% Average	330	360
Working Group 2.5% Average	500	560
Working Group 3% 95th percentile	1000	1100
Draft Update (2% discount)[83]	**1200**	**1300**

[78] EPA External Review Draft of Report on the Social Cost of Greenhouse Gases (2022) [Draft SC-GHG Update].
[79] *Id.*
[80] Nat'l Acads. Sci., Engineering & Med., Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide (2017).
[81] Draft SC-GHG Update, *supra* note 78, at 4 ("[B]ecause of data and modeling limitations . . . estimates of the SC-GHG are a partial accounting of climate change impacts and, as such, lead to underestimates[.]"); *id*. at 72.
[82] *Id.* at 9 (describing 2% as the "central" rate).
[83] Emissions in future years are discounted back to present value using a 3% discount rate. This is consistent with EPA's approach to the climate-damage valuations using non-standard discount rates of 2.5% and 5%.

As Table 2 illustrates, the climate benefits of the Proposed Rule and its alternatives are higher under EPA's draft climate-damage valuations than using the four Working Group valuations that EPA now applies.

B. EPA Should Conduct Additional Analysis Using the Discounting Approach Laid Out in the Draft Update to Circular A-4

In economics, a discount rate translates impacts that occur at different times into a common present value—the higher the annual discount rate, the less impacts further into the future are valued relative to impacts closer to the present. In the Proposed Rule, EPA generally follows the default approach to discounting laid out in the Office of Management and Budget's Circular A-4 by applying annual discount rates of 3% and 7%.[84] While it is reasonable for EPA to rely on the discount rates provided by federal guidance, it is now widely recognized that Circular A-4's discount rates are outdated and too high.[85]

In April, the Office of Management and Budget published a draft update to Circular A-4 that, among other revisions, called for extensive changes in discounting to ensure that long-term benefits and costs receive proper consideration in regulatory impact analysis ("Draft Circular A-4 Update").[86] Specifically, the Draft Circular A-4 Update proposes to lower the default, risk-free consumption discount rate used in regulatory impact analysis from the current 3% to 1.7%, based on updated data and extensive economic scholarship.[87] Also reflecting current economic literature, the update would eliminate the use of the opportunity cost of capital discount rate (currently estimated at 7%) and replace it with the shadow price of capital approach.[88] These updates are consistent with the best available evidence and widely supported by the field's leading experts.[89]

EPA should apply the discounting approach from the Draft Circular A-4 Update in sensitivity analysis if it finalizes this regulation before OMB finalizes that update, and consider applying that approach in its primary analysis should OMB finalize the Circular A-4 Update before this rule is finalized.

Table 3 shows the net benefits of the Proposed Rule and Alternative 1 using the 1.7% discount rate from the Draft Circular A-4 Update (except for climate benefits), which Policy Integrity generated using OMEGA and inputting the 1.7% discount rate. A full result table with all rows from EPA's benefit-cost tables is presented below in the Appendix, as Table A-1.

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[84] OFF. OF MGMT. & BUDGET, CIRCULAR A-4: REGULATORY ANALYSIS 33–34 (2003).
[85] *See, e.g.*, Peter H. Howard et al., *U.S. Benefit-Cost Analysis Requires Revision*, 380 SCIENCE 803 (2023); COUNCIL OF ECON. ADVISERS, DISCOUNTING FOR PUBLIC POLICY: THEORY AND RECENT EVIDENCE ON THE MERITS OF UPDATING THE DISCOUNT RATE.
[86] OFF. OF MGMT. & BUDGET, CIRCULAR A-4: DRAFT FOR PUBLIC REVIEW 9–11 (Apr. 6, 2023) [hereinafter Draft Circular A-4 Update].
[87] *Id.* at 75–76.
[88] *Id.* at 78–80.
[89] Howard et al., *supra* note 85.

Table 3: Net Benefits Using 1.7% Social Discount Rate (2020$ Billion)

	Proposed Program	Alternative 1
3% discount rate, 3% average SC-GHG from Interagency Working Group	1600	1800
3% discount rate, 2% average SC-GHG from EPA's 2022 Draft Update	2500	2800
1.7% discount rate, 2% average SC-GHG from EPA's 2022 Draft Update	**3200**	**3500**

As Table 3 illustrates, the net benefits of both the proposed program and Alternate 1 roughly double when a 1.7% social discount rate is applied (with a 2% near-term discount rate applied to climate impacts consistent with EPA's draft SC-GHG update). As these updated discount rates are used, the net benefits of Alternate 1 relative to the proposed program also increase.

C. EPA Should Update the Baseline to Ensure Full Consideration of the Inflation Reduction Act

In regulatory impact analysis, the baseline refers to "the best assessment of the way the world would look absent the proposed action."[90] Developing an accurate baseline is important for conducting benefit-cost analysis, but challenging when baseline conditions are in flux. That is the case here given last year's passage of the Inflation Reduction Act (IRA).

To model the baseline for the Proposed Rule, EPA adopts key variables from the Annual Energy Outlook 2021 (AEO 2021), such as fleet size, new vehicle sales shares, fuel prices, electricity prices, and vehicles miles traveled.[91] However, AEO 2021 was developed before the IRA's passage and thus does not include the effects of that law. While it was reasonable for EPA to rely on AEO 2021 in this proposal, it should consider adjusting the baseline in the final rule to fully incorporate the IRA's impacts. In particular, according to the 2023 version of Annual Energy Outlook (AEO 2023), the IRA will decrease both short-run and long-run electricity prices relative to the no-IRA case.[92] AEO 2023 also projects that the IRA will decrease long-run gas prices, with a minimal short-run impact.[93] Gasoline and electricity prices are important modeling inputs, as they affect the relative cost of ownership between ICE vehicles and BEVs and thereby influence the sales of these vehicles. These prices also affect the fuel-cost savings, the rebound effect, and related environmental impacts.

There are several potential options for EPA to consistently account for the IRA across modeling inputs. One option is for EPA to adopt AEO 2023 for parameters where it currently uses AEO 2021. This would presumably also entail updating future BEV penetration, which, although EPA models separately, is based in part on parameters from AEO 2021. If EPA updates its baseline to incorporate AEO 2023, it should beware that AEO 2023 models only certain aspects of the IRA

[90] Circular A-4, *supra* note 86, at 15.
[91] *See* RIA at 9-1.
[92] *See infra* p. 30 fig.2 (difference between AEO 2023 with IRA (solid-blue line) and AEO 2023's "No IRA" case (dotted-blue line)).
[93] *See infra* p. 30 fig.1 (difference between AEO 2023 with IRA (solid-blue line) and AEO 2023's "No IRA" case (dotted-blue line)).

but does not include the producer-side battery tax credit.[94] To blunt the resulting potential underestimate of the IRA's full impact, EPA should consider using the "High uptake of the IRA" sensitivity case provided in AEO 2023.

If updating the baseline to AEO 2023 is infeasible, a more feasible alternative may be for EPA to continue to use AEO 2021 as its baseline and then add the IRA's impact on other parameters on top of that. Data within AEO 2023 enables this type of assessment, as AEO 2023 provides sensitivity analysis in which it models the world with and without the IRA.[95] This enables a direct comparison to assess the IRA's effect on key parameters, including electricity prices and gas prices.[96] As noted above, EPA should consider adopting the "High uptake of the IRA" sensitivity case in AEO 2023 for comparison purposes.[97]

This modeling adjustment could have meaningful effects (though it's unclear whether this would increase or decrease net benefits overall, and it would almost certainly not change the sign or ordering of net benefits). According to projections from AEO 2023, the retail electricity price for transportation could be lower by an average of 0.45 cents per kWh from 2027 to 2032 under a high-IRA uptake scenario compared to a scenario without the IRA. This could translate to a decrease of about $50 in the "generalized cost,"[98] i.e. the purchase price net of vehicle ownership and operation costs.[99] The lower cost of operating an electric vehicle would translate to greater BEV uptake than EPA projects in its baseline fleet. This suggests, among other implications, that the Proposed Rule's compliance costs may be lower than EPA projects, since automakers may already be closer to complying with the proposed standards under the baseline than EPA recognizes.

The Appendix below includes four figures illustrating the data presented in this section.

D. EPA Provides Rigorous Analysis of Mineral and Energy Security and Could Provide Further Support and Analysis

In the context of the Proposed Rule, mineral security refers to the uninterrupted availability at affordable prices of minerals needed to produce vehicles. Relatedly, energy security refers to the uninterrupted availability at affordable prices of gas and electricity needed to drive vehicles.[100] While EPA conducts an extensive analysis of both mineral security and energy security, additional analysis would further support its findings.

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[94] U.S. Energy Information Administration, Transportation Demand Module Assumptions 26 (Mar. 2023), https://www.eia.gov/outlooks/aeo/assumptions/pdf/TDM_Assumptions.pdf.

[95] *See* Projection Tables for Side Cases, Annual Energy Outlook 2023, https://www.eia.gov/outlooks/aeo/tables_side_xls.php (providing tables for "No IRA" case).

[96] EPA acknowledges that it has estimates of future retail electricity prices that account for the IRA and that these estimates exhibit lower prices compared to a scenario without the IRA. But due to the absence of corresponding information on gasoline price estimates under the IRA and a desire for consistency across variables and model components, EPA opts not to use these estimates. RIA at 2-84.

[97] *See* Projection Tables for Side Cases, *supra* note 95 (providing tables for "High uptake of the IRA" case).

[98] Considering the average EV efficiency at 3 miles per kWh, a reduction of 0.45 cent per kWh equates to a savings of 0.15 cents per mile. Incorporating EPA's assumptions for consumer fuel-cost calculations in their purchase decision—with an annual mileage of 12,000 miles, a 2.5-year fuel-cost valuation period, and a fueling efficiency factor of 0.9—this saving translates to around $50 = 2.5(\text{years}) \times \{0.15(¢/\text{mile}) \times 12{,}000(\text{miles/year}) \div 100(¢/\$)\} \div 0.9$.

[99] Both producers and consumers use this metric in their decisionmaking processes. *See* RIA at 4-2 to 4-4.

[100] In the RIA, EPA sometimes uses the term "electricity security" when referencing electricity specifically.

On mineral security, EPA concludes that increased penetration of electric vehicles resulting from the Proposed Rule will "not lead to a critical long-term dependence on foreign imports of minerals or components, nor that increased demand for these products will become a vulnerability to national security."[101] This is mainly attributable to two basic reasons. First, EPA explains that there is already substantial domestic capacity to produce critical minerals, which is likely to increase in the future due to recent policies.[102] Second, EPA explains that because vehicles are durable goods that can last many years, supply disruptions of critical minerals have limited impacts because consumers can normally delay vehicle purchases.[103]

EPA can provide additional context for the first point. Specifically, EPA should highlight that ICE vehicles may be susceptible to similar risks as BEVs from supply shocks due to our reliance on foreign vehicles and vehicle parts. From 2017 to 2021, just 69% of U.S. consumer passenger vehicles and 84% of commercial vehicles were produced domestically.[104] Moreover, an estimated one-fourth of the 15,000 to 30,000 parts making up an ICE vehicle are sourced globally as of 2011.[105] In fact, ICE vehicles have far more parts and moving parts than electric vehicles.[106] Thus, shortages of key inputs can cause production delays and shortages, with supply-chain shortages resulting from the 2011 Tohoku earthquake and tsunami[107] and the COVID-19 pandemic.[108] Moreover, like the rare earth metals in BEV batteries, there are also supply-chain risks for metal inputs into ICE vehicles.[109] These various risks put EPA's analysis of mineral security into context, highlighting the mineral and supply security risks of continuing to rely on ICE vehicles under the No Action scenario.

Turning to energy security, EPA reasonably concludes that the Proposed Rule will benefit domestic energy security by shifting consumption from petroleum to electricity, which is cheaper, more price-stable, and more domestically-produced.[110] In addition to a thorough qualitative analysis,[111] EPA conducts a quantitative analysis of the Proposed Rule's oil security premium using a peer-reviewed methodology.[112] In a nutshell, this analysis estimates the economic benefits resulting from reductions in oil imports.[113] An important parameter in this analysis is the own-price elasticity of demand for oil. This parameter reflects the sensitivity of oil sales to oil price changes. More specifically, it represents the expected decline in oil demand (on a percentage basis) from a 1% increase in oil price.

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[101] Proposed Rule, 88 Fed. Reg. at 29,313.
[102] *Id.* at 29,313–23; RIA at 3-19 to 3-29.
[103] Proposed Rule, 88 Fed. Reg. at 29,323;
[104] *See* Annual U.S. Motor Vehicle Production and Domestic Sales, U.S. Dep't of Transp., https://www.bts.gov/content/annual-us-motor-vehicle-production-and-factory-wholesale-sales-thousands-units.
[105] *See* CONG. RSCH. SERV., MOTOR VEHICLE SUPPLY CHAIN: EFFECTS OF THE JAPANESE EARTHQUAKE AND TSUNAMI 4 (2011).
[106] Idaho Nat'l Laboratory, How Do Gasoline & Electric Vehicles Compare?, https://avt.inl.gov/sites/default/files/pdf/fsev/compare.pdf.
[107] CONG. RSCH. SERV., *supra* note 105, at 1.
[108] Neal E. Boudette, *Supply Problems Hurt Auto Sales in 2022. Now Demand Is Weakening*, N.Y. TIMES (Jan. 4, 2023), https://www.nytimes.com/2023/01/04/business/new-car-sales-2022.html.
[109] Dengye Xun et al., Comparing Supply Chains of Platinum Group Metal Catalysts in Internal Combustion Engine and Fuel Cell Vehicles: A supply Risk Perspective, 4 CLEANER LOGISTICS AND SUPPLY CHAIN 100043 (2022).
[110] Proposed Rule, 88 Fed. Reg. at 29,388–89.
[111] RIA at 11-1 to 11-26.
[112] *Id.* at 11-26 to 11-30.
[113] *Id.* at 11-26; *see also* Proposed Rule, 88 Fed. Reg. at 29,389.

EPA should update the own-price elasticity of demand for oil to account for increased electrification over time. Specifically, EPA adopts a low own-price elasticity of demand for oil of -0.07—meaning that oil sales only marginally decline when prices increase, reflecting the fact that oil cannot be easily substituted with other products.[114] But in the future, as electric vehicles become more prominent, this is likely to change as electricity becomes more easily substitutable for oil.[115] Accordingly, the own-price elasticity of demand for oil is likely to increase in the future. EPA should thus use a higher absolute valuation of this parameter that is not based purely on historical data. One option is to apply a valuation between –0.175 and –0.33 as the research from Resources for the Future shows.[116] Alternatively, EPA could recalculate the own-price elasticity of demand for oil within the NEMS model.[117]

E. EPA Should Consider a Range of Rebound Effect Assumptions for BEVs While Upholding Its Current Assumption for ICE Vehicles

The "rebound effect" refers to "the additional energy consumption that may arise from the introduction of a more efficient, lower cost energy service."[118] In the Proposed Rule, EPA reasonably, and consistently with prior rules, assumes 10% rebound for ICE vehicles[119]—meaning that for every 1% improvement in fuel efficiency, there is a 0.9% drop in total fuel use and a corresponding increase in vehicle miles traveled. EPA's adoption of a 10% rebound rate for ICE vehicles is consistent with the literature.[120]

While a wealth of economic literature supports a small rebound effect for ICE vehicles, there is comparatively little economic research on the rebound effect for BEVs. Based on the research available, EPA assumes a rebound effect of 0% for BEVs.[121] This rebound assumption has two implications. First, it assumes that drivers do not switch their driving behavior when they switch from an ICE vehicle to a BEV,[122] despite cost differences.[123] Second, it assumes that any change in per-mile cost for BEVs, including from the introduction of more efficient BEVs or fluctuations in electricity prices, does not affect driving behavior. In effect, EPA's projection of no rebound for BEVs over the long term presumes that there is something fundamentally

[114] RIA at 11-28.
[115] *See infra* p. 30 figs.1–2.
[116] *Id.*
[117] *See* Bureau of Energy and Ocean Management, Consumer Surplus and Energy Substitutes for OCS Oil and Gas Production: The 2021 Revised Market Simulation Model (MarketSim) Model Description 22 (2021) (describing similar methodology). Using this methodology, the elasticity of demand may still be too low because the latest version of NEMS only considers current policy and fails to consider the likely path of policy—such as the Proposed Rule—that could further increase electricity-to-oil substitution.
[118] RIA at 4-13.
[119] *Id.* at 4-16.
[120] *See generally* Inst. for Pol'y Integrity, Comments on Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (Sep. 27, 2021),
[121] RIA at 4-16.
[122] *Id.* at 4-17 (stating that "BEVs are not driven more than ICE vehicles").
[123] According to predictions from OMEGA, under the Proposed Rule, the average per-mile fuel cost of BEVs is projected to be approximately 62% lower than that of ICE vehicles between 2022 and 2055. This data is sourced from the '20230315_091353_MY_period_costs.csv' file in the '20230315_091353_effects_central' folder, downloadable from the 'Light-and medium-duty effects' section on EPA's website: https://www.epa.gov/regulations-emissions-vehicles-and-engines/optimization-model-reducing-emissions-greenhouse-gases

different about consumer perceptions of BEVs compared to ICE vehicles, and not simply an issue of familiarity or technological constraints that will be overcome in the future.

EPA's assumption of no rebound effect for BEVs relies on the empirical evidence available, namely Chakraborty et al. (2022) and Nehiba (2022).[124] Although insightful, these studies leave reason for uncertainty. For instance, both studies employ cross-sectional data and do not fully address the endogeneity between vehicle choices and usage, which is discussed further below. This correlation between consumer vehicle choices and usage could significantly vary between early adopters of BEVs and average ICE vehicle owners, thereby impacting the study conclusions. While these studies contribute to the emerging body of research in this field, their findings should thus be interpreted with some caution. Beyond Chakraborty et al. (2022) and Nehiba (2022), we are aware of several other studies that purport to use better data and identifying assumptions and also find zero rebound for electric vehicles (but do not yet have working papers available).[125]

While the available research provides some support for a 0% rebound rate for BEVs based on historical evidence, there is reason to believe that effect may not hold in the future. One potential explanation for the current BEV rebound findings is that "[c]onsumers are quite price inelastic, because they are inattentive."[126] With the costs of BEV charging often consolidated into electricity bills, this alteration in cost perception could augment price inelasticity, rendering BEV owners less sensitive to per-mile cost variations.[127] But this effect may become less pronounced as BEVs become more common. In particular, as infrastructure grows, electricity price salience may increase as gas stations convert to charging stations and prominently display electricity prices. Relatedly, the current literature could be shaped by the demographic profile of past and current BEV owners—predominantly early adopters—who may not reflect the population that purchases BEVs in the future.[128] As BEV penetration accelerates, the associated rebound effect could potentially deviate from current estimates: Outside the vehicle context, economic literature documents a small rebound effect as electrical appliances become more efficient,[129] which could hint at similar patterns in the future for BEVs.

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[124] RIA at 4-14.

[125] Wendan Zhang et al., Brookings Institution Electric Vehicle Adoption and Combustion Mile Displacement Across Demographics: Short Run Evidence and Implications For Policy, 2023 AERE Presentation (finding a negative rebound effect for electric vehicles.); Beia Spiller, Kenneth Gillingham & Marta Talevi. *The Electric Vehicle Rebound Effect*, 2023 AEA Conference.

[126] Xavier Gabaix, *Behavioral Inattention* at 311, in 2 Handbook of Behavioral Economics: Applications and Foundations (2019).

[127] *See generally* Ben Gilbert & Joshua Graff Zivin, *Dynamic Salience with Intermittent Billing: Evidence from Smart Electricity Meters*, 107 J. ECON. BEHAVIOR & ORG. 176 (2014) (finding that households tend to decrease their consumption in response to billing information—an effect that wanes as the bill's salience fades); Steven Sexton, *Automatic Bill Payment and Salience Effects: Evidence from Electricity Consumption*, 97 REV. ECON. & STAT. 229 (2015) (finding that automatic bill payments decreases price responsiveness).

[128] RIA at 4-14 (acknowledging that the available data is "not likely representative of the current and future general population of car buyers and their driving behavior").

[129] Kenneth Gillingham et al., *The Rebound Effect is Overplayed*, 493 NATURE 475, 476 (2013) (finding a 10% rebound effect). Later, Gillingham et al. (2016) also highlight that the rebound effect for both gasoline and electricity generally falls within a range of 5% to 40%, with the majority of studies suggesting a rebound effect between 5% and 25%. Kenneth Gillingham et al., *The Rebound Effect and Energy Efficiency Policy*, 10 REV. ENV'T ECON. & POL'Y 68, 75 (2016).

In light of these complexities and uncertainties, EPA should consider exploring a range of possible rebound estimates for BEVs, including the same 10% assumption used for ICE vehicles. EPA should conduct sensitivity analysis to assess the implications of a range of rebound effects between 0% and 10%.

Notably, such an analysis would have a very limited impact on EPA's assessment of net benefit. Policy Integrity reran OMEGA using a 10% rebound rate for BEVs and found that this change decreased total net benefits by just 0.43–0.71%, leaving the rule highly net beneficial overall. In fact, when total net benefits were rounded to two significant figures, as EPA does in the Proposed Rule and RIA, they appeared unchanged. (See Table A-1 in the appendix below for full results.) This is likely because additional BEVs resulting from the Proposed Rule make up a small share of the total fleet, particularly in the earlier years in the analysis that are weighted more as a result of discounting. In future standards, the BEV rebound effect could become more significant as BEVs make up a larger share of the vehicle fleet.

F. EPA Should Work With NHTSA to Incorporate Electric Vehicles Into the Safety Analysis

To measure the Proposed Rule's safety impacts, EPA relies on two safety models developed by the National Highway Traffic Safety Administration (NHTSA).[130] First, the safety-trend model uses regression analysis to determine the impact of the model year on safety (fatalities and injuries) and property damage, and then estimate an underlying trend in baseline safety. Second, the safety-weight model identifies the impact of weight on crash fatalities by each vehicle type. EPA then combines the results of the two models and considers the effect of total vehicle miles traveled (including the Proposed Rule's rebound effect) to measure the rule's total safety impacts. Through this safety analysis, EPA concludes that the Proposed Rule could increase traffic fatalities by 1,595 compared to the No Action case.[131] This *total* increase in traffic fatalities is comparable to one year of avoided premature deaths from the Proposed Rule due to reductions in particulate matter.[132]

EPA does not monetize these traffic fatalities as part of its benefit-cost analysis for two distinct reasons. First, because some of the projected fatality increase (approximately 19%[133]) is due to "consumers' voluntary choices to drive more when operating costs are reduced" (i.e. the rebound effect), EPA concludes that the cost of these fatalities are offset by the benefit of additional driving.[134] Second, because the majority (approximately 81%[135]) of the projected fatality increase is due to a statistically insignificant change in the estimated risk of fatalities per distance

[130] RIA at 9-7; *see also* National Highway Traffic Safety Administration, Technical Support Document: Final Rulemaking for Model Years 2024-2026 Light-Duty Vehicle Corporate Average Fuel Economy Standards 646–83 (2022) ("NHTSA 2022 TSD") (describing impact of weight reduction, vehicle scrappage and sales response, and rebound effect on fatalities).
[131] Proposed Rule, 88 Fed. Reg. at 29,387.
[132] *See, e.g.*, *id*. at 29,345.
[133] *See id.* at 29,387 (projecting increase of 300 fatalities attributable to increased driving).
[134] Proposed Rule, 88 Fed. Reg. at 29,345.
[135] *Id.* at 29,387 (projecting increase of 1,265 fatalities due to non-statistically significant increase in fatality risk from driving on a per-mile basis).

traveled due to the change in the vehicle mix,[136] EPA reasonably chooses not to incorporate that risk into its benefit-cost analysis because it cannot be distinguished from zero.[137]

In either this rule or future standards, EPA should work with NHTSA to incorporate electric vehicles into both safety models. While NHTSA's safety modeling accounts for various changes in the vehicle mix such as model year and age,[138] it does not account for electrification as part of the vehicle mix and instead appears to assume constant safety trends regardless of whether a vehicle is electric or gas-powered. But due to their distinct engineering, electric vehicles present unique safety implications that EPA and NHTSA should explore further. Some of these safety implications are positive. For instance, electric vehicles have additional crumple space due to a lack of a combustion engine, which improves crash safety.[139] Additionally, the typical placement of the heavy electric powertrain under the vehicle lowers the car's center of gravity and thus improves handling and reduces the risk of dangerous rollover accidents. In fact, current electric-vehicle models are associated with some of the lowest rates of rollover accidents.[140] But some of these safety implications are negative. For instance, the additional acceleration of electric vehicles could increase safety risks to electric-vehicle passengers, passengers in ICE vehicles, and pedestrians.[141] Because electric vehicles present both safety benefits and risks, it is not clear how accounting for electric vehicles in the safety modeling would affect EPA's results.

Including electrification in the safety analysis can admittedly be challenging given the limited information available about the relative safety of electric versus ICE vehicles.[142] Nonetheless, a few principles are helpful. First, because NHTSA's safety-weight model already accounts for the impact of vehicle weight on safety, weight (and any features of electric vehicles associated with it) should be run through regression to avoid double-counting. Specifically, weight may be correlated with other safety features, such that the regression suffers from omitted variable bias. Second, the safety-trend model should control for horsepower, which may have a negative safety externality in both electric and ICE vehicles.[143] And third, the safety-trend model should control for vehicle type more generally such as cars, crossovers, and minivans (which the weight model already does).

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[136] EPA projects that of the 1,595 increased fatalities from the Proposed Rule, 300 are attributable to increased driving and 1,265 are attributable to the non-statistically significant increase in fatality risk. *Id.* at 29,387.
[137] *Id.* at 29,345.
[138] NHTSA 2022 TSD, *supra* note 130, at 681; *see also id.* at 598.
[139] Zachary Shahan, EV Safety Benefits—Crumple Zones, Rollover Results, Vehicle Control, CleanTechnica, https://cleantechnica.com/2018/12/30/ev-safety-benefits-crumple-zones-rollover-results-vehicle-control/ (Dec. 30, 2018).
[140] *Id.*
[141] Chao Gong et al., *Safety of Electric Vehicles in Crash Conditions: A Review of Hazards to Occupants, Regulatory Activities, and Technical Support*, 8 IEEE Transactions on Trasp. Electrification 3870, 3872 (2022).
[142] *See generally id.*
[143] *See* Insurance Institute for Highway Safety & Highway Loss Data Institute, Flexing Muscle: Sports Car Ratings Show Range of Performance, 51 Status Report, no. 5 (2016), at 4–5, https://www.iihs.org/iihs/sr/statusreport/article/51/5/2 (explaining how "high-horsepower vehicles are more likely to exceed the speed limit, particularly by 10 mph or more, and have higher mean speeds than vehicles with less powerful engines").

G. EPA Should Further Explain Its Choices Around Scrappage, Pass-Through, and Vehicle Sales

EPA should provide additional explanation around certain modeling choices—namely scrappage, pass-through, and sales.

"Scrappage" refers to the rate of which drivers discard old automobiles. OMEGA treats scrappage as exogenous, meaning that the rate of scrappage does not depend on the Proposed Rule's other effects.[144] This choice is reasonable: While economic theory and evidence suggest that scrappage depends in part on the Proposed Rule's other effects (most notably the rate at which the Proposed Rule affects new vehicle prices and sales),[145] this effect is very difficult to model due to data limitations, and past attempts by EPA and NHTSA to model scrappage have fared poorly.[146] Moreover, the increasing movement to electric vehicles provides even more reason to treat scrappage as exogenous, as virtually no analysis on the scrappage of BEVs exists. However, the Proposed Rule provides no discussion of scrappage or EPA's choice not to model it. Particularly since EPA endogenously modeled scrappage in the 2020 Rule, the agency may wish to explain its decision not to follow this approach in the Proposed Rule and a discussion of how it may affect the results. Moreover, to the extent feasible, EPA should attempt to model scrappage in future standards.

"Pass-through" refers to the degree to which manufacturers pass on cost increases to consumers. EPA in prior tailpipe rules has assumed 100% pass-through to consumers in the vehicle market—meaning that every dollar of additional cost to the automaker is ultimately borne by the purchaser.[147] EPA appears to repeat this assumption in the Proposed Rule. That approach is also reasonable given consistency with the agency's prior approach and the very limited economic evidence on vehicle pass-through. Nonetheless, that limited available evidence (from a 2010 paper) indicates that pass-through in the vehicle market may be below 100%.[148] Accordingly, EPA should discuss and provide a rationale for its approach. EPA should also support further research in this area, given its potential importance.

Finally, with regard to sales, EPA should clarify how OMEGA treats how producers expect consumers to value fuel costs. Within the model, consumers and producers shape their preferred new vehicle mix independently,[149] each informed by their unique perspectives on fuel costs: Consumers weigh their expected fuel expenses, whereas producers consider how they think consumers will weigh their expected fuel expenses. In the RIA, EPA explains that consumers are

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[144] *See* RIA at 9-3 to 9-5.

[145] *See* Howard K. Gruenspecht, *Differentiated Regulation: A Theory with Applications to Automobile Emissions Control* (1982); Howard K. Gruenspecht, Differentiated Regulation: The Case of Auto Emissions Standards, 72 Am. Econ. Rev. 328 (1982); ENV'T PROT. AGENCY, THE EFFECTS OF NEW-VEHICLE PRICE CHANGES ON NEW- AND USED-VEHICLE MARKETS AND SCRAPPAGE 3-6 to 3-11 & 5-7 to 5-7 to 5-12 (2021).

[146] Inst. for Pol'y Integrity, Comments on the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks 66–71 (Oct. 26, 2018), https://policyintegrity.org/documents/Emissions_Standards_EPA_NHTSA_Comments_Oct2018.pdf.

[147] *E.g.* 2020 Rule, 85 Fed. Reg. at 24,594–95.

[148] Using regression analysis, Hellerstein and Villas-Boas (2010) find only partial pass through for the vehicle industry with an average pass-through rate of 38%. Rebecca Hellerstein, & Sophia B. Villas-Boas, *Outsourcing and Pass-Through*, 81 J. INT'L ECON. 170, 175 (2010).

[149] The model then searches for solutions for a set of vehicle attributes, purchase prices, and quantities such that the sales and production shares match.

assumed to factor in fuel costs of 12,000 miles annually for 2.5 years.[150] However, the OMEGA input files suggest that producers expect consumers to consider fuel costs up to 15,000 miles annually.[151] Although this difference is not inherently problematic, especially if EPA posits imperfect information between consumers and producers,[152] EPA should explain this difference. This might also be a minor programming error, such that EPA intended for producers to accurately peg consumer valuation of fuel costs at 12,000 miles annually.

III. EPA Should More Robustly Affirm That Standards Help Correct Market Failures That Prevent Consumers From Achieving Valuable Fuel Savings

The "energy efficiency gap" refers to the effect of a suite of market failures that together "lead[] to a slower diffusion of energy-efficient products than would be expected" if consumers maximized their net investment returns.[153] EPA correctly recognizes the presence of the energy efficiency gap in the Proposed Rule.[154] Accordingly, the Proposed Rule properly counts the full value of energy savings as a benefit, just as it and other agencies have done in prior tailpipe and appliance-efficiency regulations.[155]

Despite this consistent practice and the widespread evidence of the energy efficiency gap, certain challengers to the 2021 Rule have disputed the validity of this gap in the ongoing litigation. They have argued that consumers avoid purchasing fuel-efficient vehicles because they prioritize other vehicle attributes that these challengers allege are adversely affected by fuel efficiency, not because of the existence of market failures as is suggested by much of the economic literature.[156] While their argument lacks merit,[157] its existence counsels EPA to thoroughly document the energy efficiency gap.

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[150] RIA at 4-2.

[151] This information is derived from the 'sales_share_params_ice_bev_pu_b0p4_k1p0_x02031-cuv_b2p0_k1p0_x02029_nu8p0-sdn_b0p4_k1p0_x02020_nu1p0_20230228.csv' file for consumers, and the 'producer_generalized_cost-body_style_20220613.csv' file for producers, both located within the '2023-03-14-22-42-30-ld-central-run-to2055\all_inputs' folder, downloadable from the 'Light-duty central case (zip)' section on EPA's website: https://www.epa.gov/regulations-emissions-vehicles-and-engines/optimization-model-reducing-emissions-greenhouse-gases

[152] EPA, OMEGA Documentation Sec. 4.3.2 (last revised May 8, 2023), https://omega2.readthedocs.io/en/2.1.0/index.html#gl-label-producer-generalized-cost ("The producer, as an independent decision-making agent, will not have perfect information about the internal consumer decision process. Within the Producer Module, OMEGA allows the user to define the consumer decisions from the producer's perspective, which may be different from (or the same as) the representation within the Consumer Module.").

[153] Kenneth Gillingham & Karen Palmer, *Bridging the Energy Efficiency Gap: Policy Insights from Economic Theory and Empirical Evidence*, 26 J. Econ. Perspectives 3, 19 (2014); *see also* Proposed Rule, 88 Fed. Reg. at 29,397; RIA at 4-38.

[154] Proposed Rule, 88 Fed. Reg. at 29,397; RIA at 4-38 to 4-41.

[155] *See* BETHANY DAVIS NOLL ET AL., INST. FOR POLICY INTEGRITY, SHORTCHANGED 21–29 (2020), https://policyintegrity.org/files/publications/Clean_Car_Standards_Rollback_and_Fuel_Savings_Report.pdf.

[156] *See* Brief for Private Petitioners at 65–68, *Texas v. EPA* (D.C. Cir. filed Nov. 3, 2022). This account echoes reasoning that EPA flirted with (but ultimately declined to adopt) in the 2020 Rule. In that rule—as a sensitivity analysis only—EPA subtracted 42 months of fuel savings per consumer to approximate the alleged loss of welfare from other vehicle attributes. 85 Fed. Reg. 24,174, 24,701–02 (Apr. 30, 2020).

[157] *See*, *e.g.*, Gloria Helfand et al., *Searching for Hidden Costs: A Technology-Based Approach to the Energy Efficiency Gap in Light-Duty Vehicles*, 98 ENERGY POL'Y 590, 605 (2016) ("We find scant systematic evidence of hidden costs for the primary technologies expected to be used to meet EPA and DOT standards."); Hsing-Hsiang Huang et al., *Re-searching for Hidden Costs: Evidence from the Adoption of Fuel-Saving Technologies in Light-*

Yet EPA provides less analysis of this issue than it did in the 2021 Rule. EPA can bolster its discussion of the energy efficiency gap in three key ways. First, EPA should fully adopt its justification for the energy efficiency gap from the 2021 Rule. Second, EPA should expand upon that justification by offering additional explanations that it omitted in 2021. And third, EPA should affirm the continued relevance of the energy efficiency gap with respect to electric vehicles, and delete language that could be read to question the gap's continued relevance.

A. At a Minimum, EPA Should Fully Adopt Its Justification for the Energy Efficiency Gap That It Provided in the 2021 Rule

Although EPA offers support for the existence of the energy efficiency gap in the Proposed Rule and RIA, it offers less evidence now than it did in the 2021 Rule.[158] The agency should fully adopt its 2021 explanation of the energy efficiency gap to avoid any confusion as to whether it continues to support the explanation it previously provided.

For instance, EPA's regulatory impact analysis for the 2021 Rule (2021 RIA) provided significantly more explanations for the market failures that cause the energy efficiency gap and numerous additional supporting citations.[159] The current RIA omits several key market failures that the agency recognized previously, including consumer prioritization of attributes that convey status, consumer use of simplified decision rules, and consumer "satisficing" on fuel economy rather than optimization.[160]

The 2021 RIA also described research identifying problematic assumptions underlying a few studies showing an efficiency-performance tradeoff,[161] and clearly explained that, if producers did reduce vehicle performance to comply with fuel-efficiency standards (contrary to the best available evidence), then EPA's estimate of compliance costs would be too high because that estimate assumes that producers retain all performance features.[162] While EPA briefly alludes to this research now, it does not offer nearly as detailed a defense for its conclusion that "the presence of fuel-saving technologies do not lead to adverse effects on other vehicle attributes."[163] Similarly, EPA nods at the constant-performance modeling assumption without explaining how compliance costs would need to be revised downward without it.[164]

To avoid any potential confusion over whether EPA still supports the justifications for the energy efficiency gap that it provided in 2021, EPA should fully readopt its previous explanation. EPA can do this through one of two ways: either by expressly incorporating by reference its full 2021 explanation or by inserting the explanations that it provided in 2021 but omits now.

Duty Vehicles, 65 TRANSP. RESEARCH PART D: TRANSP. & ENV'T 194, 194 (2018) ("[A]utomakers have typically been able to implement fuel-saving technologies without harm to vehicle operational characteristics.").

[158] *See* Proposed Rule, 88 Fed. Reg. at 29,397; RIA at 4-38 to 4-41.

[159] 2021 RIA at 8-4 to 8-6.

[160] *Id.* at 8-4 (providing all three rationales).

[161] *Id.* at 8-2 to 8-3.

[162] *Id.* at 8-3.

[163] RIA at 4-38.

[164] *See id.* at 4-40.

B. EPA Should Provide Additional Justifications for the Energy Efficiency Gap in Addition to Those It Provided in the 2021 Rule

While EPA provided considerable support for the energy efficiency gap in the 2021 Rule and 2021 RIA (much of which it restates in this proposal), it could have gone further then. In fact, economic literature offers numerous additional explanations for the energy efficiency gap. Additionally, these further justifications support EPA's correct choice not to devalue consumer fuel savings due to any alleged efficiency-performance tradeoff. EPA should now adopt these additional arguments supporting its treatment of fuel savings, particularly in light of the litigation over this aspect of the 2021 Rule. Similarly, EPA should state (even more clearly than it did in 2021) that its model's constant-performance assumption obviates the need to estimate any potential lost consumer welfare.

1. EPA Should Discuss Additional Contributing Market Failures

EPA should describe additional market failures that contribute to the energy efficiency gap. These include dealership incentives, biases, and information asymmetries; institutional myopia; and manufacturer market power. As discussed below, most or all of these market failures apply similarly to electric vehicles as they do to ICE vehicles.

i. Dealership incentives, biases, and information asymmetries

Salespeople's incentives and biases may cause informational asymmetries that prevent consumers from optimizing fuel efficiency.[165] Studies show that dealers and salespeople often believe that electric vehicles and other efficient cars have lower profits for dealers than gas-powered cars,[166] for various reasons.[167] Consumers (and researchers posing as consumers) have often complained of poor dealership experiences when trying to purchase electric vehicles, citing salespeople's limited knowledge; misinformation and dishonesty about vehicle cost, range, and other attributes; inconsistent enthusiasm for electric vehicles; lack of inventory for more efficient and electric vehicles; poor timeliness for completing paperwork and vehicle delivery; limited promotional materials on energy efficiency; and inability to facilitate consumers' cost

[165] *See* Fred Lambert, *After Losing Dealers over Its Electric Move, Cadillac Is Now Gaining New Ones*, ELECTREK, Sept. 23, 2021 (reporting that one-fifth of U.S. Cadillac dealers exited from the brand in 2020 rather than commit to selling electric vehicles).

[166] Cox Automotive, *Evolution of Mobility: The Path to Electric Vehicle Adoption* 23 (2019), https://perma.cc/UV7N-42BE (reporting that 54% of surveyed dealers say there is a lower ROI for sales of EVs compared to gas); Eric Cahill et al., *New Car Dealers and Retail Innovation in California's Plug-In Electric Vehicle Market* (U.C. Davis Inst. Of Transp. Stud., Working Paper UCD-ITS-WP-14-04, 2014), https://perma.cc/DJ7T-SGXT (citing real or perceived profitability concerns, especially for compact or midsized vehicles).

[167] Cahill et al., *supra* note 166, at 10 ("[A]s a category, PEVs may not represent a compelling investment to many dealers."); *id.* at 9–10 (noting that dealers have the false perception that PEVs entail longer transaction times and lower profits, when in fact dealers make more than average on PEVs in gross profits).

comparisons of electric versus gas vehicles.[168] Some dealerships have admitted that poor sales training is a major barrier to electric vehicle sales.[169]

ii. Institutional myopia and inattention, including short-termism

Though EPA refers to myopia in both the 2021 RIA[170] and (more briefly) in the current RIA,[171] this applies to both individual and institutional consumers. In particular, economists find that corporate managers can exhibit similar kinds of inattention as individual consumers and so fail to implement energy efficiency initiatives despite positive paybacks.[172] Businesses may also face a kind of myopia called short-termism, in which corporate employees have an incentive to favor short-term profits over long-term investments if, for example, their compensation or career prospects are tied to near-term earnings (or if they must meet a particular budget in a given year).[173] Employees with such incentives may have reason to purchase cheaper, less efficient vehicles.[174] Studies suggest that short-termism can affect managers' choices about energy efficiency specifically,[175] and about environmental sustainability broadly.[176]

This market failure should remain prominent as electric vehicles become more widely available, due to the fact that electric vehicles frequently have higher purchasing prices but provide operating-cost savings over time. The limited price salience of electricity, including the use of automatic bill-pay, means that many consumers (including corporate consumers) will not properly factor in long-term operating cost savings.

iii. Manufacturer market power

Though EPA mentions in both the 2021 RIA and the current RIA that strategic marketing choices by manufacturers can result in inefficient under-supply of fuel economy to some consumer segments,[177] EPA does not fully connect this inefficient pattern to market power.

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[168] *Id.*; EPA, *Draft Technical Assessment Report: Midterm Evaluation of Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards for Model Years 2022–2025* at 3-14 (2016) at 6-15; Cox Automotive, *supra* note 166; Gerardo Zarazua de Rubens et al., *Dismissive and Deceptive Car Dealerships Create Barriers to Electric Vehicle Adoption at the Point of Sale*, 3 NATURE ENERGY 501 (2018); Lindsay Matthews et al., *Do We Have a Car for You? Encouraging the Uptake of Electric Vehicles at Point of Sale*, 100 ENERGY POL'Y 79 (2017); Zoe Long et al., *Consumers Continue to Be Confused About Electric Vehicles: Comparing Awareness Among Canadian New Car Buyers in 2013 and 2017*, 14 ENV'T RES. LTRS. 114036 (2019).

[169] Cox Automotive, *supra* note 166, at 30 (citing lack of OEM support).

[170] 2021 RIA at 8-4.

[171] RIA at 4-39 (discussing "a lack of foresight [and] an aversion to short term losses relative to longer term gains").

[172] *See* Suresh Muthulingam et al., *Energy Efficiency in Small and Medium-Sized Manufacturing Firms*, 15 MFG. & SERV. OPERATIONS MGMT. 596, 612 (2013) (finding that manager inattention contributed to the non-adoption of energy efficiency initiatives, since initiatives that appear lower on a list of efficiency recommendations, and initiatives that require more managerial attention, are less likely to be adopted).

[173] A similar dynamic could exist in government, and so affect local, state, and federal government fleet purchases, if officials are rewarded for short-term cost savings rather than long-term fiscal health.

[174] This incentive could be muted by a firm's accounting practices if costs and expenses are amortized over time.

[175] *See* Stephen J. DeCanio, *Barriers Within Firms to Energy-Efficient Investments*, 21 ENERGY POL'Y 906, 907–08 (1993); Suresh Muthulingam et al., *Adoption of Profitable Energy Efficiency Related Process Improvements in Small and Medium Sized Enterprises* 1, 7 (Working Paper, 2008) (finding that managers fail to implement energy efficiency improvements with short payback periods for several reasons, including myopia and a stronger focus on upfront costs than on net benefits, attributed partially to short-termism).

[176] *See* Yujing Gong & Kung-Cheng Ho, *Corporate Social Responsibility and Managerial Short-Termism*, ASIA-PACIFIC J. ACCT. & ECON. (2018).

[177] 2021 RIA at 8-5; *id.* at 4-39 to -40.

Because of the limited competition in at least some segments of the vehicle market, manufacturers may be able to act strategically when pricing vehicles and when producing vehicles with combinations of different fuel economy and other vehicle features to push consumers toward purchases that lead to higher manufacturer profits at the expense of optimal fuel economy.[178] There is a relatively small number of firms producing several types of vehicles and engines.[179] This market failure therefore could influence purchases by all consumer groups and across several vehicle classifications, including electric vehicles.

2. EPA Should More Clearly State That Its Model's Constant-Performance Assumption Obviates the Need to Estimate Lost Consumer Welfare

As in prior rules, EPA assumes when modeling the Proposed Rule that manufacturers will incur any additional costs necessary to hold vehicle performance constant. While EPA highlighted this fact in the 2021 RIA,[180] it should strongly conclude that the constant-performance assumption built into OMEGA obviates the need to estimate any potential lost consumer welfare from forgone attributes. The reason for this is straightforward: Because EPA already models the costs of maintaining vehicle performance, any alleged reductions in vehicle performance resulting from the Proposed Rule would be offset by a reduction in compliance cost relative to EPA's projection. In effect, therefore, EPA's analysis already accounts for the cost of any possible efficiency-performance tradeoffs through its projection of compliance costs.

Thus, while EPA sensibly concludes that "the presence of fuel-saving technologies do not lead to adverse effects on other vehicle attributes,"[181] it should more forcefully assert that this conclusion does not increase its estimate of net benefits.

C. EPA Should Reaffirm the Continued Relevance of the Energy Efficiency Gap, Particularly With Respect to Electric Vehicles, and Remove Confusing Language that Could Be Read to Suggest the Opposite

While EPA supports the energy efficiency gap in the Proposed Rule and RIA, it also makes some confusing statements that could be read to suggest that the gap may be inapplicable to electric

[178] *See generally* Carolyn Fischer, Res. for the Future, *Imperfect Competition, Consumer Behavior, and the Provision of Fuel Efficiency in Light-Duty Vehicles* (2010), https://www.rff.org/documents/1472/RFF-DP-10-60.pdf.
[179] *See id.* at 3 (explaining that "the largest four firms accounted for 75.5 percent of the value of shipments in the automobile market and 95.7 percent of the light-duty and utility vehicle market"); Nat'l Acad. of Scis., *Assessment of Technologies for Improving Light-Duty Vehicle Fuel Economy—2025–2035* at 11-356 (2021) (citing that the top ten firms accounted for 90% of light-duty sales in 2018); *see also* Winston Harrington & Alan Krupnick, Res. for the Future, *Improving Fuel Economy in Heavy-Duty Vehicles* (2012), https://media.rff.org/documents/RFF-DP-12-02.pdf (explaining that the heavy-duty trucking industry "is dominated by a small number of large manufacturers" and is even smaller than it would seem at first glance because of "affiliations, partnerships, and outright ownership of one company by another").
[180] 2021 RIA at 8-3.
[181] RIA at 4-38; *see also* Davis Noll et al., *supra* note 155, at 32–33 (discussing how "many fuel economy technologies actually improve various performance attributes").

vehicles,[182] that it has become very small for ICE vehicles,[183] or even to question the energy efficiency gap's existence.[184] If EPA does not intend these suggestions and instead means only that a narrow subset of market failures are becoming less impactful, it should clarify its confusing statements. Insofar as EPA intends to suggest that the energy efficiency gap may not apply to electric vehicles, it should rethink these claims. For the reasons explained below, EPA should strongly reaffirm the continued existence and relevance of the energy efficiency gap.

EPA's problematic statements reference the "invisibility" explanation for the energy efficiency gap—i.e., that "the mainstream consumer would [not] know about" certain fuel-efficient technologies when selecting between vehicles.[185] The agency seems to hypothesize that this explanation does not apply to electric vehicles, whose fuel efficiency is more salient.[186] However, consumer salience effects should also apply strongly to electric vehicles since consumers often pay their electricity bills automatically (and with a time delay) and therefore may not be aware of how much they can save on fuel costs.[187] And, as EPA acknowledges, the energy efficiency gap is caused by a variety of market failures.[188] Many of these market failures would not be cured by increased visibility; rather, electric vehicles may exacerbate some market failures that contribute to the energy efficiency gap. For instance, network externalities apply especially strongly to electric vehicles as consumers may be reluctant to purchase electric vehicles until adequate charging and maintenance infrastructure is available. A study finding that homeowners—who have greater incentive to invest in charging infrastructure than more transient home renters[189]—purchase electric vehicles at a far higher rate supports this hypothesis.[190] And as discussed above, research on dealership biases, incentives, and information asymmetries often pertains to electric vehicles.[191]

On the producer side, too, market failures that contribute to the energy efficiency gap apply strongly to electric vehicles.[192] For instance, the first-mover disadvantage may be especially

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[182] Proposed Rule, 88 Fed. Reg. at 29,397 (stating that "it becomes less and less of an issue with the growing share of electric vehicles in the market, and changes in vehicle attributes due to the new technology are clearer"); RIA at 4-40 (similar).

[183] Proposed Rule, 88 Fed. Reg. at 29,397 ("[T]here may still exist a slight gap in ICE vehicle purchases due to this uncertainty . . . ."); RIA at 4-40 ("[T]he availability of more fuel efficient vehicles has increased steadily over time, thus narrowing or closing the energy efficiency gap . . . . [A] slight gap in ICE vehicle purchases may still exist due to uncertainty surrounding new fuel savings technologies . . . .").

[184] Proposed Rule, 88 Fed. Reg. at 29,397 (describing "uncertainty surrounding the existence or reason behind the energy efficiency gap"). EPA also states that the energy efficiency gap "may still exist," implying that it may not. *Id.*; RIA at 4-38, 4-40.

[185] Proposed Rule, 88 Fed. Reg. at 29,397; *see also* RIA at 4-40.

[186] *Id.* at 29,397; RIA at 4-39.

[187] Laura Abrardi, *Behavioral Barriers and the Energy Efficiency Gap: A Survey of the Literature*, 46 J. INDUS. & BUS. ECON. 25 (2019).

[188] RIA at 4-39 to -40 ("In fact, the gap likely exists due to a combination of consumer- and producer-side characteristics.").

[189] Numerous studies point to a homeowner-tenant agency problem, also known as the split incentives, in residential rental markets whereby landlords fail to sufficiently invest in energy efficiency because their tenants (rather than the landlords themselves) will realize the monetary savings. *See, e.g.*, Jesse Melvin, *The Split Incentives Energy Efficiency Problem: Evidence of Underinvestment by Landlords*, 115 ENERGY POLICY 342 (2018).

[190] Lucas W. Davis, *Evidence of a Homeowner-Renter Gap for Electric Vehicles*, 26 APP. ECON. LTRS. 927 (2019) (recognizing evidence that "automatic billing increases residential electricity consumption by 4–6%").

[191] *See supra* notes 165–169 and accompanying text.

[192] *See* RIA at 4-40.

prominent for electric vehicles because early movers for electric vehicles must pay to educate consumers about their product.[193] Indeed, in the same paragraph where EPA appears to suggest that the energy efficiency gap "becomes less of an issue with the increasing prevalence of BEVs in the market," EPA also states that "the share of [plug-in electric vehicles] in the marketplace is, at least partially, constrained due to the lack of offerings."[194]

Because many of the justifications for the energy efficiency gap apply to electric vehicles, it is implausible to suggest that this phenomenon will dissipate as electric vehicles become more prevalent. In fact, the Department of Energy has consistently recognized evidence that "consumers undervalue future energy savings" from more efficient electrified appliances, including because of "excessive focus on the short term."[195] Likewise, numerous economic studies confirm that the energy efficiency gap applies to electrical appliances.[196]

Regarding ICE vehicles, EPA does not cite any evidence that would justify this seeming break from its prior analyses regarding the significance of the energy efficiency gap.[197] To the contrary, most or all of the theoretical explanations for the energy efficiency gap still hold. EPA should therefore delete these unsubstantiated and stray statements regarding the energy efficiency gap and ICE vehicles, or at least provide a balanced literature review.

IV. Barring a Compelling Reason Otherwise, EPA Should Select the Alternative That Will Maximize Net Social Welfare

Section 202 of the Clean Air Act instructs EPA to balance its mandate to safeguard "public health and welfare" with an "appropriate" consideration of costs.[198] In the Proposed Rule, EPA "finds that the expected compliance costs for automakers are reasonable in light of the emissions reductions in air pollutants and the resulting benefits for public health and welfare" and recognizes that a finding of significant net benefits "reinforces" its conviction that the proposed standards are "appropriate."[199] Moreover, President Biden has reaffirmed the principles of Executive Order 12866,[200] which include a mandate that each agency, "in choosing among alternative regulatory approaches, . . . should select those approaches that maximize net benefits," including "distributive impacts" and "equity," to the extent permitted by law.[201] EPA should follow these principles in setting these standards.

Applying these standards, EPA should more strongly consider Alternative 1 (the most stringent among the options analyzed), particularly in light of the economic recommendations and analysis presented in this letter. EPA's proposed program would reduce emissions and increase net social

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[193] Todd D. Gerarden et al., *Assessing the Energy-Efficiency Gap*, 55 J. ECON. LIT. 1486, 1492–93 (2017).
[194] RIA at 4-40.
[195] Energy Conservation Program: Energy Conservation Standards for Room Air Conditioners, 88 Fed. Reg. 34,298, 34,352 (May 26, 2023).
[196] *E.g.* Gerarden et al., *supra* note 193, at 1515; Francois Cohen et al., *Consumer Myopia, Imperfect Competition and the Energy Efficiency Gap: Evidence from the UK Refrigerator Market*, 93 EUR. ECON. REV. 1 (2017); Shigeru Matsumoto, *Consumer Valuation of Energy-Saving Features of Residential Air Conditioners With Hedonic and Choice Models*, 55 EMPIRICAL ECON. 1779 (2018); Jiaxing Wang et al., Determinations of Household Energy Efficiency Investment: Analysis of Refrigerator Purchasing Behavior, 13 INT'L J. ECON. POL'Y STUDS. 389 (2018).
[197] *See* RIA at 4-40.
[198] 42 U.S.C. §§ 7521(a)(1)–(2).
[199] Proposed Rule, 88 Fed Reg. at 29,198, 29,344.
[200] Exec. Order 14,094 § 1, 88 Fed. Reg. 21,879 (Apr. 11, 2023).
[201] Exec. Order 12,866 § 1(a), 58 Fed. Reg. 51,735, 51,735 (Oct. 4, 1993).

welfare and so is justifiable,[202] yet the analysis accompanying the Proposed Rule shows that Alternative 1 would result in $200 billion more net benefits through 2055.[203] Critically, EPA concludes that Alternative 1 is "anticipated to be feasible."[204] Alternative 1 is more net beneficial than the proposed program in part because of greater reductions in air pollution,[205] which EPA describes as "[a]n essential factor . . . in determining the appropriate level of the proposed standards."[206] Moreover, the $200 billion figure does not take into account significant unmonetized benefits that would likely further increase Alternative 1's relative advantages.[207]

Additionally, further analysis shows that Alternative 1 is likely even more net beneficial versus the proposed program than EPA currently acknowledges. Applying updated discount rates and climate-damage valuations shows that Alternative 1 is $300 billion more net beneficial than the proposed program.[208] Furthermore, approval of the preemption waiver for California's Advanced Clean Cars II (ACC II)—which could occur before this rule is finalized, and thereby shift the analytical baseline—may further reinforce the conclusion that Alternative 1 is most net-beneficial.[209] According to EPA's analysis, selecting Alternative 1 in the absence of the waiver would increase BEV penetration relative to the proposed program by 2 percentage points and increase per-vehicle cost by $611 in 2032.[210] In contrast, selecting Alternative 1 with the waiver already in place would increase BEV penetration relative to the proposed program by 4 percentage points (i.e., doubling the incremental effect) while increasing per-vehicle cost by $763 in 2032 (a far more modest increase on a percentage basis).[211] This suggests that Alternative 1 may be even more net beneficial compared to the proposed program with ACC II in place.

For the reasons discussed in *supra* Section I and elsewhere in this letter, Alternative 1 would not substantially increase legal risk under the major questions doctrine. Alternative 1 relies on the same regulatory approaches that have considerable precedent in prior EPA tailpipe rules.[212] It also has similar effects on BEV penetration.[213]

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[202] Proposed Rule, 88 Fed. Reg. at 29,200 tbl.6.
[203] *Compare* Proposed Rule at 29,200 tbl.6, *with id.* at 29,200 tbl.17 (at a 3% discount rate and the 95th percentile values for the SC-GHG at a 3% discount rate).
[204] Proposed Rule, 88 Fed Reg. at 29,280. EPA concludes that "standards substantially more stringent than Alternative 1 would not be appropriate because of uncertainties concerning the cost and feasibility of such standards." *Id.* at 29,201.
[205] *Compare* Proposed Rule, 88 Fed Reg. at 29,348 tbl.135, *and id.* at 29,355–56 tbl.147, *with id.* at 29,348 tbl.136, *and id.* at 29,356 tbl.148.
[206] Proposed Rule, 88 Fed Reg. at 29,344.
[207] *See* Proposed Rule, 88 Fed Reg. at 29,380 (noting that the Proposed Rule does not monetize the benefits associated with reducing ambient concentrations of ozone, reductions in direct exposure to NO_2 and mobile source air toxics, improved ecosystem effects, or visibility); *id.* at 29,389 (noting that the Proposed Rule does not monetize military benefits as a result of reductions in U.S. oil imports); RIA at 7-38 tbl.7-1 (showing that the Proposed Rule does not monetize numerous adverse impacts of $PM_{2.5}$, including certain cardiovascular, respiratory, cancer, nervous system, metabolic, reproductive, and developmental effects).
[208] *See supra* p. 12 tbl.3.
[209] EPA conducts sensitivity analysis that considers how approval of the ACC II preemption waiver would affect the agency's regulatory impact analysis but does not present the benefits, cost, or net benefits under that scenario. Nor was Policy Integrity able to determine the benefits, cost, and net benefits under this sensitivity in OMEGA.
[210] Proposed Rule, 88 Fed Reg. at 29,333 tbl.99; *id.* at 29,203 tbl.12.
[211] *Id.* at 29,355 tbl.108; *id.* at 29,355 tbl.109.
[212] *See generally supra* Part I.B.
[213] *See supra* p. 10 tbl.2.

Accordingly, barring a compelling reason otherwise, EPA should select the regulatory alternative that maximizes net benefits—according to EPA's current analysis, Alternative 1.

Respectfully,

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Appendix

Table A-1: Net Benefits Using Updated SC-GHG, Updated Discount Rates, and 10% BEV Rebound

	Proposed Program			Alternative 1		
	3% Social Discount Rate	1.7% Social Discount Rate	3% Social Discount Rate 10% BEV rebound	3% Social Discount Rate	1.7% Social Discount Rate	3% Social Discount Rate 10% BEV rebound
Vehicle Technology Costs	280	340	280	330	390	330
Repair Costs	-170	-220	-170	-180	-230	-180
Maintenance Costs	-410	-530	-410	-450	-590	-450
Congestion Costs	2.3	2.9	2.4	3.5	4.2	3.7
Noise Costs	0.037	0.046	0.039	0.055	0.065	0.057
Sum of Non-Emission Costs	-290	-410	-290	-300	-430	-300
Pre-tax Fuel Savings	890	1,100	890	990	1,300	990
EVSE Port Costs	120	140	120	120	140	120
Sum of Fuel Savings less EVSE Port Costs	770	990	770	870	1,100	870
Drive Value Benefits	4.8	5.9	4.9	6.5	7.7	6.5
Refueling Time Benefits	-85	-110	-85	-90	-110	-90
Energy Security Benefits	41	53	41	46	58	46
Sum of Non-Emission Benefits	-39	-49	-39	-38	-48	-38
Climate Benefits						
5% Average	82	150	82	91	170	91
3% Average	330	420	330	360	460	360
2.5% Average	500	580	500	560	650	560
3% 95th Percentile	1000	1300	1000	1100	1400	1100
EPA 2022 Draft Update (2% Average)	1200	1500	1200	1300	1700	1300
Criteria Air Pollutant Benefits						
PM 2.5 Health Benefits – Pope III et al., 2019	280	360	280	290	360	290
Net Benefit						
With Climate 5% Average	1400	1900	1400	1500	2000	1500
With Climate 3% Average	1600	2100	1600	1800	2300	1800
With Climate 2.5% Average	1800	2300	1800	2000	2500	2000
With Climate 3% 95th Percentile	2300	3000	2300	2500	3200	2500
With Climate EPA 2022 Draft Update (2% Average)	2500	3200	2500	2800	3500	2800

Baseline Section

The figures below illustrate the data presented in the baseline section above. Figure 1 compares retail motor fuel prices in 2020 dollars between in AEO 2021, AEO 2023's "High uptake of the IRA" case, and AEO 2023's "No IRA" case Figure 2 compares retail transportation electricity price in 2020 dollars between those same three forecasts.

Figure 1: Retail Motor fuel price ($/gallon)

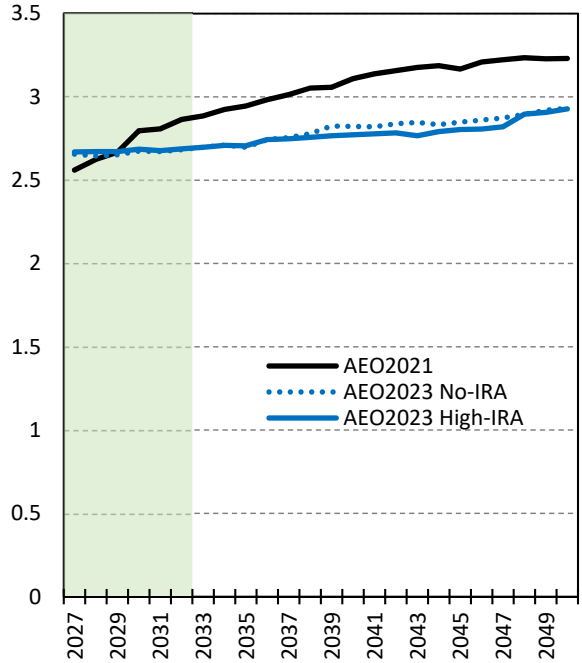

Figure 2: Retail Transportation Electricity price (¢/kWh)