General Motors

General Motors LLC
Renaissance Center
Detroit, Michigan

FE 6359

October 26, 2018

U.S. Environmental Protection Agency
EPA Docket Center, EPA West, Rm B102
1301 Constitution Avenue NW
Washington, DC 20002

National Highway Traffic Safety Administration
West Building, Ground Floor, Rm W12–140
1200 New Jersey Avenue SE
Washington, DC 20590

Comments of General Motors on Docket ID Nos. NHTSA–2018–0067; EPA–HQ–OAR–2018–0283; FRL–9981–74–OAR; The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks (NPRM)

General Motors LLC (GM) appreciates the opportunity to offer comments on the National Highway Traffic Safety Administration's (NHTSA's) and Environmental Protection Agency's (EPA's) joint Notice of Proposed Rulemaking on fuel economy and greenhouse gas emissions for 2021 and later model years; The Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021–2026 Passenger Cars and Light Trucks (NPRM). 83 Fed. Reg. 42986 (Aug. 24, 2018).

If you have any questions, please contact me at 313-665-2964.

Sincerely,

Barbara Kiss
Director, Environment & Energy
Global Public Policy

Attachments

General Motors

General Motors LLC
Renaissance Center
Detroit, Michigan

Table of Contents

Table of Appendices

General Motors

General Motors LLC
Renaissance Center
Detroit, Michigan

I. Executive Summary

For over a century, cars have driven our society, providing unprecedented mobility and transforming the way we live and work. General Motors leads the development of groundbreaking technologies and businesses that further its vision of zero crashes, zero emissions and zero congestion. GM supports economy-wide efforts to address climate change. That means annually improving fuel economy as GM has historically done, through one national regulatory program that protects American jobs and American consumers.

GM agrees that it was appropriate to reopen the midterm evaluation of fuel economy standards. The U.S. auto industry has made great strides in increasing fuel economy during the first six years of the program adopted in 2012. In the outer years of that program, however, the current standards increase at a rate that exceeds incremental engineering improvements and will thus make new vehicles more expensive, reduce demand and jobs, and provide fewer CO_2 reductions relative to the substantial costs required, while also phasing out key incentives (*e.g.*, EV multiplier) and introducing policies that impede electrification as a solution (*e.g.*, including upstream emissions for EVs).

The preferred alternative is not the answer to these regulatory challenges. Rather, we prefer standards through 2026 that continue improving the fuel economy of gasoline powered vehicles at historic rates and policies that support American leadership in zero emissions vehicles. America must take the lead in this effort or other nations will dominate in electric vehicles (EVs) and set the standards for the world.

GM has consistently advocated for modernized regulations that facilitate a market-facing bridge to a zero emissions future and is disappointed that none of the alternatives offered in the NPRM include such provisions. GM is troubled that some existing measures – like the EV multiplier – are proposed to be phased out after MY2021. The result is that, just when EVs are on a path to becoming more technologically and economically viable, the proposed fuel economy standards only recognize innovation in conventional fuel economy technologies, which provide less environmental benefit for each dollar invested.

GM strongly believes that EVs are the future of transportation. But, the path to that future will require deliberate regulatory incentives due to the high cost of batteries and competition from foreign manufacturers. The time is right for a National Zero Emission Vehicle (NZEV) program administered by EPA that enables scale by promoting ZEV investment that meets customer demand throughout the entire nation and effectively addresses climate change. GM also supports incentives for complementary business models that spur EV deployment, such as additional credits for EVs operating as autonomous vehicles (AVs) and within rideshare

platforms. These models expand access to emission-free mobility, improve EV transportation options for low income communities, and displace gasoline miles travelled.

GM supports one national program for all 50 states and urges the federal government to pursue a compromise involving all parties. A national compromise will eliminate regulatory uncertainty and enable all stakeholders to focus cooperatively on economic growth, energy conservation, and environmental protection. The ability to sell the same fleet in all 50 states will also reduce manufacturer burden and consumer price. Consistent with Congress's intent, this compromise should reflect technologically feasible, cost-effective improvements that reflect the historic pace of innovation, fuel costs, and customer acceptance.

Now is the time for policies that address climate change while promoting American industry, American workers, and American innovation in transportation technology. These policies should support investment in advances like EVs and complementary business models that will maintain U.S. leadership in global mobility. And, while the CAFE program should reflect industry's continuous fuel economy improvement, it should not require high-cost investment in marginal internal combustion engine improvements that customers are not willing to pay for and that divert resources from the further development of electrification. The policies should also amplify existing consumer-facing policies that stimulate EV demand (*e.g.*, tax and infrastructure incentives). Specifically, GM suggests a fuel economy regulation that is harmonized into a single national approach and encourages:

- Consumer-driven cost-effective improvements to traditional internal combustion engine vehicles;
- Investment in electric vehicles and autonomous EV technology;
- Development of a National Zero Emission Vehicle (NZEV) program to enable EV scale; and
- Development of complementary business models to maximize EV deployment.

These policies are different than those envisioned in the 2012 regulation and recently reaffirmed by California. They are also different from those proposed in the NPRM. They reflect technological, economic, and geopolitical realities that were not foreseen in 2012 and not adequately considered in the proposed rule. And, done well, they can promote stable American industrial leadership while delivering superior environmental benefits.

II. The Better Approach is a National Zero Emission Vehicle Program

The proposed NZEV program would effectively respond to our nation's need to conserve energy and reduce greenhouse gas (GHG) and other emissions from the transportation sector, while encouraging American innovation, promoting the success of the U.S. automotive sector, and preserving U.S. industrial leadership for years to come.

A. Description of proposed EPA NZEV program

General Motors supports a nationwide program built on existing ZEV programs, as follows:

- ZEV requirements (by credits) each year, starting at 7% in 2021, increasing 2% each year - to 15% by 2025, then 25% by 2030.
  - ZEV market grows at 15% year-over-year for the nine-year period.
  - Puts 7 million long-range EVs on American roads by 2030.
- Crediting system modelled on existing ZEV programs: credits per vehicle, based on EV range, as well as averaging, banking, and trading.
  - Starting credit bank for each OEM based on 2017-2020 national ZEV sales.
- Requirements after 2025 linked to path toward commercially-viable EV battery cell availability at a cost of $70/kWh (to be determined by Argonne National Lab).
  - Target accelerated if $70/kWh threshold is reached sooner, or delayed if later.
- Requirements after 2025 linked to path toward adequate EV infrastructure development.
  - Scaled from the NREL National EV Infrastructure Analysis, 4,250 SAE DC Fast-Charging Sites (14,000 plugs) are required by 2030 to support the proposed 25% requirement.[1]
  - Independent analysis required to determine if ramp rate is sufficient to reach 2030 goal.
  - Target accelerated if infrastructure threshold is reached sooner, or delayed if later.
- 1.5x ZEV credits for vehicles over 5,250 lb. Test Weight Class to recognize increased utility and additional displaced conventional fuel. Alternatively, replace the range-based multiplier with a credit calculation based on battery energy.
- 6.0x ZEV credits for EVs deployed as Autonomous Vehicles (regardless of range) to recognize higher vehicle miles travelled and higher gasoline-mile replacement, and to avoid artificially penalizing AVs, which will have shorter range due to AV computing power needs.
- 1.75x ZEV credits for EVs deployed in rideshare programs modeled on existing ZEV Transportation System Credits.
- Zero Emissions Task Force to promote complementary policies.[2]
- Program terminates when 25% target is met, or based on a determination that the battery cost or infrastructure requirements are not practicable within the timeframe.

---

[1] Derived from National Plug-In Electric Vehicle Infrastructure Analysis, U.S. Dept. of Energy, Office of Efficiency & Renewable Energy, Table ES-2, *available at* https://www.nrel.gov/docs/fy17osti/69031.pdf (last visited Oct. 15, 2018).

[2] Appendix 1 - Zero Emissions Task Force.

1. The climate change benefits of the proposed NZEV policy radically amplify those of existing ZEV programs

The greenhouse gas benefits of EVs result from several efficiencies. Because EVs emit no CO_2 when operating, each EV provides a massive reduction in GHG emissions on a per-unit basis of approximately 350 grams of CO_2 per mile.[3] Further, while "[o]nly about 12%–30% of the energy from the fuel you put in a conventional vehicle is used to move it down the road,"[4] "up to 80% of the batteries' energy is transferred directly to power the car."[5] For these and other reasons, each dollar invested in ZEV yields more GHG reduction than each dollar invested in gasoline engine improvements.[6]

The NZEV program promises to harness these efficiencies towards CO_2 reductions well beyond the current ZEV program administered by California and the nine states that have adopted it (existing ZEV programs). The NZEV program has the potential to place more than 7 million long-range EVs on the road by 2030, compared to 1.3 million required by existing ZEV programs, yielding a cumulative incremental reduction of 375 million tons of CO_2 emissions between 2021 and 2030, not including the additional benefits from lower range EVs and Plug-In Hybrids.

Fleetwide U.S. ZEV Volume Projections: NZEV Program v. Existing ZEV Programs
(4 Credits/Unit in Both Programs)

MODEL YEAR	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Proposed NZEV Requirement (Credits)	*7%*	*9%*	*11%*	*13%*	*15%*	*17%*	*19%*	*21%*	*23%*	*25%*
Proposed NZEV Annual Units	310,000	400,000	488,000	577,000	665,000	755,000	844,000	933,000	1,021,000	1,110,000
Proposed NZEV Cumulative Units	310,000	710,000	1,200,000	1,227,000	2,440,000	3,195,000	4,039,000	4,972,000	5,993,000	7,103,000
Existing ZEV Programs Cumulative Units	186,000	412,000	676,000	979,000	1,320,000					

[3] Environmental Protection Agency, EPA-420-R-18-001, Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 Through 2017 (2018) ("Trends Report"), p. 4 at Table 2-1 "Adjusted CO_2 Emissions, Adjusted Fuel Economy, and Key Parameters by Model year."

[4] Where the Energy Goes: Gasoline Vehicles, U.S. Dept. of Energy, Office of Efficiency & Renewable Energy, *available at* https://www.fueleconomy.gov/feg/atv.shtml (last visited Oct. 15, 2018).

[5] Energy 101: Electric Vehicles, U.S. Dept. of Energy, Office of Efficiency & Renewable Energy, *available at* https://www.energy.gov/eere/videos/energy-101-electric-vehicles (last visited Oct. 15, 2018).

[6] Appendix 7 - Comparative Cost of GHG Control Strategies (GM CBI).

2. The NZEV program must accommodate uncertain future battery cost

The battery is the single largest EV component in terms of cost, mass, and vehicle architecture impact. EV sales over the past five years have shown that small, low-range EVs appeal to an extremely limited segment of the U.S. market, and these vehicles have been severely discounted to get consumers to even consider purchasing them. Larger EVs – with larger batteries – are needed to satisfy American customers' expectations for driving range and utility, and will be necessary for EV sales to increase in the future.[7] And, we expect cold-climate customers to demand additional "label" range to offset the impact of ambient temperature on range. For 300 miles of range in a medium-sized vehicle, at a battery cell cost of $140/kWh, the cell cost alone is over $13,000, or approximately equivalent to the material cost of an entire gasoline-powered compact vehicle. This cost does not account for other incremental material costs of an electric vehicle: battery enclosure, electric drive units, power electronics, or charging systems. Compounding this challenge, customers are unwilling to pay any more for an electric vehicle than an equivalent gasoline-powered vehicle, regardless of potential savings in fuel over the life of the vehicle.[8] While battery price projections anticipate costs dropping up to 50% by 2030 (to $70/kWh),[9] this depends on future inventions of scalable technologies that can be implemented within required lead-time. And it depends on a much more capable and robust battery cell supply base, which today is severely limited with only several viable suppliers globally. Accordingly, the NZEV program must allow for acceleration or delay of targets depending on battery cost.

B. EPA has the statutory authority to adopt and enforce an NZEV policy designed to control vehicle GHG and criteria emissions

EPA has broad authority pursuant to Section 202(a)(1) of the Clean Air Act (Act or CAA) to regulate "any air pollutant from any class … of new motor vehicles or … engines, which … cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare."[10] This includes criteria and GHG emissions.[11] The proposed NZEV policy would build on past EPA actions to regulate ZEVs pursuant to this authority. For example, EPA has already established Federal Tier 3 Bin 0 emissions standards for ZEVs and issued certificates of conformity to manufacturers of such vehicles.[12] EPA has also adopted test procedures to measure ZEV battery performance and range so they can be properly counted towards manufacturers' emissions and fuel economy requirements.[13] EPA and NHTSA also adopted

[7] Appendix 5 - Minimum Acceptable Range EV Study (GM CBI).

[8] Appendix 6 - Willingness to Pay for EV (GM CBI).

[9] Appendix 2 - EV Battery Cost Projection (Bloomberg New Energy Finance).

[10] 42 U.S.C. § 7521(a)(1).

[11] 42 U.S.C. § 7602(g); *Mass. v. EPA*, 549 U.S. 497 (2007); 74 Fed. Reg. 66496 (December 15, 2009).

[12] 40 C.F.R. § 86.1811-17.

[13] *See, e.g.,* 40 C.F.R. §§ 600.116-12, 1066.501.

vehicle environmental performance label requirements to ensure the public is provided useful information when considering the purchase of a ZEV.[14] EPA should build upon this foundation by adopting the proposed NZEV program.

1. EPA can replace its GHG standards with the NZEV program

EPA has long exercised its considerable discretion to develop programs to regulate vehicle emissions, and to make fundamental changes to those programs over time.[15] "It is well settled that EPA has inherent authority to reconsider, revise, or repeal past decisions to the extent permitted by law so long as the Agency provides a reasoned explanation. This authority exists in part because EPA's interpretations of the statutes it administers 'are not carved in stone.' *Chevron v. NRDC,* 467 U.S. 837, 863 (1984). An agency 'must consider varying interpretations and the wisdom of its policy on a continuing basis.' *Id.* at 863–64."[16] This means EPA can, based on changed circumstances and an adequate record, reasonably decide to fully replace its GHG program with the NZEV program.

EPA can also consider making the NZEV program an optional compliance pathway, which would allow the option of complying with current EPA GHG requirements or instead complying with the NZEV program. EPA would not have to terminate its GHG requirements, but could consider taking that step in the future after observing the success of the NZEV program. EPA also could consider converting its GHG standards into "back stop" standards that would be harmonized with CAFE standards and remain in place but be enforced independently only if NHTSA failed to enforce its standards.[17]

---

[14] *See* 40 C.F.R. § 600.310-12 and 49 C.F.R. § 575.401.

[15] For example: (1) EPA began its emissions certification program in the 1970s by testing manufacturers' pre-sale vehicles and issuing emissions certifications, but by 1981 EPA had totally revamped its program to rely on manufacturer self-testing of pre-production vehicles and submittal of data for EPA certification approval; (2) EPA originally conducted extensive emissions compliance testing of in-use vehicles but in 1999 adopted its Compliance Assurance Program that required manufacturers to procure and test in-use vehicles at specified time and mileage points; (3) EPA adopted its National Low Emissions Vehicle (NLEV) program for the 2001 – 2004 model years which allowed manufacturers and states to opt into a federal program whereby vehicles meeting more stringent California-type emission standards were produced and sold in the states before equivalent federal standards took effect; (4) EPA has often adopted optional emission standards and optional phase-in requirements that incentivize the early introduction of lower emissions vehicles to realize environmental benefits while providing manufacturers with additional flexibility; and (5) in the One National Program EPA recognized that the Clean Air Act "does not have … specific requirements for the form of CO_2 standards…" which enabled EPA to adopt novel attribute-based standards aligned with NHTSA's CAFE standards. NPRM, 83 Fed. Reg. 42986, 43189 (Aug. 24, 2018).

[16] NPRM, 83 Fed. Reg. at 43242 (Aug. 24, 2018).

[17] EPA implemented a "back stop" when it adopted mobile air toxic regulations for the petroleum industry, as mandated by Section 202(l). EPA regulations did not impose any new regulatory obligations

2. EPA has the authority to set GHG and NZEV standards within Energy Policy and Conservation Act of 1975 (EPCA) standards

Although EPA and NHTSA have different statutes to follow in setting GHG and CAFE standards, they have demonstrated with the 2012 One National Program that they can reconcile their standard-setting responsibilities. A harmonized outcome is possible for the agencies in large part because they both must consider technological feasibility and the cost of compliance when setting standards.[18] Nor does the Clean Air Act compel EPA to set GHG emission standards without regard to the co-benefits provided by NHTSA's CAFE standards. Therefore, EPA can set its GHG standards to support the CAFE standards yet not require new or different fuel economy technologies and additional costs for manufacturers. Alternatively, with its NZEV policy, EPA could model NZEV's GHG benefits and set the NZEV requirements to provide benefits that support but do not exceed those achieved by NHTSA's CAFE standards. This would accord with the Supreme Court's faith expressed in *Mass. v. EPA* that the agencies can "both administer their obligations and yet avoid inconsistency."[19]

C. The NZEV Policy will further NHTSA's statutory mandate to support fuel economy policies that conserve energy

The proposed NZEV policy is consistent with the objectives of EPCA and the Energy Independence and Security Act of 2007 (EISA), and within NHTSA's authority under those statutes.[20] A successful NZEV program will reduce U.S. petroleum consumption, allow for more efficient use of domestic oil, reduce the need to import oil, and avoid the wasteful or destructive use of energy.[21]

1. "Maximum feasible" under EPCA allows for consideration of "other motor vehicle standards of the government," including the proposed NZEV program, and the need of the nation to conserve energy

NHTSA is required to set maximum feasible CAFE standards, balancing consideration of four factors: technological feasibility, economic practicability, the effect of other motor vehicle standards of the government on fuel economy, and the need of the United States to conserve energy.[22] NHTSA has broad discretion to give weight to any of the four factors, so long as the

---

but acted as a "back stop" to fuel standards EPA had adopted under Section 211. *Affirmed in Sierra Club v EPA*, 325 F.3d. 374 (D.C. Cir. 2003).

[18] Section 202(a)(2) (42 U.S.C § 7521(a)(2)) of the Clean Air Act and Section 32902(f) of EPCA (49 U.S.C. § 32902(f)) require consideration of technology and cost.

[19] *Mass. v. EPA,* 549 U.S. 497, 532.

[20] *See* EPCA, Pub. L. 110-140, 89 Stat. 871 (1975), and EISA, Pub. L. No. 94-163, 121 Stat. 1492 (2007).

[21] NPRM, 83 Fed. Reg. at 43213-16 (Aug. 24, 2018).

[22] 49 U.S.C. § 32902(f).

agency does not undermine EPCA's fundamental purpose of energy conservation.[23] If EPA implements an NZEV program, NHTSA's authority affords it the flexibility to set maximum feasible CAFE standards that would be complementary to, and harmonized with, that program. In considering the effect of other motor vehicle standards of the government on fuel economy, NHTSA would include the impact of the NZEV program, as NHTSA historically has done for emissions regulations.[24] This would allow NHTSA to set standards that are maximum feasible, while accounting for the technological developments manufacturers make to comply with EPA's NZEV program. NHTSA's complementary CAFE standards could shift focus to improving the fuel economy of non-ZEV vehicles, and do so in a way that allows for appropriate fuel economy increases in those vehicles.

NHTSA's authority to set fuel economy standards that are complementary to an EPA NZEV program also derives from EPCA's requirement that it consider the need of the United States to conserve energy when setting fuel economy standards. The U.S. Energy Information Administration projects a range of fuel prices in 2050—from $2.41/gallon in a low oil price scenario, to $5.95/gallon in a high price scenario.[25] To mitigate the potential negative effects of higher fuel price scenarios, NHTSA can give more weight to this EPCA factor, allowing for the consideration of an NZEV program. Implementation of both programs would support NHTSA's fundamental statutory mandate, and collectively advance the agencies' common goals.

D. The proposed NZEV program would build on existing ZEV programs

In Section 209 of the Clean Air Act, Congress empowered EPA to waive preemption, recognizing California's status as a "pioneer in the field" of vehicle emissions that could serve as a "laboratory" for vehicle emissions controls.[26] Congress hoped these waivers would benefit the

---

[23] *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1195 (9th Cir. 2008).

[24] The effect of other Federal motor vehicle standards on fuel economy "is interpreted to call for making a straight-forward adjustment to the fuel economy improvement projections to account for the impacts of other Federal standards, principally, those in the areas of emission control…" 42 Fed. Reg. at 33537 (June 30, 1977).

[25] U.S. Energy Information Administration, Annual Energy Outlook 2018, *available at* https://www.eia.gov/outlooks/aeo/pdf/AEO2018.pdf (last visited Oct. 25, 2018).

[26] 113 Cong. Rec. 30975 (Cong. Moss) ("California … offers a unique laboratory, with all of the resources necessary, to develop effective control devices which can become a part of the resources of this Nation and contribute significantly to the lessening of the growing problems of air pollution throughout the Nation."); 113 Cong. Rec. 32478 (Sen. Murphy) ("It was my concern for allowing California to continue its pioneering efforts in the field of air pollution that led to an amendment of this bill which the Senate and, later, the House accepted… granting California a waiver of Federal preemption of the field in control of motor vehicle emissions. [….] In a sense, our State will act as a testing agent for various types of controls and the country as a whole will be the beneficiary of this research."; S. Rep. No. 403, 90th Cong. 1st Sess. at 33 (1967) ("The Nation will have the benefit of California's experience with lower standards which will require new control systems and design. In fact California will continue to be the testing area for such lower standards and should those efforts to achieve lower emission levels be

nation by incubating policies that could be adopted on the national-level when appropriate. In the ensuing decades, several California programs have been replicated on the national scale.[27] The NZEV program would likewise build on California's efforts toward GHG reduction[28] consistent with this Congressional roadmap.

The scale of climate change demands national solutions. The fact that nine additional states have opted into the existing ZEV program demonstrates both the national need to control GHG emissions, and the need for a national approach that builds on existing ZEV programs.[29] By yielding a cumulative incremental reduction of 375 million tons of CO_2 emissions over the existing ZEV programs between 2021 and 2030, the NZEV program compels ZEV investments that far exceed those required by existing ZEV programs, and goes much further toward protecting public health and welfare. And given California's significant investments in infrastructure, consumer education, and incentives (both monetary and non-monetary), we expect that California will continue to be the nation's dominant EV market. These same investments and complementary efforts need to be made nation-wide to enable the growth of this market and to position the United States as a leader in technology development as well as deployment.

---

successful it is expected that the Secretary will, if required to assure protection of the national health and welfare, give serious consideration to strengthening the Federal standards.")

[27] For example, Onboard Diagnostic (OBD) requirements were first adopted by California in 1988 (13 C.C.R. § 1968), and then expanded nationally in 1993 (42 U.S.C. § 7521(m); 58 Fed. Reg. 9468 (Feb. 19, 1993); 40 C.F.R. § 86.094-17). Similarly, California's Low Emission Vehicle III (LEV III) Program was first adopted by California for MY2015 and later vehicles (13 C.C.R. § 1961.2), and later harmonized nationally to apply to MY2017 and later vehicles (40 C.F.R. §86.1811-17).

[28] California acknowledged in its most recent ZEV waiver application that "[t]here is no criteria emissions benefit from including the ZEV proposal in terms of vehicle … emissions. The LEV III criteria pollutant fleet standard is responsible for those emission reductions in the fleet; the fleet would become cleaner regardless of the ZEV regulation because manufacturers would adjust their compliance response to the standard by making less polluting conventional vehicles." Docket No. EPA-HQ-OAR-2012-0562-0004 at 15-16.

[29] *See, e.g.,* Letter from Deborah Mans, NJDEP Deputy Commissioner, to Rana McReynolds, Clerk of the Air Resources Board, dated September 24, 2018. ("…New Jersey is particularly vulnerable to changes in sea level that could result from global climate change. Global climate change contributes to the increased frequency and strength of devastating natural disasters such as Superstorm Sandy that, in 2012, ravaged large portions of New Jersey…. Sea level rise threatens to contaminate drinking water, erode and submerge New Jersey's beaches and coastal ecosystems and cause enormous coastal and inland flood damage…."). *See also* Letter from Tommy Wells, Director, D.C. Department of Energy and Environment to the California Air Resources Board dated September 20, 2018 ("The District anticipates harms from the effects of global warming. By 2080, the U.S. Army Corps of Engineers conservatively predicts up to 3.4 feet of additional sea level rise in the District. This change can result in increased flooding and damage. The average summer high temperature is projected to rise from 87F to 97F by 2080.")

E. The NZEV program will promote U.S. manufacturers' role as global leaders in EV development and technical standards and further U.S. national security interests

General Motors is proud to offer the first mainstream, long-range EV on the market, the Chevrolet Bolt EV, which has sold over 37,000 vehicles since its introduction, across all 50 states. The Bolt EV is a U.S. manufacturing success story – as of Fall 2018, the battery cells, battery packs, and vehicles are all manufactured in Michigan. In addition, 16 states are home to suppliers that provide components and systems for the Bolt EV.[30] GM anticipates further substantial investment in the United States to support the ZEV volumes required by the NZEV program.[31] Not only does this investment provide U.S. jobs, but it also ensures the place of U.S. industry at the leading edge of innovation.

The NZEV program also will further U.S. national security interests.[32] China has clearly seen the value of this technology by becoming the first country to develop an NZEV program. It is critical for the United States to do the same to remain at the forefront of EV development, manufacturing, and worldwide sales. In this respect, an NZEV program would cement U.S. leadership in EV technologies and technical standards. Further, EVs have the potential to reduce civilian and military dependence on foreign petroleum, and would ensure uninterrupted operation of military and non-military logistics in the event of an energy shortage or embargo-like crisis. And by shifting the market toward renewable energy, an NZEV program would help mitigate the national security risks of climate change by, among other means, reducing GHG emissions.

The NZEV program should also support international collaboration to ensure the United States can benefit from advances made in other countries, empower U.S. manufacturers to compete with non-U.S. manufacturers at home and abroad, and help the U.S. set global standards for EVs and EV technology. Technology for manufacturing EVs and EV components is primarily commercial and widely available outside the United States. Encouraging and supporting international development and sale of U.S.-developed EVs allows U.S. manufacturers to invest in R&D with that global scale in mind and to make use of the best and brightest talent in a way that inures to the benefit of the United States. Ultimately, such a carefully crafted NZEV program will promote U.S. national security interests while ensuring the United States remains the leader in the development and deployment of EVs and EV technologies worldwide.

---

[30] Appendix 3 - Chevrolet Bolt EV Manufacturing Footprint (Fall 2018).

[31] Appendix 8 - GM Planned ZEV Investments (GM CBI).

[32] *See, e.g.,* National Security Strategy of the United States of America (December 2017). ("The United States will pursue an economic strategy that rejuvenates the domestic economy, benefits the American worker, revitalizes the U.S. manufacturing base, creates middle-class jobs, *encourages innovation, preserves technological advantage, safeguards the environment, and achieves energy dominance*" (emphasis added)).

III. The No Action Alternative Standards Are Beyond Maximum Feasible

At the time of this rulemaking, GM has learned from its experience complying with, and strategizing for, the early years of EPA's GHG and NHTSA's CAFE programs. As the latter half of EPA's GHG program and NHTSA's augural standards draws near, GM is concerned that the standards exceed what was statutorily contemplated by the CAA, EPCA, and EISA. This rulemaking remains an appropriate mechanism to reevaluate whether the standards are consistent with the agencies' statutory authority.

A. The No Action Alternative standards are not technologically feasible or economically practicable

In setting GHG and CAFE standards, EPA and NHTSA largely share similar, overlapping considerations. Under EPCA, NHTSA must consider technological feasibility and economic practicability, or as NHTSA interprets them—whether a method of improving fuel economy is ready for commercial deployment, and whether a standard is within the financial capability of the industry, but not so stringent as to lead to adverse economic consequences.[33] Likewise, under the CAA, EPA considers technology effectiveness, its cost, and necessary lead time, in evaluating the feasibility and practicability of potential standards. Additionally, EPA considers emissions reductions, fuel savings, energy conservation, and the impacts of the standards on the auto industry.[34]

In consideration of economic practicability, technological feasibility, technology effectiveness, and fuel savings, EPA's 2021-2025 standards and NHTSA's augural standards are not appropriate, and are beyond maximum feasible. GM has made considerable investments in CO_2-reducing technologies, and will continue pursuing these technologies. However, many CO_2-reducing technologies relied upon by the agencies in their compliance pathways have not been as fruitful as was projected, in many cases having reduced effectiveness due to the synergistic effects of implementing multiple CO_2-reducing technologies concurrently.[35] In other instances, technologies and vehicles have suffered from poor consumer acceptance, or do not deliver the fuel saving benefits consumers expect because the technology is effective in limited applications.[36] GM has been consistent in its belief that modernized standards that promote the development and proliferation of battery EVs, along with complementary policies that

[33] Economic practicability also includes, amongst other things, consumer demand for fuel economy and other vehicle attributes. NPRM, 83 Fed. Reg. at 43208 (Aug. 24, 2018).

[34] *Id*. at 43227.

[35] Appendix 9 – Technology Analysis (GM CBI).

[36] *Id.*

promote the development of EV rideshare and autonomous vehicles,[37] remain the most promising means to reduce CO_2 emissions and conserve energy.[38]

IV. Industry Has Demonstrated It Can Make Year Over Year Fuel Economy Improvements

In the NPRM, NHTSA tentatively determined the maximum feasible CAFE standards are "flat" from model years 2021 through 2026. To arrive at those standards, NHTSA placed less weight on the need of the United States to conserve energy, technological feasibility, and effect of other motor vehicle standards of the Federal government. Concurrently, NHTSA placed increased weight on economic practicability, stating that it believes that all regulatory alternatives under consideration raise economic practicability issues, including the potential for elimination of consumer choice, loss of U.S. jobs, and additional adverse economic impacts. NHTSA has historically interpreted "economic practicability" to mean, among other things, whether a standard is within the financial capability of the industry, but not so stringent that it would lead to adverse economic impacts such as job loss or unreasonable elimination of consumer choice.[39] To that end, economic practicability serves as a check on how much and how rapidly fuel saving technologies can be applied to the fleet.

In consideration of EPCA's four factors, General Motors believes CAFE standards for internal combustion powered vehicles that increase in line with historic rates from model years 2021-2026 reflect the maximum feasible standards, particularly in consideration of a complementary NZEV program. General Motors believes this approach is economically practicable, as it is consistent with the historic capabilities of the industry, accounting for the realities of existing near-term CAFE standards as well as the availability of fuel-saving technologies and industry competition.[40]

Since 1980, industry has improved the fuel economy of a predominantly internal combustion fleet at an average rate of 1%/year.[41] While that trend demonstrates continual improvement of internal combustion engines, those improvements have not been consistent year-over-year, and are not enough to keep pace with future finalized fuel economy standards for internal combustion engines. This is true despite the "flexibilities" provided in the current rules that allow for advanced technology vehicle multipliers, off-cycle emission credits, and credit for the use of lower GHG refrigerant. Additionally, nearly all major fuel-saving technologies that had

[37] Support for policies (such as the AV START Act, S. 1885) that supports development and deployment of Autonomous Vehicles in rideshare fleets, particularly all-electric AVs.

[38] To that end, it is imperative that EVs not be required to account for upstream emissions for compliance purposes. Inclusion of upstream emissions disincentives production of EVs, and could slow the widespread availability of these vehicles.

[39] NPRM, 83 Fed. Reg. at 43208 (Aug. 24, 2018).

[40] Appendix 9 – Technology Analysis (GM CBI).

[41] Trends Report, *supra*.

been contemplated have been implemented by manufacturers, or will be implemented within the rulemaking timeframe. General Motors believes that increasing internal combustion engine standards based on historic rates, is economically practicable, and in turn, maximum feasible. Standards inclusive of these considerations are within the capability of manufacturers without eliminating consumer choice, leading to the loss of jobs, or creating any other adverse economic impacts.

V. One National Program is Best for the Economy, Consumers, and Industry

One harmonized national regulatory program is best for the economy, consumers and industry because it allows manufacturers to reduce costs and administrative burdens by designing and building vehicles that comply with a single national standard instead of having to design and build two sets of vehicles, one to meet a federal standard and the other to meet a standard enforced in California and the Section 177 States. The cost and burdens avoided by manufacturers when they do not have to comply with this "two-car" scenario in turn provides significant benefits for consumers through reduced vehicle prices. For this rulemaking, GM analyzed the cost and administrative burdens of the "two-car" scenario and the vehicle price implications. GM's sales in California and the Section 177 States account for about 26% of GM's U.S. sales. A "two-car" scenario would increase costs for GM substantially, and these costs would have to be spread over a smaller volume of vehicles. As a result, consumers would incur higher vehicle prices, with corresponding loss in sales and negative employment impacts.

A harmonized national program also provides regulatory certainty that enables economic growth. A primary goal of the prior One National Program was to provide regulatory certainty and consistency for the industry.[42] The time to develop new products with engine upgrades takes years. GM will face significant planning challenges and associated costs if the 2021 – 2026 model year standards are not settled with sufficient lead time to develop and implement compliant technology.[43]

VI. Responses to Other Requests for Comment

General Motors believes program flexibilities will continue to play an increasingly important role in reducing CO_2 emissions and increasing fuel economy. As discussed in Appendix 4 – Comments on Technical Issues, there are technologies and innovations that are important for EPA and NHTSA to acknowledge in their programs to ensure continued progress toward meeting the agencies' standards.

---

[42] "The agencies' final rules will also provide regulatory certainty and consistency for the automobile industry by setting harmonized national standards. They were developed and are designed in ways that recognize and accommodate the relatively short amount of lead time for the model years covered by the rulemaking and the serious current economic situation faced by this industry." 75 Fed. Reg. 25324, 25544 (May 7, 2010).

[43] Appendix 10 - GM Product Development Process (GM CBI).

VII. Alliance Comments

GM, as a member of the Alliance of Automobile Manufacturers, incorporates by reference the comments submitted by the Alliance on this rulemaking.

VIII. Conclusion

GM supports one national program for all 50 states and urges the federal government to pursue a compromise involving all parties. GM suggests a fuel economy regulation that encourages cost effective improvements to traditional internal combustion engine vehicles as well as the development of a National Zero Emission Vehicle (NZEV) program.

TABLE OF APPENDICES

Appendix 1 – Zero Emissions Task Force

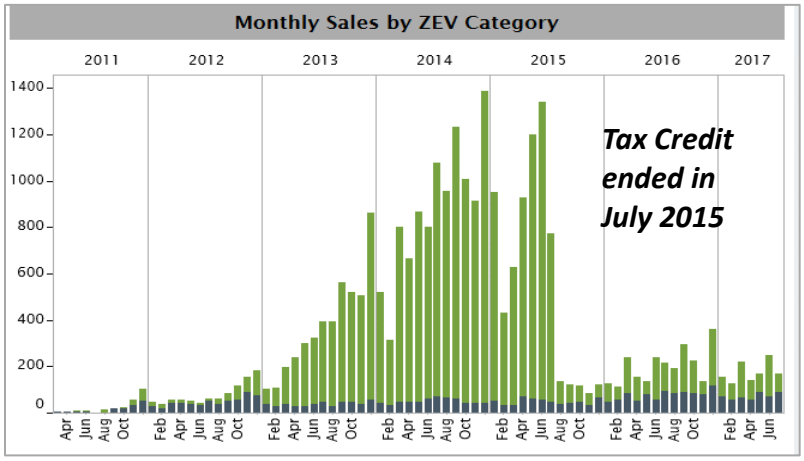
GM supports the creation of a federally-managed task force including stakeholders from the automotive industry, suppliers, and the public utilities commissions, to ensure that necessary EV complementary policies are enacted in the following areas, among others: Consumer Incentives and Education, EV Charging Infrastructure, and Battery Research and Supply Chain.

Consumer Incentives and Education

The 200,000 unit per manufacturer cap on the $7,500 Federal EV Tax Credit, 26 U.S.C. § 30D, should be replaced with a sunset program for all manufacturers once EV sales penetration reaches 5% of the U.S. light-duty fleet (approx. 850k/year).

- The current structure penalizes the first movers in this space, putting companies like GM and Tesla at a severe pricing disadvantage in the market for several years.
- This incentive should be converted to a compelling-point-of-sale rebate that can be used by all retail, commercial, and government entities.

Importance of Incentives: Georgia ZEV Sales Over Time



This data shows ZEV sales before and after $5,000 Georgia state tax credit for BEVs, demonstrating the importance of this incentive to overall ZEV volumes. *Source: Alliance of Automobile Manufacturers, using information provided by IHS Markit*

- A federally-funded program should be established to drive EV adoption through federal, state government, and local government fleet EV purchase commitments (recognizing that many government fleets cannot take advantage of tax credits).
- A federally-funded national EV-awareness campaign should be established, including EV experience centers across the United States, K-12 education programs, and media programs that highlight the benefits of driving electric for both retail consumers and fleet operators.

EV Charging Infrastructure

The proposed NZEV program recognizes that increased EV charging infrastructure is necessary for ZEVs to achieve scale. To support this development, GM recommends the following federal support:

- Reestablish and reform the EVSE (Electric Vehicle Supply Equipment) Infrastructure Tax Credit, 26 U.S.C. § 30C, to convert it into a compelling rebate that can be used by all retail, commercial, and government entities.

- Establish a federal grant program to accelerate public and private workplace charging.
- Establish a federal grant program to accelerate investment in urban DC fast-charging hubs.
- Establish a national building code that requires all new residential construction (single family homes and multi-unit dwellings) to support EV charging.
- Establish a federal program to ensure all EV charging stations in the United States are easily identifiable to consumers (e.g. some uniformity in appearance).

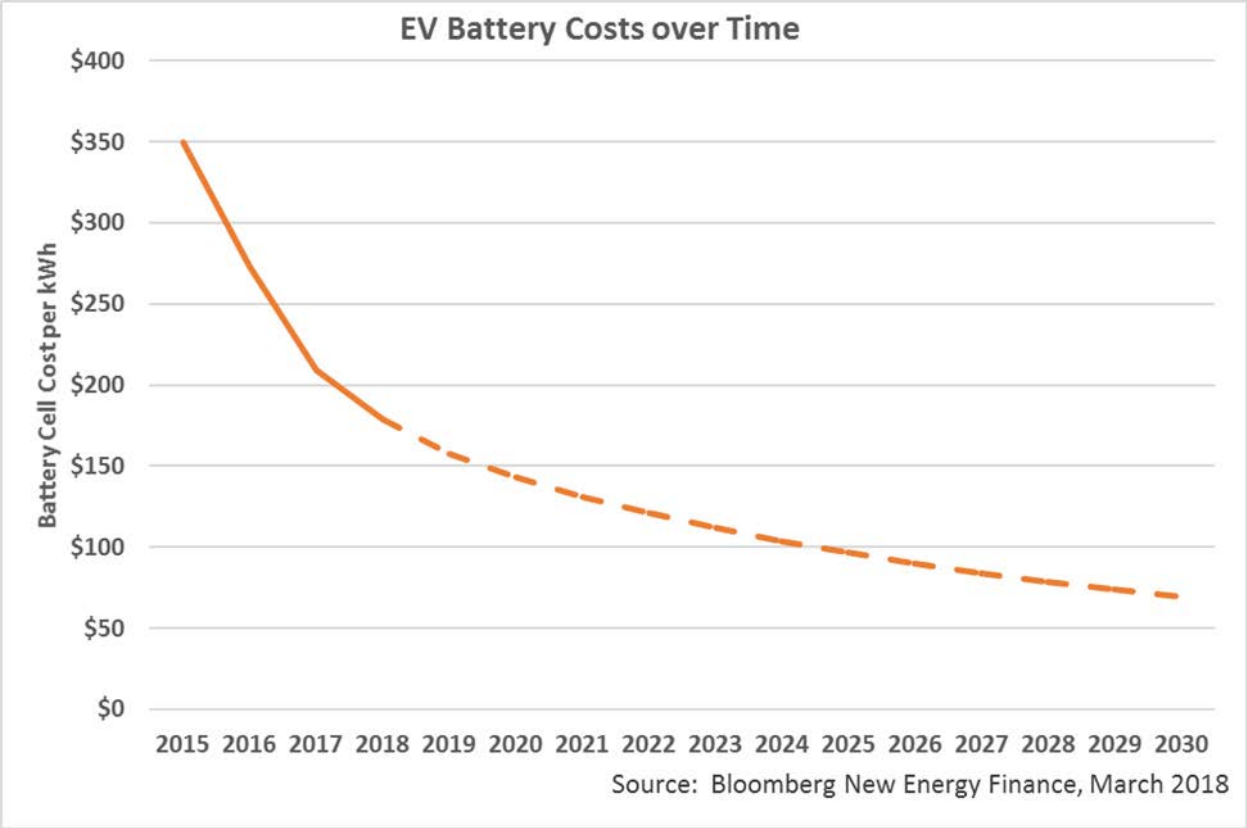
Battery Research and Supply Chain

Today, there is an urgent global race to own the intellectual property and manufacturing footprint of battery electric and autonomous vehicle technologies, and to spur these global ambitions through deliberate industrial policies.

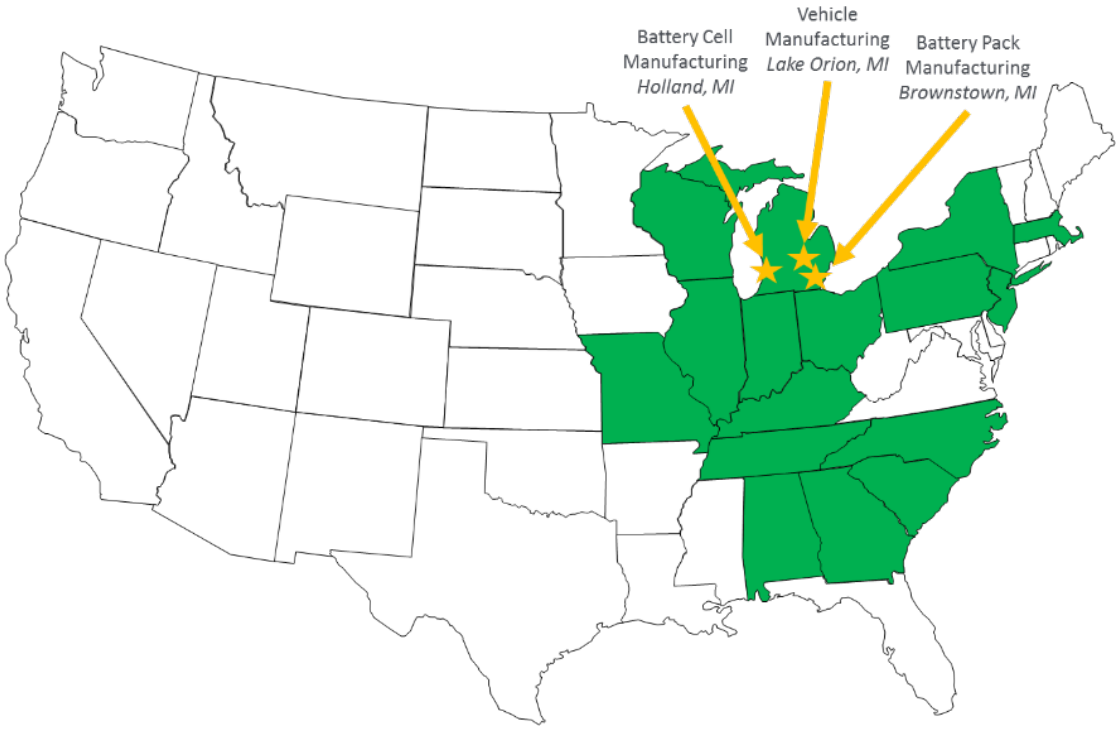
To compete in this global race, the U.S. government must adopt policies to promote EV battery technologies, for example:

- Increasing by 3x the R&D investment in emerging battery cell technologies (cobalt-lean/cobalt-free, Li-metal solid state and silicon-dominant negative electrode, etc.).
- Providing $150-200M in grants for public/private battery cell learning laboratories.
- Investing in U.S.-based battery cell and battery pack manufacturing capacity.

Appendix 2 – EV Battery Cost Projection (Bloomberg New Energy Finance)



Appendix 3 – Chevrolet Bolt EV Manufacturing Footprint (Fall 2018)



Chevrolet Bolt EV Manufacturing Footprint (Fall 2018)

Home to at least one supplier of Bolt EV components

Appendix 4 – Comments on Technical Issues

The flexibility mechanisms included in this program play an increasingly important role in saving fuel and reducing greenhouse gas emissions in a cost-effective manner. The current rulemaking should be used as an opportunity to expand and streamline these flexibility provisions to allow additional benefits, which will be necessary given the challenging overall emission reduction goals being sought from the transportation sector. These mechanisms broaden the technologies available to meet GHG and CAFE standards, and widen the timeframe in which technologies can be implemented, resulting in less GHG emissions, and more fuel saved. General Motors believes that accelerating introduction of key new advanced technologies through these mechanisms can be a valuable outcome from this rulemaking.

General Motors supports the extensive comments from the Alliance of Automobile Manufacturers regarding flexibility mechanisms, and incorporates them by reference. In particular, the Alliance cites the widening gap between the regulatory standards and actual industry-wide new vehicle average fuel economy that has become evident since 2016, despite the growing use of improvement "credits" from various flexibility mechanisms, such as off-cycle technology credits, mobile air conditioner efficiency credits, mobile air conditioner refrigerant leak reduction credits and credits from electrified vehicles. Most of these flexibility provisions were entirely new and somewhat experimental when created. The inexperience with them, combined with a conservative bias in implementation, led to a variety of caps and other limits on the use of these emissions reduction mechanisms. Examples include:

1. Caps on credits for air conditioner efficiency technologies (cars 5.0 gCO_2/mi, trucks 7.2 gCO_2/mi)
2. Caps on credits from thermal control technologies (cars 3.0 gCO_2/mi, trucks 4.3 gCO_2/mi)
3. The 10 grams CO_2 per mile cap on off-cycle credits from the pre-approved list
4. The expiration of various incentives for electrified vehicles such as the BEV/PHEV (plug-in hybrid electric vehicles) multipliers, zero accounting for upstream emissions from electricity generated for BEVs/PHEVs, and the advanced technology pickup credit

At the time, this conservative approach ensured automobile manufacturers did not receive regulatory credits beyond the real-world value of the technologies they implemented, however these caps and other limitations are now inhibiting further progress. Because of the long lead time necessary to implement many of the relevant technologies, such as active powertrain thermal features and electrified powertrains, the caps have not yet been reached on the vehicle fleets currently being sold. However, these technologies will be implemented on a widespread basis within the 2021-2026 timeframe under review in this NPRM, and the caps and incentive expirations become binding constraints for General Motors planning and decision making in this timeframe. The result is that beneficial technologies are not being fully implemented under the current rules, because the credits that could have been earned due to the real-world emissions reductions and fuel savings of the technologies are not allowed. The current rulemaking provides an opportunity to update flexibility mechanisms to reflect the experience

that has been gained over the past several years with these technologies and regulatory mechanisms, in order to close the regulatory compliance gap that has emerged.

Incentives for Electric Vehicles

General Motors believes that accelerated introduction of advanced technologies such as electric vehicles can be a valuable result of the joint CAFE/CO_2 programs. Accordingly, the final rules for both the EPA and the NHTSA programs should augment and extend the incentives for these important technologies. We support the Alliance recommendations for increased BEV and PHEV multipliers that extend at least through 2026. Electric vehicles are expected to be essential for compliance in the 2021-2026 timeframe, and this regulatory incentive is necessary to support their adoption throughout this period.

With regard to upstream emissions, General Motors requests that EPA permanently allow manufacturers to attribute 0 grams of CO_2 per mile for the upstream emissions associated with generating electricity used as a transportation fuel. Removing these BEV, PHEV and FCV upstream emissions factors would return EPA to its traditional framework for regulation of vehicle emissions, which included only emissions from the actual vehicle. It would also make regulation of electricity as a transportation fuel consistent with regulation of other fuels (such as biofuels), and would remove a regulatory disincentive to the commercialization of electric vehicles. Finally, removing the upstream emissions factors for electric vehicles allows EPA to avoid the immense difficulty of fairly estimating future emissions factors amidst anticipated rapidly changing conditions in the electricity generation sector. Therefore, we request that EPA permanently allow automobile manufacturers, in their compliance accounting for this regulation, to attribute 0 grams of CO_2 per mile for the upstream emissions associated with generating electricity used as a transportation fuel.

Credit for Vehicles Used in High-Utilization Commercial Business Models

Historically, EPA and NHTSA's CO_2 and CAFE programs have focused on reducing emissions and fuel consumption on a vehicle-by-vehicle basis. This has been accomplished by measuring fuel economy improvements based on defined driving cycles. However, new business models emerging in the transportation sector are significantly altering the way vehicles are utilized. Trips previously taken in privately-owned vehicles, or foregone altogether, are being replaced by ridesharing trips, delivering door-to-door service at the touch of a mobile phone. Utilization of these services presents new opportunities to reduce CO_2 emissions and fuel consumption. Accordingly, it would be helpful to include regulatory provisions during this rulemaking that incentivize environmentally beneficial outcomes from this increasingly important sector of the light-duty vehicle fleet.

The California Clean Cars regulation provides a framework for regulatory incentives that recognize and reward the environmental benefits that can be achieved through low emission vehicles used in this type of activity. Specifically, the Clean Car regulation provides credit for transportation system approaches that "maximize the usage, exposure, and vehicle miles traveled of electric vehicles." General Motors, through its wholly-owned subsidiary Maven LLC,

is actively demonstrating new mobility paradigms that align with the goals of the Transportation System Credit program under the California Zero Emission Vehicle Program. GM's Maven business unit is deploying EVs in a variety of neighborhoods, increasing electric vehicle miles travelled (eVMT) and exposure to electric vehicles. Leveraging the embedded connectivity within the vehicle, drivers are able to seamlessly become members and immediately address their transportation needs with shared-use zero emission vehicles. GM proposes a nationwide system patterned after these California credits, whereby an additional 1.75x multiplier would be applied to qualifying electric vehicles deployed in ride share. This multiplier reflects the higher utilization of these ride share vehicles compared to similar privately-owned personal vehicles. This multiplier would be available to assist compliance in both the EPA and the NHTSA regulations.

One new type of light-duty vehicle just now being introduced into service epitomizes this type of high-utilization commercial operation. These are vehicles equipped with a high level of autonomous driving capability, Level 4 or 5 as defined by SAE J3016 standard, which allows them to be operated without a human driver. The additional cost from the sensors, computers and other equipment and software to operate at these high levels of autonomous driving is extremely expensive. So much so that these vehicles would not be expected to be sold in appreciable volumes to traditional private vehicle owners during the timeframe covered by this regulation, since the annual driving patterns of private personal vehicles typically total only 15,000 miles per year or less. Instead, the high costs of these autonomous vehicles only lend themselves to very high-utilization commercial sectors of the market, such as round-the-clock operation by a ride sharing service. Only very high utilization rates allow the extra costs to be recovered while remaining competitive with the costs of human drivers. Importantly, ride sharing services may in some cases be operated by the vehicle's manufacturer, so that the vehicle would not be included in the sales fleets that are currently the basis for regulation.

We propose that light-duty vehicles and medium-duty passenger vehicles (MDPVs) with Level 4 or 5 autonomous driving capability be given a multiplier that reflects their higher real-world utilization rates, compared to conventional vehicles. Based on an expected accumulation of over 85,000 miles per year by these vehicles in their high-utilization commercial capacities, the recommended multiplier would be 6. This 6x multiplier would be included in the fuel economy and GHG calculations for qualifying vehicles, in combination with other credits, advanced technology multipliers and other adjustments, thereby providing a strong incentive to include all the best low emission technologies on these high-utilization vehicles. Manufacturers could elect to include in their compliance fleet average calculations vehicles that are owned by the manufacturer or a subsidiary, if the vehicles are operated in a high-utilization commercial business model. This multiplier would also be available in both EPA and NHTSA's programs.

<u>Air Conditioner Efficiency and Thermal Control Technologies</u>

As described in greater detail in the Alliance comments, the caps for air conditioner efficiency technologies and thermal control technologies should be combined, since both groups of technologies work to reduce the fuel consumption of the vehicle air conditioner. Further, the combined caps for these technologies should be increased 64% to reflect the best data on the

actual U.S. average fuel consumption by light-duty vehicle air conditioners. This percentage reflects data on mobile air conditioning fuel consumption from the National Renewable Energy Laboratory (NREL), and reconfirms earlier studies in this area. Moreover, the NREL data is consistent with other studies, which are all contrary to the study upon which these caps were established. Continued use of outdated cap data has resulted in an underestimate of the emissions reductions possible from these technologies.

Beyond the current pre-approved credit list, two additional beneficial cabin thermal technologies have been approved for off-cycle credit, based on applications from General Motors. These are the air conditioner compressor with variable crankcase suction valve technology (such as the Denso SAS compressor) and the active climate controlled seats, which include a thermoelectric cooling device in addition to ventilation fans. To streamline administration, credits for these technologies should be added to the pre-approved list.

Eliminate the AC17 A-B Test

The agencies should eliminate the AC17 A-to-B testing requirements that begin in 2020. This provision requires manufacturers to test air conditioner efficiency technologies using the AC17 test procedure. From the beginning, industry has been strongly against this testing requirement given the difficulty of consistently measuring small improvements during vehicle testing, combined with the fact that there is typically no good baseline vehicle designed or built (i.e., no identical vehicle is built without the efficiency technologies that get the credits). The AC17 test requirement therefore creates uncertainty over the future value of these credits and potentially undermines the success that the pre-approved list of credits has achieved in stimulating implementation of improved technologies. Difficulties fully substantiating credits beginning in 2020 due to the AC17 requirement could have a disastrous impact if they undermine industry confidence in the pre-approved credit lists as a reliable basis for investments in these technologies.

Off-Cycle Technologies Pre-Approved List and Credit Cap

The 10 grams CO_2 per mile cap placed on credits from the pre-approved list was an arbitrary limit without any technical justification based on either the emission reduction potential of the technologies on the list or the overall average national amount of off-cycle fuel consumption. As GM and the industry have gained experience with off-cycle technologies, it has become clear that more than 10 grams per mile in emission reductions from technologies on the pre-approved credit list is achievable, provided there is adequate lead time.

In addition, GM and several other manufacturers have received approval for off-cycle credits for high efficiency alternators. These credits are stimulating rapid advances in alternator/generator efficiency, thereby achieving the goal of these off-cycle regulatory provisions. To streamline administration, high efficiency alternator credits should be added to the pre-approved off-cycle credit list. However, this would be counterproductive if movement to the pre-approved list also meant moving the high efficiency alternator credits under the 10-gram cap. Similarly, several additional off-cycle emission reduction technologies have been identified and proposed in the Alliance comments for potential addition to the pre-approved

list. These additional emission reduction technologies could not be effectively incentivized if the 10 grams CO_2 per mile cap remains in place, since there is no room under the cap, and it would be impractical to undergo the cumbersome, uncertain and time-consuming individual credit approval processes under Method 2 or Method 3 at each manufacturer, for each application of these technologies.

In view of these considerations, the 10-gram cap on off-cycle credits from the pre-approved list has become counterproductive and should be eliminated by EPA and NHTSA. If it is not eliminated, it should be significantly increased for the 2021-2026 timeframe, so the off-cycle credit program can continue to stimulate new emissions reduction technologies. Potential technology combinations support an achievement of over 15 grams CO_2 per year in off-cycle emissions reduction from the pre-approved list, even with thermal control technologies transferred to the air conditioner/thermal control list. In order not to inhibit implementation of beneficial off-cycle emission reduction technologies, any cap for the pre-approved list should be set at least as high as a fleet average achievement of 20 grams CO_2 per mile.

Credit Approval Process

The approval process for credits for new off-cycle technologies requires streamlining and improvement. Many of these problems can be limited if the agencies adopt the Alliance recommendations for adding their list of new technologies to the off-cycle and AC/thermal control pre-approved credit lists. The Alliance recommendations for new air conditioner efficiency, thermal control and off-cycle technology credits include virtually all of the technologies that might be submitted for credit approval under Method 2 or Method 3 in the near term. For additional new technologies that are developed in the future (or for any technologies that are not yet put on the pre-approved lists), the approval processes can be improved. For example, when a credit for a new technology is approved for one manufacturer, the EPA decision document announcing that approval can serve as a guidance document that assigns a credit value or calculation methodology for the technology for all manufacturers, without demanding duplicative testing. Alternatively, the agencies might establish a process to quickly add these new technologies to the pre-approved lists.

GM also supports the ability to have suppliers develop and submit applications for off-cycle credits for new technologies, and to have these approvals also issued effectively as guidance documents that provide a credit template for the entire industry. This is an approach that the European Union Eco-Innovation program has used effectively.

We disagree with the NPRM proposal to potentially provide provisional credits that might be rescinded if subsequent testing does not fully validate the value of the technology. Manufacturers must be able to rely on the credit values, and cannot make substantial investments to implement technologies if the resulting credits remain uncertain.

Expansion of Advanced Technology Credits Beyond Pickups

Similar considerations apply to the provisions for incentives for advanced technology pickups. The agencies' stated intent of these provisions is to incentivize the penetration of "game

changing" technologies for large pickup trucks into the marketplace. The incentives were also intended to create an opportunity in the early years of the program to begin penetration of advanced technologies into large pickup trucks, which in turn could enhance the chance for achieving the more stringent later year standards for those vehicles. Electrified vehicle technology does not just hold game changing potential for full size pick-up trucks; it also has game changing potential for SUVs, smaller pickups, and passenger cars.

We believe that for the provisions to provide a meaningful incentive that meet EPA and NHTSA's objectives, the eligibility criteria need to be less restrictive and the scope expanded beyond full size pick-up trucks to all vehicles.

Unlimited Carryforward of Surplus Credits

Global climate concerns are motivated by the long atmospheric lifetimes of well-mixed greenhouse gases such as carbon dioxide, methane, N_2O and HFCs. Because the environmental impacts from each unit of emissions occur slowly over long time periods, and are not local in nature, there is not a strong reason to require specific emission reductions in any specific region or year. In principle, a ton of emission reduction in one vehicle category or at one manufacturer is as valuable as a ton reduced in another category or manufacturer. Similarly, for long-lived greenhouse gases such as CO_2, a ton reduced this year is equivalent to a ton reduced next year. Based on these principles, there should be no restrictions on credit trading or carryforward of surplus credits. This implies that there is no good basis for the expiration of surplus credits earned by overachieving the standards in any year. Instead, there should be broad flexibility as to when and where emissions reductions are achieved.

The regulation should therefore be revised to allow unlimited carryforward of surplus compliance credits, without any expiration of the credits. The ability to carryforward and trade surplus credits is important since it incentivizes all manufacturers to make early emissions reductions, even if their individual compliance status in the early years does not force action. With a framework of unlimited credit carryforward, the overall costs of industry-wide emissions reductions can be minimized, and early emission reductions are better incentivized. Similarly, there should be no restrictions on averaging or trading of emissions credits between light-duty fleets, either within a manufacturer's internal fleets or in credit trading among manufacturers.

[Appendices 5-11 Redacted; Confidential Business Information]