300 Renaissance Center
Detroit, MI 48265-3000

FE 6366

May 31, 2022

California Air Resources Board
1001 I Street
Sacramento, California 95814
Notice of Public Hearing to Consider Proposed Advanced Clean Cars II Regulations
(*submitted via https://ww2.arb.ca.gov/applications/public-comments*)

Comments of General Motors on CARB's Advanced Clean Cars II Proposal

General Motors LLC (GM) appreciates the opportunity to offer comments on the California Air Resources Board's (CARB) proposed adoption to the California Code of Regulations, of title 13, sections 1961.4, 1962.4, 1962.5, 1926.6, 1962.7, and 1962.8, and its proposed amendments to the California Code of Regulations, title 13, sections 1900, 1961.2, 1961.3, 1962.2, 1962.3, 1965, 1968.2,1969, 1976, 1978, 2037, 2038, 2112, 2139, 2140, 2147, 2317, 2903 for the 2026 through 2035 model years (September 3, 2021).

If you have any questions, please contact me at 313-665-9967.

Sincerely,

Matthew Rudnick
Director – Climate, Environment & Energy Policy
Global Public Policy
General Motors

Executive Summary

For over a century, personal vehicles have driven our society, providing unprecedented mobility and transforming the way we live and work. GM 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 including a drive towards an all-electric future and improving the fuel efficiency of our fleet through one national regulatory program that supports and strengthens American jobs and enhances the wellbeing of American consumers. GM supports the overall emission reduction goals of California and the federal government. The U.S. auto industry is embarking upon a profound transition as we do our part to achieve the country's and states' climate commitments and GM is leading the way.

GM, and the U.S. auto industry, have made great strides in improving fuel economy and reducing greenhouse gas emissions since the first joint CAFE/GHG standards were adopted for the 2012 model year. We believe standards should respect the statutory differences between EPA's GHG program, NHTSA's CAFE program, and CARB's vehicle emission regulations and be closely coordinated and harmonized such that the deployment of the same fleet of new vehicles meets all regulations. Taken together, these standards should drive American leadership in the clear future of transportation – that is, battery electric vehicles (EVs). The standards should not force industry to split its resources between investments in legacy propulsion technologies and electric vehicles, as this will slow down the nation's progress toward its climate commitments. Striking the proper balance is essential as the United States must take the lead or other nations will dominate in electric vehicles and set global regulatory and industrial standards.

GM strongly believes that EVs are the future of transportation and has consistently advocated for modernized regulations that facilitate a market-facing bridge to that zero emissions future. In 2018, we were the first automaker to call for a National Zero Emission Vehicle (ZEV) program that enables scale by promoting ZEV investment that meets customer demand throughout the entire nation and effectively addresses climate change. And in January 2021, we were the first full-line U.S. automaker to set 2035 as the target date to eliminate tailpipe emissions from new light-duty vehicles. GM remains focused on securing a durable national EV policy that complements tailpipe standards with essential investment in infrastructure, consumer incentives, battery technology, and EV supply chains and supports U.S. leadership in this transition.

GM is an industry leader with plans to become carbon neutral in its global product portfolio and its operations by 2040 and has set science-based targets in line with the Paris Agreement and the U.S. Nationally Determined Contribution (NDC) in support of that goal. Now is the time for a holistic regulatory and policy approach that addresses climate change while promoting American industry, American workers, and American innovation in transportation technology. These regulations and policies should support investment in EVs to maintain U.S. leadership in global mobility. Implemented well, they can promote stable American industrial leadership while delivering significant environmental benefits.

In August 2021, we shared our aspiration of achieving 40-50% of annual U.S. sales volumes of all electric vehicles by 2030, with the higher end of the range enabled by supportive policies. For GM, that

means going all-in on battery electric vehicles and selling them to customers across the United States. The auto industry is embarking upon a profound transition as we do our part to achieve the country's climate commitments.

We continue to urge California and the Biden Administration[1] to develop standards that are harmonized and encourage industry to move confidently toward our shared – and ultimate – goal of an all-electric, low-carbon transportation future. We caution against finalizing mismatched, divergent, and inefficient regulations that will hinder industry's ability to effectively engage on the substantive challenges that must be met to achieve the nation's climate goals.

We appreciate our continued collaboration with California toward our shared vision of a transportation future with zero tailpipe emissions. We recognize California's authority to set standards and are committed to emission reductions that are aligned with the California Air Resources Board's targets. We commend California for its leadership in implementing the complementary policies necessary to support this transition, including charging infrastructure investment, consumer purchase incentives, mineral resource development, and public education.

Speed is important in reducing greenhouse gas emissions. We strongly believe that the fastest way to reduce emissions and achieve an all-electric future is through a national program with emission reductions that are harmonized between NHTSA, EPA, and California. A harmonized program will reduce regulatory uncertainty and enable all stakeholders to focus cooperatively on reducing greenhouse gas emissions, conserving energy, and growing the economy. The ability to sell the same fleet in all 50 states will also reduce consumer price and manufacturing complexity, enabling quicker fleet turnover with sales of newer, more efficient vehicles.

GM Is Making Substantial Progress Toward its Goal of an All-Electric Future

Every day, GM is moving closer to an all-electric future. We have committed more than $35 billion to electric vehicle (EV) and autonomous vehicle (AV) development, with a plan to eliminate tailpipe emissions from new light-duty vehicles by 2035. In the U.S. we have announced more than $9 billion in investments to manufacture EVs and battery cell plants in Michigan, Ohio, and Tennessee. Concurrently we are creating new on-shore and near-shore supply chains to feed these facilities. Even as we manage short-term challenges like COVID-19 and the semiconductor shortage, we continue to accelerate our investment in EVs. We have made significant strides towards an all-electric future, most recently announcing new vehicles, technological breakthroughs, and efforts to make the charging experience seamless for customers, including:

- Unveiling the production version of the Tennessee-built Cadillac LYRIQ, an all-electric crossover, nine months earlier than planned due to our virtual engineering and software expertise.
- Unveiling six vehicles with Ultium batteries: Cadillac LYRIQ, Chevrolet Silverado EV, Chevrolet Equinox EV, Chevrolet Blazer EV, GMC HUMMER EV, GMC HUMMER EV SUV for launch and production in 2022-2024.

[1] *See* Executive Order 14037, Aug 5, 2021 (86 FR 43583).

- Announcing a high-volume battery-electric Silverado, to be built at Factory ZERO in Detroit-Hamtramck for both fleet and retail customers, with a GM-estimated 400 miles of range on a full charge for certain configurations.
- Launching the redesigned Chevrolet Bolt EV and new Bolt EUV built in Orion, Michigan, and accelerating production, aiming for a record 40,000 sales in the U.S. for 2022.
- Planning for, by the end of 2025, installed capacity to build 1 million EVs in North America, representing up to $50 billion in annual revenue.
- Introducing BrightDrop, a business created to help commercial delivery fleets maximize productivity, improve safety, and reduce their carbon footprint. We are delivering Zevo 600 vans to our first customer, FedEx Express, this year.
- Announcing that Ultium Cells LLC, our joint venture with LG Energy Solution, will produce battery cells at three plants: Lordstown, Ohio; Spring Hill, Tennessee; and Lansing, Michigan.
- Announcing EV assembly at five North America GM plants: Factory ZERO in Detroit-Hamtramck, Michigan; Spring Hill Assembly in Spring Hill, Tennessee; CAMI in Ingersoll, Ontario; and Ramos Arizpe Assembly in Mexico.
- We signed a joint development agreement and increased our investment in SolidEnergy Systems, one of several companies we are working with to help commercialize lithium-metal batteries, which have incredible potential to deliver even better EV performance, more range and lower costs for customers.
- We will build two EVs for Honda using our Ultium technology – one SUV for the Honda brand, and one for the Acura brand.
- We introduced Ultium Charge 360, an innovative and holistic approach that integrates charging networks with our mobile apps and other products and services to simplify the charging experience for our EV customers. Through this initiative, we are offering customers access to more than 100,000 plugs across the U.S. and Canada.

Everybody In: GM's commitment to inclusive and accessible EV future

We are continuing our work toward an inclusive and accessible zero-emission future with our EV deployment and with additional complementary activities to support more widespread adoption. As indicated with the activities above, this includes moving toward electric vehicles across all vehicle segments, providing longer electric vehicle ranges to accommodate diverse household driving and charging behavior, and offering the vehicles at lower price points to make them more affordable to more prospective buyers. In addition, we are also supporting broader efforts related to EV infrastructure, education, awareness, and workforce development.

EV infrastructure. To support broader EV deployment, we are actively involved in supporting the build-out of charging infrastructure across the country to provide accessible options for different household needs. We are supporting public and residential charging needs:

- *Ultium Charge 360 ecosystem:* We have committed to nearly $750 million in investments to support charging infrastructure buildout to expand access to charging. This includes multiple programs targeting home, workplace, and public charging.

- *Public charging*: we are partnering with EVgo to deploy 3,250 DC fast chargers in over 50 metropolitan areas across the country. These chargers make charging easier and more convenient, in addition to providing charging options for people who otherwise lack home charging access. In addition, GM is partnering with our dealers to expand access to charging by installing up to 40,000 Level 2 EV chargers in our dealers' communities, including underserved, rural and urban communities where charging is often limited. These stations are open to all EVs, not just GM products.
- *Residential charging*: GM is covering the cost of standard home installations for new Bolt EV and EUV customers in order to simplify the process and broaden access to home charging. In addition, customers can also opt for $500 EVgo credit instead if public charging is more valuable.

***EV Deployment and Awareness*.** To further address electric vehicle access and awareness, we also help fund programs that directly deploy EVs as well as partnerships with community organizations to support education and outreach, help connect people with resources, and try to grow the market in underserved areas. Here are a few such examples.

- *LEAP*: GM has partnered with LEAP to increase the number of vaccinated farm workers in the Central Valley. GM has loaned the LEAP Institute 4 Bolt EVs which will be used for the purpose of transporting farm workers to and from vaccination appointments and other medical appointments as necessary. GM extended their initial loan from 6 months to 12 months.
- *Central California Asthma Collaborative*: The project will conduct outreach related to EV technology, available light-duty EV and EV infrastructure incentives, and climate adaptation strategies (wildfire smoke preparedness) in disadvantaged communities through a network of CBO partners who are already working with schools, community groups and residents on a host of environmental and social justice issues.
- *Ecology Action*: EVs Para Todos will engage, educate, and support low- and moderate-income residents of California's Central Coast in purchasing their first EVs through sixteen direct outreach or education events and individualized EV purchase guidance. We help participants access state and local financial incentives and create in-person opportunities for community members to experience and learn about electric vehicles, battery technology, and EV charging.

Workforce Development. As part of the Climate Equity Fund, GM aims to support programs that help adults with barriers to employment, or those threatened by the economic transition to a net-zero economy, adapt and build skills to work in a more sustainable career. One good example is a recent project where we provided funding so that ValleyCAN can develop and deploy an EV certification program in local community colleges located in the Central Valley. The curriculum has been adopted in 5 of the local community colleges and students are gaining the necessary tools needed to provide maintenance on EVs

Harmonization between California and Federal Programs

We recommend that CARB coordinate with federal regulators to ensure the same test procedures, test fuels, vehicle test group definitions, crediting provisions (e.g., off-cycle, air conditioning, averaging, banking, trading) and electric vehicle treatment (i.e., EVs are 0 g/mile and counted toward averaging requirements) in criteria pollutant and GHG regulations. Together, aligning these aspects of the regulation ensure the same fleet of vehicles can be deployed to meet our shared emission-reduction goals and simultaneously meet the state and federal regulations. We also recommend that all vehicle manufacturers be regulated to the same emission standards, as the existing California GHG standards for model years 2021-2025 require greater GHG reduction than the Settlement Agreements entered into between California and several manufacturers.

Alliance Comments

GM, as a member of the Alliance for Automotive Innovation, incorporates by reference the comments submitted by the Alliance on this rulemaking. The following remarks provide additional comments to reinforce the Alliance's comments and provide additional support and rationale related to various aspects of the Advanced Clean Cars II (ACC2) proposal.

ZEV stringency and flexibilities

To achieve our common goal to transition to zero-emission all-electric vehicles, we recommend that CARB adopt the maximum possible flexibilities to allow the industry, consumers, and the State to collectively achieve that goal. The regulatory stringency proposed in this rule is ambitious and unprecedented, so we encourage CARB to allow overcompliance in early years, without restricting the use of those credits in future years. Overcompliance in earlier years serves all stakeholder goals in accelerating the transition to zero emission mobility, while also allowing the auto industry to navigate uncertainty and local/state non-homogeneity in the ZEV market uptake, as well as the variability of complementary support like charging infrastructure, incentives, and consumer awareness campaigns. There should be little concern about "too much" early ZEV compliance undermining future goals when California's regulatory path is as ambitious as what CARB has proposed with an ultimate all-ZEV end point by 2035.

To this end, we recommend several specific modifications to ensure the maximum possible ZEV deployment in the earliest years possible. Although we support CARB's move to make one electric vehicle get one ZEV credit, we make the following recommendations to remove the other constraints and to ensure accelerated electric vehicle deployment:

- *Historical Banked Credits*: We recommend that CARB increases the maximum usage of historical ZEV credits be allowed for up to 25% (instead of the proposed 15%), restricting the applicability only to pure ZEVs. The recommended change to the CARB proposal would promote greater EV deployment over 2023-2025, leading up to model year 2026.
- *Early Action Credits*: We recommend that the use of Early Action ZEV credits for 2022-2025 not be discounted or constrained from use for model year 2026 and later years. Under the proposed CARB staff provisions, only credits for EV shares above 7% in non-California states for 2024-2025 are counted toward 2026 and later (and only above 20% in California), and these Early Action credits are only allowed to make up 15% of the 2026 and later requirements. These

provisions disincentivize the early deployment of ZEVs before 2026; removing the Early Action constraints will increase EV deployment earlier than CARB's proposal.

- *Pooling*: To support accelerated EV deployment across the ZEV states, we have two recommendations: We recommend (1) doubling the maximum usage allowances for 2026-2030 (i.e., 50%/40%/30%/20%/10% instead of 25%/20%/15%/10%/5%), (2) allowing the over-compliance accounting to include (rather than exclude) Historical and Early Action credits. These recommended changes would better support manufacturers' efforts to grow the various EV markets over new ZEV launches. For example, some states will be better suited for new electric pickups and other better for electric crossovers, but these new EV offerings will have different product roll-out timing. Unconstrained pooling allows manufacturers to maximize their efforts to find new EV customers and build markets, wherever possible, rather forcing more uniform distribution across ZEV states. There should be little concern for states "not getting their share of EVs" if broader pooling is allowed – the stringency of this regulation combined with the Federal GHG standards and OEM EV commitments means that OEMs will be encouraged to sell EVs in large numbers across the U.S. – localized EV deployment will no longer be an option.
- *Environmental Justice credits*: To ensure the greatest possible use of these credits for accelerated deployment of EVs in applicable programs, we have two recommendations: We recommend (1) expanding the eligibility to include 2022-2025 vehicles to accelerate earlier ZEV deployment for such programs, (2) increasing the credit values for new or used vehicles of the corresponding model year (e.g., 0.3 for 2022-2024, 0.2 for 2025-2029, 0.1 for 2030). As currently structured, the proposed timing of the EJ credit eligibility is missing an opportunity to accelerate ZEVs in these critical applications in 2022-2025, and the credit values may not be sufficient to incentivize significant ZEV deployment of new or used vehicles for these programs, considering the low vehicle price thresholds.

Especially in the case of the Section 177 states that adopt the California ZEV regulation, these flexibilities are crucial. In many of the ZEV-adopting states, EV market uptake has been lower than the U.S. average EV uptake, and state government support has been limited and unreliable, as compared to California's enthusiastic and holistic ZEV support from both state and local government agencies, electric power utilities, and other stakeholders. Without expanded use of the flexibility provisions, as recommended above, there will be fewer ZEVs deployed in the ZEV-adopting states outside California before 2026, and it will be extremely challenging for the industry as a whole to successfully comply in several ZEV states starting in 2026, the first year of this new regulation.

Test procedures

Updating to SAE J1634 2021 procedures. We applaud CARB's leadership in modernizing its battery electric vehicle testing procedures to the updated 2021 SAE J1634 (SAE International "Battery Electric Vehicle Energy Consumption and Range Test Procedure," April 2021) incorporated by reference in these test procedures. These 2021 SAE J1634 test procedures are supported by regulatory agency and extensive industry input and incorporate global best practices to support battery durability, vehicle performance, and energy efficiency, with associated real-world benefits for consumers.

In addition, we recommend that CARB works with U.S. EPA to support U.S. EPA-CARB harmonization on the updated 2021 SAE J1634 CARB test procedures to minimize laboratory test burden and ensure battery electric vehicles are consistently tested with one test procedure to simultaneously meet federal and state testing requirements.

Direct current energy measurements. We request that the requirement to measure direct current (DC) energy during alternating current (AC) recharge be removed from the Zero Emission and Hybrid Electric Vehicle test procedures (2018 through 2025 and 2026+). Measurement of DC energy during AC recharge introduces additional and unnecessary test burden to laboratories and may require modification of charge monitoring systems and additional intrusive current sensor(s) on the vehicle/powertrain if the recharge cable is separate from the drive cables. Our recommendation is to remove the text "DC energy required to fully charge…" from F.3.3.d., G.3.1.d (CARB Appendix B-8) and also E.1.2.d (CARB Appendix B-9). Related to this topic, we previously corresponded with CARB staff going back in 2017 and would welcome further discussion to clarify and better ensure that we are harmonizing the vehicle test procedures with those of EPA.

Durability requirements

We recommend modifying the proposed durability requirements to better meet customer expectations for electric range and vehicle cost, as well as to align the CARB enforcement on durability with the warranty requirements. The proposed regulations related to battery durability and state-of-health/range (e.g., 80% minimum capacity at 10 years or 150,000 miles) overly constrain the battery specifications in a manner that will ultimately require that ZEV manufacturers provide excess battery capacity, or conversely de-rate the range values of vehicles. The excess battery could be on the order of 15% (e.g., 115 kWh instead of 100 kWh battery pack) to ensure compliance with the newly proposed durability requirement. Such a requirement would constrain how the companies are developing their EV battery packs and how customers can fully utilize that pack over the life of the vehicle—as well as add excess vehicle cost and vehicle weight. In addition, deploying larger battery packs means less EVs overall will be deployed in a potentially supply-constrained situation for battery materials. As a result, we are concerned that this requirement, even though it is well intentioned, could ultimately slow down the transition to affordable EVs across more vehicle segments.

To address this, we recommend that CARB align its durability requirements with its ZEV warranty requirements (i.e., 70% capacity by 10 years/150,000 miles for 2026-2030 model years, 75% capacity by 10 years/150,000 miles for 2031 and later). This would align ZEV consumer warranty protections with CARB's ZEV durability enforcement actions, whereas otherwise these two new requirements will be misaligned and inconsistent. For comparison, the global standard for EV durability—the United Nations Economic Council of Europe (UN ECE) Global Test Requirement (GTR) Minimum Performance Requirement—is for a minimum of 80% capacity at 5 years/62,000 miles and for 70% at 8 years/100,000 miles. CARB's current proposal is over twice as stringent as the global UN standard for 80% capacity (i.e., CARB's 150,000 miles compared to UN's 62,000 miles). If CARB adopts our recommendation to align its durability and warranty requirements, the new CARB standard would still remain the most stringent durability requirement in the world, substantially more stringent than the

global UN standard (i.e., 75% at 10 years/150k miles, compared to UN ECE's 70% at 8 years/100k miles).

Table: UN durability, proposed CARB durability and warranty, and GM recommended durability requirement

	2026-2030	2031+
UN ECE Global Test Requirement (GTR) Minimum Performance Requirement for EV durability	80% (5yr/62k miles) 70% (8yr/100k miles)	
CARB ACC2 ZEV warranty proposal requirement proposal	70% (8yr/100k miles)	75% (8yr/100k miles)
CARB ACC2 ZEV durability requirement proposal	80% (10yr/150k miles)	80% (10yr/150k miles)
Recommended ZEV durability requirement	**70% (10yr/150k miles)**	**75% (10yr/150k miles)**

We also recommend several additional clarifications for any potential durability requirement enforcement steps. To account for uncertainty and variability in the real-world (e.g., frequent vehicle owner full-charge, deep-discharge, and fast-charging events) consider enforcement action only when greater percentage of in-use tested vehicles are below the regulated state-of-charge levels (i.e., as compared with the proposal for greater than 5 of 10 tested vehicles). In the event of any potential in-use enforcement exceedance, we recommend that the first action is that CARB allow the manufacturer to provide an extended warranty for 10 years or 150,000 miles to owners of the applicable vehicles. Having this as the first action, preceding discussions between the company and regulators about a model-wide recall, will be the quickest and most effective way for manufacturers to immediately address any such issue and related costs for impacted ZEV drivers. These changes are warranted due to the nascent state of automotive battery developments.

Also related to the durability requirement, we recommend continued work regarding an improved calculation method that best reflects how manufacturers are designing and deploying the battery capacity for consumer benefits within its data reporting requirements of 1962.5 (Appendix A-6). We recommend that CARB allows automakers discretion regarding the opening up of the battery capacity over the vehicle lifetime as we all work toward greater clarity regarding the associated measurement of battery state-of-health (SOH). We greatly appreciate the technical discussions with CARB staff on this topic, and we recommend that CARB leaves open the door for continued dialogue toward improved handling of the battery capacity SOH and the reporting of battery reserve to optimally meet CARB enforcement, consumer transparency, and battery durability goals (e.g., through CARB-industry meetings, guidance documents, through SAE, etc).

Charging cord requirements

We recommend that the charging cord requirement be modified, such that the charging cord is to be made available to EV buyers at the dealership or by the OEM. This removes the requirement that those customers that do not need the charging cord (e.g., if they already have one) take one, and it also ensures that manufacturers are not required to include the vehicle be equipped with one as the vehicle is shipped from factories.

Vehicle test group definition

We recommend that CARB explicitly adopt the text of the EPA test groups for ZEVs. It is critical that manufacturers be allowed to certify electric vehicles to the same specifications and for the same test group definitions to minimize unnecessary laboratory burden and ensure consistent information for all EV buyers. The proposed CARB language would ideally remove "powertrain deterioration" and "vehicle class" (in 1962.4(i)(1), Appendix A-5) in order to remove ambiguities with respect to how test groups are defined. This will help to ensure electric vehicles can be tested and certified the same for California as for elsewhere across the United States, and thus ensure the most widespread deployment and availability of electric vehicle models.

Classification of ZEVs by vehicle class

We recommend that CARB allows manufacturers to classify zero-emission medium-duty vehicles as either light-duty (i.e., toward the ACC2 ZEV regulation) or medium-duty vehicles (i.e., toward the Advanced Clean Truck regulation). It is expected that there will be many electric vehicle models that will straddle the two weight classes due to their multiple battery pack and electric range options. For example, there will be models for which the electric range is below 300 miles that are below the light-duty maximum weight, and otherwise similar models with greater than 400 miles of electric range that are above the light-duty maximum weight due to the larger, heavier battery pack. Such an allowance, at manufacturers' discretion, would support faster and greater ZEV deployment across a wider spectrum of electric ranges for prospective customers. This added flexibility would remove constraints and promote the greatest possible deployment of shorter- and longer-range electric van and pickups, regardless of year-to-year differences in manufacturer ZEV production and the stringency of the light-duty ZEV and Advanced Clean Truck programs.

Battery label

We believe that CARB should directly reference SAE J1798 for specifying capacity, instead of SAEJ2288, which references the SAE J1798 standard.

Conclusion

GM looks forward to working with the California Air Resources Board, its staff, and all stakeholders to develop regulations that are complemented by strong federal, state, and local policies to support the transition to a zero-emission vehicle future. GM supports one national program across all 50 states that includes California's engagement and urges the regulatory agencies to pursue a regulatory program that encourages holistic consideration of the most cost-effective means to decarbonize the transportation sector and transition to an all-electric vehicle future that benefits the industry, its workforce, the nation, and our global climate.