



September 27, 2021

The Honorable Michael S. Regan
Administrator
United States Environmental Protection Agency
EPA Docket Center
Mail Code 28221T
1200 Pennsylvania Avenue, NW
Washington, DC 20460

**Re: Docket ID: EPA–HQ–OAR–2021–0208; FRL 8469–02–OAR Revised 2023 and
Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards**

Dear Administrator Regan:

The Alliance for Vehicle Efficiency (AVE) respectfully submits these comments in response to the Environmental Protection Agency’s (EPA) proposed rule Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards (the Proposed Rule).

AVE is an organization representing leading automotive suppliers which have created tens of thousands of American jobs and invest in the development of new advanced vehicle technologies. AVE works with stakeholders from across the automotive industry, environmental nonprofits, and state regulators to help find common ground and pursue policies to meet future environmental goals, strengthen the automotive supplier industry, and provide real environmental improvements. These contributions have resulted in consistent gains in achieving greater fuel efficiency and reducing emissions, which helps secure the United States’ position as an automotive technology leader.

AVE is supportive of EPA’s stated purpose to issue the Proposed Rule in response to President Biden’s Executive Order 13990 “Protecting Public Health and the Environment and Restoring Science To Tackle the Climate Crisis” (Jan. 20, 2021).¹

Following EPA’s issuance of emission standards over a decade ago, automotive suppliers invested billions of dollars in innovative technologies needed to meet the vehicle standards promulgated in 2010 and 2012. Those standards, drafted in conjunction with the National Highway Transportation Safety Administration (NHTSA) and the State of California, set out to provide industry with over a decade of regulatory certainty with the objective of creating One National Program. This decade-long regulatory certainty spurred an unprecedented reinvestment in domestic manufacturing by creating tens of thousands of new manufacturing jobs, investment in new facilities, and the ability for manufacturers to develop and expand new supply chains for

¹ Federal Register / Vol. 86, No. 151 / August 10, 2021, at 43728

the advanced technologies needed to meet the new standards.² As EPA and NHTSA look to enact standards for vehicles produced after model year 2027, AVE strongly urges the agencies to proceed with a joint rulemaking that provides industry with a unified approach to test cycles and compliance targets and timelines.

The Proposed Rule's objective of restoring the standards to the level anticipated before the Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks re-establishes support for the long-term investments that technology suppliers made over a decade ago. The Proposed Rule will provide suppliers with the opportunity to obtain a return on these earlier investments which will in turn support the next generation of technology investments necessary to meet future emission standards.

Overview of AVE's Support and Recommendations for EPA's Proposed Rule

- AVE supports EPA's proposal to increase of the off-cycle credits menu cap from 10 g/mile to 15 g/mile.
- AVE supports EPA's goal of offering advanced multiplier credits up until 2026 and recommends EPA offer additional performance-based credits to automotive manufacturers (OEMs) for any vehicle that exceeds the standards ahead of EPA's compliance timeline.
- AVE supports performance-based credits to incentivize rapid adoption of emission-reducing technology in ICE vehicles.
- AVE recommends EPA's regulatory analysis account for the impact multipliers have on technology improvements to internal combustion engines (ICE) and hybrid vehicles.
- AVE urges EPA to account for lifecycle and upstream emissions for all vehicle technologies, and the fuels that power them in future emission standards. AVE also requests EPA work with the Department of Energy and NHTSA to create a unified accounting approach for lifecycle emissions.
- AVE recommends that EPA's regulatory programs link the GHG reduction of vehicles to the cleaner fuels that now power them.
- AVE urges EPA to consider the costs and risks to OEMs and technology suppliers associated with converting and expanding automotive supply chains to meet future standards as more ZEV vehicles are introduced into the marketplace.

EPA's Proposed Standards are Ambitious but Achievable with Flexibilities such as Multipliers and Credits

As EPA correctly states, OEMs have already, and will continue to, incorporate "...an increasing array of advanced gasoline vehicle GHG emission-reducing technologies at a rapid pace throughout their vehicle fleets."³

OEMs and technology suppliers spend over \$100 billion per year on research and development of technology to meet increasing fuel efficiency standards and to reduce vehicle emissions. Automotive suppliers provide over two-thirds of the value of a new vehicle and are the largest

² BlueGreen Alliance, *Driving Investment: How Fuel Efficiency is Rebuilding American Manufacturing*, 2018

³ 86 Fed Reg No.150 at 43728

patent recipients in this sector. These supplier investments will provide OEMs with the advanced technologies necessary to comply with the standards proposed by EPA. By supporting multiple pathways for compliance today and in the future, EPA will allow technology suppliers to invest with confidence in even greater emission reduction technologies.

Expanding Off-Cycle Credits Menu from 10% to 15%

AVE supports EPA’s proposal to increase of the off-cycle credits menu cap from 10 g/mile to 15 g/mile⁴ and the eventual phase-out of these credits.

EPA’s off-cycle credit program incentivizes investments into technologies that provide real-world emission reductions, but that are not otherwise captured in the agency’s two-cycle test. For decades, EPA has recognized that the two-cycle test is inadequate. Without off-cycle credits, OEM compliance with GHG emission standards could be jeopardized. Expanding the credits menu cap sends a strong message to industry that investments in new advanced technologies are needed for future compliance.

Although AVE recognizes the need to incentivize consumer acceptance in the short term, credits distort the marketplace and AVE supports efforts to move away from incentives such as these.

Advanced Technology Multiplier Credits

AVE supports EPA’s goal of offering advanced multiplier credits up until 2026 and recommends EPA offer additional performance-based credits to OEMs for any vehicle that exceeds the standards ahead of EPA’s compliance timeline.

AVE continues to support performance-based standards that incentivize the development, and accelerate the adoption of, multiple emission reducing technologies to market. Performance-based credits would provide OEMs with greater flexibility and incentive to invest in cost-effective pathways to meet, or exceed, future standards.

The credits EPA is proposing will impact a small percentage of the U.S. fleet. By steering OEMs towards specific technologies that may only affect about 8% of the fleet by 2026 with extensive credits, EPA risks losing immediate and more extensive environmental improvements in exchange for estimated environmental gains years from now. EPA instead has an opportunity to accelerate the adoption of advanced vehicle technologies and reduce emissions from the vast majority of vehicles that will be sold between model years 2023 to 2026 with performance-based credits.

Performance-Based Standards Would Bring Significant Near-Term Carbon Reduction

AVE supports performance-based credits to incentivize rapid adoption of emission-reducing technology in ICE vehicles.

President Biden’s January 25th Executive Order asks EPA “...to **immediately** commence work to confront the climate crisis.”⁵ In this regard, AVE recommends EPA enact standards that will advance adoption of all GHG-reducing vehicle technologies to accelerate faster adoption of CO₂ goals and climate benefits.

⁴ 86 Fed Reg No.150 at 43733

⁵ 86 Fed Reg No. 14 at 7037 (emphasis added)

In 2012, however, EPA chose to focus on incentivizing specific technologies that had the potential to transform the light-duty sector at the expense of near-term carbon reduction.

*“EPA believes that these temporary regulatory incentives are justified under CAA section 202 (a) as they promote the commercialization of technologies that have, or of technologies that can be critical facilitators of next-generation technologies that have, the potential to transform the light-duty vehicle sector by achieving zero or near-zero GHG emissions and oil consumption, but which face major near-term market barriers. However, providing temporary regulatory incentives for certain advanced technologies will decrease the overall GHG emissions reductions associated with the program in the near term. EPA believes it is worthwhile to forego modest additional emissions reductions in the near term in order to lay the foundation for the potential for much larger “game-changing” GHG emissions and oil reductions in the longer term.”*⁶

AVE’s recommendation is a logical response to the President’s proclamation and the Administration’s further acknowledgement below on the need for more investment in ICE vehicles:

“There are going to be a lot of gas-powered cars on our roads for a long time, so, there's simply no way to meet our climate goals with EVs alone.”

*- Transportation Secretary Pete Buttigieg July 8, 2021, speaking to the Bipartisan Policy Center.*⁷

In the Proposed Rule, EPA acknowledges the challenges of bringing zero or near-zero emissions vehicles to market. EPA also acknowledges the challenges and costs associated with adopting specific emission reducing technologies to a significant percentage of an OEMs’ fleet. As indicated in EPA’s 2020 Trends Report, “. . .it has taken, on average, approximately 15-20 years for new technologies to reach maximum penetration across the industry.”⁸ EPA further states that the revised standards would result in significant benefits for public health and welfare, primarily through substantial reductions in both GHG emissions and fuel consumption and associated fuel costs paid by drivers, and the benefits of the proposed standards would be far in excess of costs.”⁹

AVE believes that with performance-based credits, EPA can send a strong signal to automakers to add more GHG-reducing advanced technologies to all vehicles and subsequently accelerate the additional public health benefits these technologies will bring.

Furthermore, over-reliance on credit multipliers to meet the Proposed Rule’s standards could reduce the real-world benefits that zero and near zero technologies can bring to the environment. Multiplier credits may make adoption of advanced technologies for ICE vehicles a more attractive compliance pathway. AVE is concerned, however, that, in the interim, ICE vehicles may see fewer innovations in emission-reducing technology added to future models should OEMs focus primarily on maximizing technology specific credits to reach future compliance standards.

⁶ 77 Fed Reg No. 199 at 62811(emphasis added)

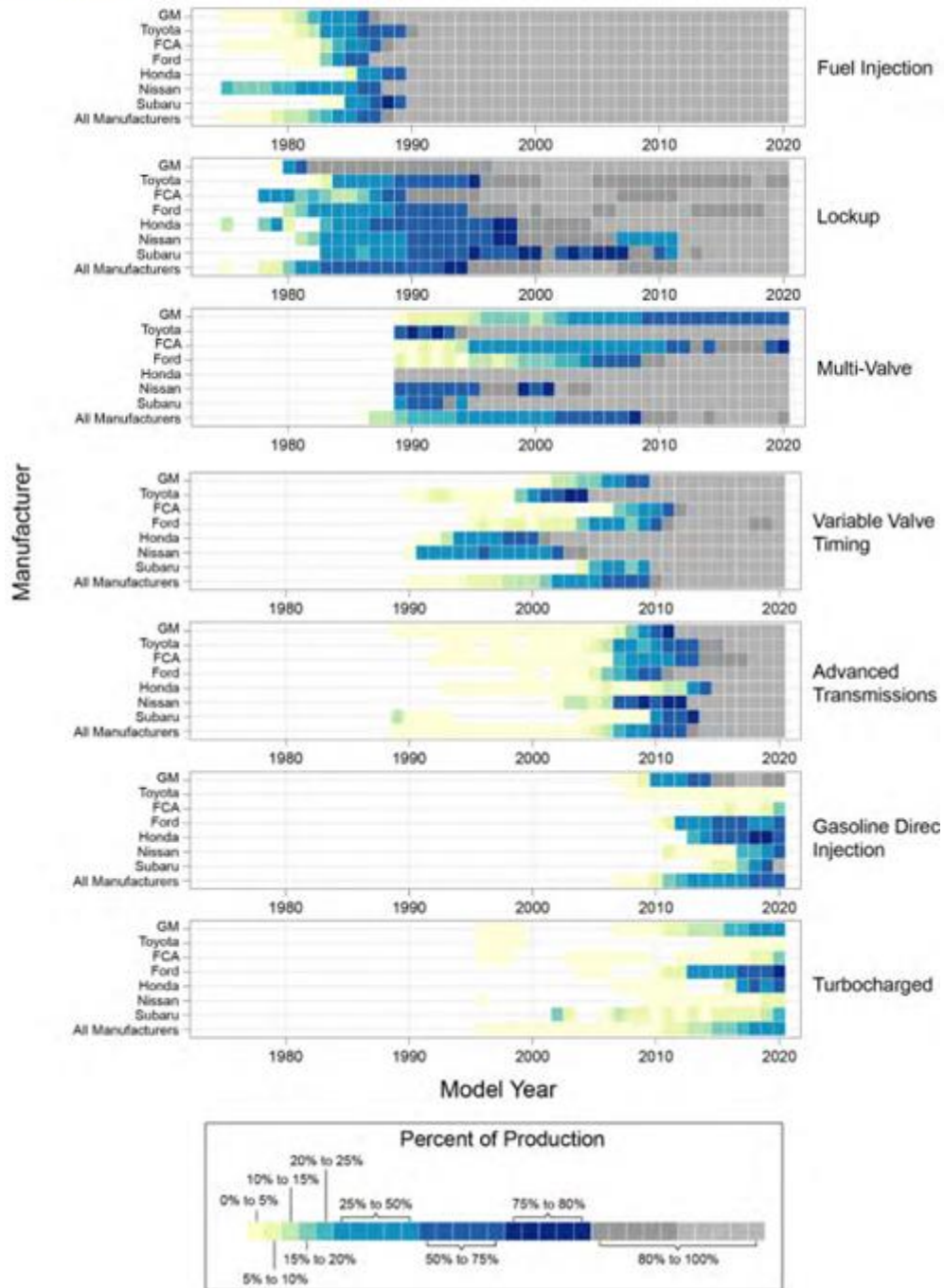
⁷ <https://www.rollcall.com/2021/08/05/biden-order-sets-electric-vehicle-target-of-50-percent-by-2030/>

⁸ EPA 2020 Trends Report at p.63

⁹ 86 Fed Reg No.150 at 43726

The chart below identifies the lengthy timeframe to achieve significant penetration for new emission reduction technologies. Performance-based standards would likely accelerate penetration of advanced technologies for all types of vehicles (ICE, hybrids, PHEV, EV) and would bring an immediate and substantial improvement to the U.S.’s efforts to reduce carbon.

Figure 4.23. Manufacturer Specific Technology Adoption over Time for Key Technologies



EPA’s Proposed Rule makes note of announcements from automakers signaling “a rapidly growing shift in investment away from internal combustion technologies and toward high levels

of electrification.”¹⁰ EPA does not, however, cite recent announcements that indicate several OEMs will not be making new investments in ICE architectures.¹¹ EPA should account for the environmental impact of these decisions as OEMs will likely sell over 50-60 million ICE vehicles during the 2023-2026 model years.

As such, AVE recommends that in their regulatory analysis, EPA also account for how multipliers may impact near-term technology improvements to ICE and hybrid vehicles.

With well over 16 million ICE vehicles sold per year, and with each currently emitting 4.6 metric tons of carbon annually,¹² even a mere 5% improvement in ICE performance would lead to reduction of approximately 3.75 million tons of additional carbon emissions per year – 15 million tons from 2023 to 2026.

Lifecycle (Upstream) Emissions

AVE urges EPA to work with the Department of Energy and NHTSA to create a unified approach for including lifecycle emissions into the Proposed Rule and future standards.

It is essential that EPA incorporate a lifecycle analysis (LCA), and account for all upstream emissions, for all vehicle technologies and the fuels that power them in future emission standards. LCA is a necessary element of the U.S.’s efforts to transform the transportation system into one that is significantly less carbon intensive.

This transformation is already in process with significant investments in renewable sources of energy, renewable and lower carbon fuels, more sustainable forms of generation to power the electrical grid, and expanded supply chains to provide the resources necessary to support production of a greener light-duty fleet.

Adoption of LCA would better prepare industry for the impact of expiring multiplier credits and the accounting of upstream, embedded, and end-of-life carbon emissions which influence the technology investments being made today by OEMs and suppliers. Yet, “*EPA is continuing to use tailpipe-only values to determine vehicle GHG emissions, without accounting for upstream emissions (EVs and PHEVs will continue to use 0 g/mile through MY 2026).*”¹³

EPA’s focus solely on tailpipe emissions appears in contrast to President Biden’s January 25, Executive Order, in which he stressed the need for standards to account for all GHG emissions.

*Sec. 5. Accounting for the Benefits of Reducing Climate Pollution. (a) It is essential that agencies capture the full costs of greenhouse gas emissions as accurately as possible, including by taking global damages into account. Doing so facilitates sound decision making, recognizes the breadth of climate impacts, and supports the international leadership of the United States on climate issues.*¹⁴

¹⁰ 86 Fed Reg No.150 at 43729

¹¹ <https://www.cnbc.com/2021/09/07/heres-why-gms-electric-vehicle-push-is-a-big-risk.html> and <https://europe.autonews.com/automakers/daimler-speeds-plans-be-electric-only-automaker>

¹² Green Vehicle Guide <https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>

¹³ 86 Fed Reg No. 151 at 43746

¹⁴ 7040 Federal Register / Vol. 86, No. 14 / Monday, January 25, 2021 / Presidential Documents

All transportation-related industries have a role to play in helping the U.S. meet our carbon reduction goals. LCA provides a holistic approach to truly impact the environment and has been recognized in environmental assessments in other jurisdictions. AVE agrees with the aspirations and direction of President Biden’s Executive Order to address the “full-costs of greenhouse gas emissions as accurately as possible.”¹⁵

LCA is challenging, and different LCA models exist, but LCA is not new:

- Low carbon fuel standards, such as the Federal Renewable Fuel Standard and the California Low Carbon Fuel Standard, have led to significant reductions in GHG emissions from transportation fuels. These standards rely on LCA as a tool to estimate the GHG emissions of fuels.¹⁶
- DOE’s Argonne National Laboratory also engages in substantial research on the LCA of vehicle and fuel technologies to improve energy efficiency and reduce GHG emissions in the transportation sector. EPA should work with DOE to measure the true impact of all technologies and develop performance-based standards that incorporate the LCA of emissions from all vehicle technologies to create a more accurate assessment of their overall GHG impact.
- DOE has been conducting LCA data modeling for many years and EPA should be encouraged to use DOE’s GREET model as a starting point. The chart below is one example of GREET modeling comparing the footprint of various vehicle technologies.

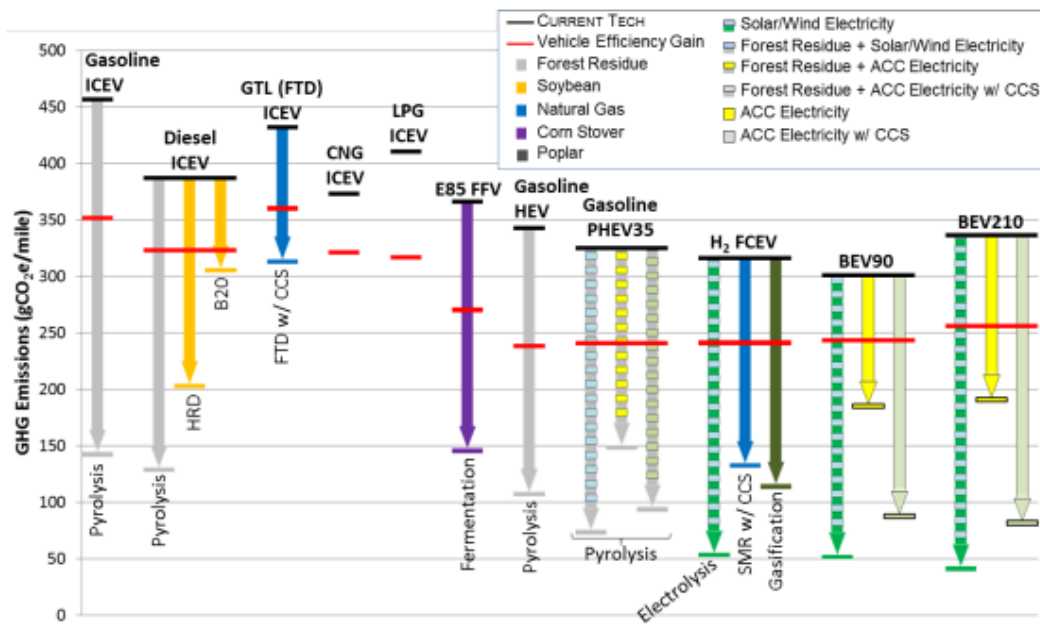


Figure ES-1. C2G GHG emissions of various vehicle-fuel pathways. Analysis was performed using GREET2014, and vehicle and fuel pathways are constrained to those deemed scalable to approximately 10% of the LDV fleet.

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¹⁵ Ibid

¹⁶ National Academy in Science: Current Methods for Life Cycle Analyses of Low-Carbon Transportation Fuels in the United States <https://www.nationalacademies.org/our-work/current-methods-for-life-cycle-analyses-of-low-carbon-transportation-fuels-in-the-united-states>

¹⁷ Argonne National Lab: Cradle-to-Grave Lifecycle Analysis of U.S. Light-Duty Vehicle Fuel Pathways: A Greenhouse Gas Emissions and Economic Assessment of Current and Future Technologies (2015)

A Pathway to Cleaner Fuels:

To further help the U.S. reach our carbon reduction goals, **AVE recommends EPA's regulatory programs link the GHG reduction of vehicles with the cleaner fuels that now power them.**

Applying LCA to the vehicle certification process could lead to more investments in, and the expanded use of, renewable fuels and low carbon fuels (eFuels). Unlike with EVs, the EPA's GHG emissions analysis for certification/compliance of ICE vehicles is not representative of the actual emissions from the country's in-use fuels pool. Using LCA, EPA's GHG rules (and NHTSA's CAFE rules) could be modified to enable automakers to certify gasoline/diesel vehicles with compliance values reflective of the projected in-use carbon intensity of national fuels.

For example, the national fuel pool currently contains approximately 10% ethanol. California's published estimates for carbon intensities of ethanol pathways average 35.1%, and the average carbon intensity of the ethanol pool is 57-61%.¹⁸ The national average E10 carbon intensity has a factor of 96 and is approximately 4% below the compliance value used by automakers toward their fleet average GHG and fuel economy.

Another example is the significant growth and development of renewable natural gas (RNG). According to data from the California Air Resources Board (CARB), the annual average carbon intensity score of RNG was -5.845 gCO₂e/MJ,¹⁹ with 92% of all on-road fuels used in natural gas vehicles in 2020 being RNG.²⁰ While the majority of this RNG is currently used in heavy-duty fleets, the current GHG regulations restrict development of innovative technologies for light-duty vehicles to be fueled by RNG.

The EPA's current and proposed GHG regulations include no mechanism to account for the lower carbon intensity of fuels to stimulate OEM investment in technologies that could utilize these fuels. There is also no incentive to further reduce the carbon intensity of fuels irrespective of any investments made by producers. AVE recommends EPA adjust compliance values for the actual carbon intensity of in-use fuels. Doing so will positively impact the annual certification compliance values of the OEMs' ICE vehicles and would likely incentivize fuel producers and OEMs to monetize future carbon reductions.

Applying upstream energy-based GHG accounting measures that consider the projected in-use carbon intensity to all vehicles could have several benefits:

- Create a market-based incentive for investment to expand the use of renewable fuels and to lower the carbon intensity of manufacturing petroleum-based fuels.
- When coupled with a national Low Carbon Fuel Standard, would provide certainty that GHG reductions would be met in-use and provide significant environmental benefits.

¹⁸<https://www.fueleconomy.gov/feg/ethanol.shtml#:~:text=MPG.,typically%20contains%20about%2010%25%20ethanol.> <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities> <https://www.usda.gov/sites/default/files/documents/CA-LCFS-Incentivizing-Ethanol-Industry-GHG-Mitigation.pdf> (respectively)

¹⁹ California Air Resources Board, Low Carbon Fuel Standard Program, Certified Fuel Pathways. Available at: <https://ww2.arb.ca.gov/resources/documents/lcfs-pathway-certified-carbon-intensities>.

²⁰ <https://www.rngcoalition.com/press>; See June 2, 2021, Press Release

Impact on Manufacturing Supply Chains

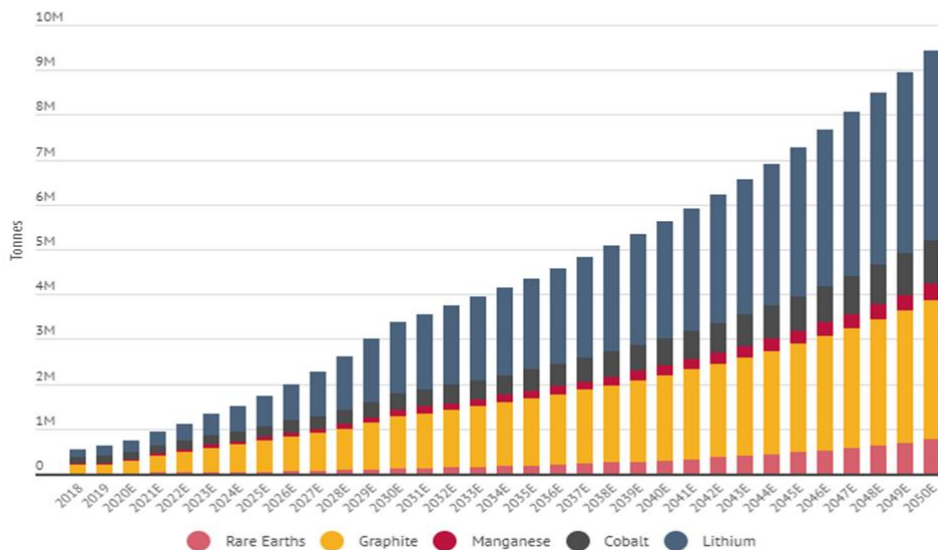
AVE urges EPA to consider the costs and risks to OEMs and technology suppliers associated with converting and expanding automotive supply chains to meet future standards as more ZEV vehicles are introduced into the marketplace. To remain competitive, and to meet future standards, OEMs and technology suppliers could experience significant challenges associated with revamping supply chains, training workers, and obtaining the necessary resources.

Global supply chain pressures have already had a dramatic impact on the automotive sector and its ability to manufacture more efficient vehicles. The ongoing semiconductor shortage, which is expected to last well into 2022, has increased the cost of manufacturing, stifled the production of new vehicles, and forced temporary shutdowns of American automotive facilities.²¹

Critical Minerals: Similarly, EPA should consider the impact of rising commodity prices and the global availability of critical minerals and materials. Demand for steel and aluminum and the critical minerals needed for EVs is growing and will likely impact the price and availability of all types of vehicles. The World Bank recently predicted the global need for critical minerals will quadruple by 2035, far exceeding current supply.

The World Bank estimates demand for these minerals could rise up to 500 per cent by 2050, while ANZ Research's calculation (based on the Bloomberg New Energy Finance scenario) suggests even higher growth rates for lithium, graphite and rare earths.

Critical minerals demand outlook



Source: BNEF, World Bank, ANZ Research

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The industry may face challenges in the critical materials supply chains needed to achieve compliance. This cost and risk analysis would be similar in scope to the analysis EPA already conducts on fuel prices, as incorporated in previous rulemakings.²³ These measurements are

²¹ Chip shortage expected to cost auto industry \$110 billion in revenue in 2021

<https://www.cnbc.com/2021/05/14/chip-shortage-expected-to-cost-auto-industry-110-billion-in-2021.html>

²² <https://bluenotes.anz.com/posts/2020/08/anz-research-critical-minerals-exports-renewable-energy-technology>

²³ 83 Fed Reg No. 165 at 42993

key indicators that will impact production numbers, the price of vehicles, job growth, and consumer choice, and are a necessary consideration in determining future achievable standards.

Charging Infrastructure: EPA acknowledges that developing charging infrastructure for EVs, PHEVs, and FCEVs will increase upfront costs and may possibly be a barrier for consumers purchasing these vehicles.²⁴ EPA should therefore include an additional cost analysis for the infrastructure needs of EV, PHEV, and FCV vehicles for mass market adoption, as well as how the lack of charging infrastructure in certain regions may impact sales. This analysis would likely assist regulators with understanding the need for further consumer incentives.

Fleet Mix: AVE urges EPA to incorporate real-world sales data as forecasted by IHS Markit (below) to account for the historical changes in fleet mix since 2012. In 2012, EPA modeling predicted significant reductions in light truck sales:

“Between MY2008 and MY2025, the agencies’ forecast [for light-duty truck sales] showed declines from 17.8% to 5.8% for Chrysler, from 14.5% to 12.0% for Ford, from 26.8% to 27.8% from General Motors, and from 58.3% to 44.5% for the aggregate of these three manufacturers.”²⁵

US Sales								
	CY 2019	CY 2020	CY 2021	CY 2022	CY 2023	CY 2024	CY 2025	CY 2026
Car	4,853,963	3,528,356	3,667,708	3,451,198	3,280,131	3,026,842	2,952,294	2,940,674
LTR	12,221,888	11,058,032	13,020,689	13,510,434	13,784,388	13,802,300	13,782,395	13,878,052
	17,075,851	14,586,388	16,688,397	16,961,632	17,064,519	16,829,142	16,734,689	16,818,726
Car	28%	24%	22%	20%	19%	18%	18%	17%
Light Truck	72%	76%	78%	80%	81%	82%	82%	83%

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IHS Markit predicts an additional 23% increase in light truck sales from the end of 2021 to 2026. Real-world modeling in the Proposed Rule will assist manufacturers with future planning to reflect consumer’s vehicle choices.

Post-2026: As indicated in President Biden’s August 5, 2021, Executive Order, EPA will soon embark on setting standards beyond 2026. As EPA looks to increase the stringency of these standards, the agency must foster innovation for multiple technology pathways that demonstrate feasibility and maximize the environmental benefits of all available technology. As technology solution providers, AVE members will help the U.S. reach its climate goals.

Conclusion

The U.S. light-duty marketplace of today is quite different from that of 2012 when EPA and NHTSA issued joint emissions and fuel economy standards. The challenges of the global marketplace have forced OEMs and technology suppliers to change the way they operate and invest in advanced vehicle technologies. Performance-based standards that reflect real world data, including LCA and upstream emissions, provides industry the best opportunity to

²⁴ 86 Fed Reg No. 151 at 43737

²⁵ 77 Fed Reg No. 199 at 62677

²⁶ <https://ihsmarkit.com/products/automotive-light-vehicle-sales-forecasts.html>

compete globally while offering consumers reasonably-priced vehicles that will meet the U.S.'s carbon reduction goals.

EPA should also consider adjusting future standards to reflect the global pressures facing OEMs and technology suppliers if the United States is going to continue leading the world in producing advanced vehicle technologies for the next generation of vehicles. A single technology solution will not accomplish our goals and EPA should set standards that encourage as many solutions as possible.

AVE encourages EPA to use this rulemaking as an opportunity for regulators to provide certainty across the automotive industry, foster more U.S. jobs and innovation, and solidify the United States' position in the world as a leader in mobility innovation.

Respectfully submitted,



Lee Janger
Executive Director