GENERAL MOTORS

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Chair Mary Nichols and Board Members
California Air Resources Board
1001 "I" Street
Sacramento, CA 95814

Subject: Advanced Clean Cars Mid-Term Review – GM Comments

Dear Chair Nichols and Board Members:

General Motors (GM) appreciates the opportunity to provide comments on ARB Staff's Advanced Clean Cars Mid-Term Review (ACC MTR). GM supports the extensive comments provided by the Alliance of Automobile Manufacturers (Alliance). Given our strong working relationship with ARB, we also want to provide some direct comments to provide additional detail on our unique perspective.

Zero Emission Vehicle (ZEV) Regulation

GM is a committed leader on vehicle electrification. With an EPA estimated range of 238 miles per full charge, the Chevrolet Bolt EV is the nation's first long-range, affordable mass-market battery electric vehicle (BEV) and has won numerous awards, including North American Car of the Year and Motor Trend Car of the Year. The Chevrolet Volt has the longest all-electric range of any plug-in hybrid, full electric power to maximize all-electric trips, and is a two-time Green Car of the Year winner. Despite these strong product offerings, sales are falling short of ARB's policy goals.

GM remains concerned that the ZEV regulation does not reflect market realities. The requirements are very aggressive in California, and the challenge is significantly greater in the Northeast states. The Alliance letter provides extensive comments on these concerns. Below, we provide some additional context and perspective on our position as a company that is committed to vehicle electrification.

Adjustments are needed to address market realities in the Northeast states. The ZEV requirements in the Northeast states are a significant cause for concern as sales and supportive public policies in these states lag far behind California. This is the single most important concern we have with the midterm review of the ZEV program. Sales of the Chevrolet Volt illustrate the point: despite widespread product availability and comparable

dealer inventory, Volt sales in the Northeast states have consistently fallen far short of sales in California, typically being only 10 to 20% of the California sales rate (i.e. Volt sales as a percent of total light-duty sales). This same pattern holds true for other plug-in and hybrid vehicles.[1]

The Alliance filing recommends adjusting the requirements in the Northeast states as part of the midterm review process in order to better reflect market realities. However, the ARB staff report suggests that the market, infrastructure, and supportive policies are developing and recommends no changes at this time. While GM remains committed to working with policymakers and stakeholders on developing the market, we remain concerned about the growth trajectory required.

Given the steep ramp that is needed to comply with ARB requirements over the next several years, and the uncertainty around the policies, incentives, and consumer preferences, GM strongly agrees with the Alliance recommendation that a thorough review of the market is needed. This should take place no later than 2019, with adjustments made to the requirements as necessary to account for differences between the Northeast and California markets.

Complementary measures and consistent incentives are essential. The ZEV program goals can only be met if there is sufficient consumer demand for the vehicles. This requires market-facing measures such as incentives and infrastructure development. GM has played, and will continue to play, a leading role in efforts to address these needs by securing incentive funding and HOV access at the state level. However, even in California, stable funding for incentives is increasingly difficult to secure. Many states are also introducing additional fees for buyers of zero emission vehicles. The loss of incentives, together with the introduction of fees, can be expected to have a negative impact on sales.

GM has also been very active in efforts to develop sustainable, scalable solutions to the shortage of charging infrastructure. We have been working for several years with utilities and utility regulators, including the California Public Utilities Commission, to enable utility investment in EV infrastructure. This also includes work on electricity pricing and vehicle-grid integration opportunities that have the potential to benefit EV drivers. Progress to date on infrastructure deployment and utility/regulator engagement has been slow but GM remains committed to finding solutions.

Transportation System Credits should be extended and expanded. The current ZEV regulation encourages the deployment of ZEV technologies into a variety of innovative shared-use applications such as car-sharing or ride-sharing programs through Transportation System Credits. These deployments have the potential to support the goals of the program and grow the ZEV market by increasing consumer exposure to the technology and thereby helping overcome consumer awareness and acceptance challenges. However, the Transportation System Credits program is set to expire after model year 2017. For the reasons outlined below – ranging from greater vehicle exposure to more electric miles to innovation – GM strongly supports expanding and extending this program.

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[1] For more detailed discussion and data on sales of the Volt and other PEVs in California and the Northeast states, see the Alliance comments, Attachment 1, pages 32-35. Volt sales are detailed in figure 1-11.

The staff report notes that the "impact of exposure to PEVs through participation in...carsharing programs has been shown to have a positive effect on attitudes towards PEVs and increase interest in PEV adoption."[2] Ridesharing offers even greater opportunities for exposure. A simple model can easily show the impact—a fleet of 100 Bolt EVs in one city, giving rides to 10 people each day, means that up to 30,000 people each month are exposed to the Bolt EV.

These high-mileage applications are significantly increasing electric miles, notably often in urban centers where the associated emissions reductions are particularly important. GM has begun deploying Bolt EVs into ride-sharing through our personal mobility brand Maven and plans to continue to grow the fleet. The rideshare drivers have no electric vehicle experience and are simply leveraging existing public DC fast charge infrastructure, yet the current fleet is averaging over 100 miles per day, with some drivers above 140 miles per day, and multiple examples of over 300 miles per day.

These cutting edge programs can also support continued innovation around technologies and business cases. For example, Maven's ride-sharing program includes an "all-included" price for the vehicle, insurance, maintenance, and charging at the EVgo network. This program design is building the business case for public charging, including L2 and DC fast charging in urban areas and thereby contributing to the goals of the ZEV program. These battery duty cycles are also expected to create significant learning for future battery development. Longer term, these shared mobility applications have the potential to leverage autonomous vehicle technologies such as the autonomous Bolt EVs that GM is testing today in San Francisco.

Deployment of ZEVs into these transportation applications is furthering the goals of the ZEV program while providing important opportunities to learn about how to maximize overall benefits. However, near-term hurdles remain, as technology costs and lack of charging infrastructure have the potential to slow progress and innovation. Continuing and expanding Transportation System Credits help incentivize and facilitate additional learning through demonstrations of the benefits of ZEV deployments in these innovative shared-use applications; leveraging the ZEV program also ensures shared information across stakeholders. For these reasons, GM strongly supports expanding and extending this program.

Strong plug-in hybrids deserve more credit and a greater potential role in compliance. GM agrees with the Alliance that the current ZEV program structure should be adjusted to better reflect the contribution that PHEVs can make to the overall ZEV program. This is particularly true for the Chevrolet Volt. As an extended-range electric vehicle with an EPA estimate of up to 53 mile all-electric range and full electric power, the Volt provides substantial electric miles and the vast majority of Volt trips are pure electric. This is evident from the ARB Staff's own analysis[3] which shows that the Volt's environmental performance is markedly better than that of shorter range blended PHEVs. GM joins the Alliance in requesting that PHEV credits be adjusted to better reflect the emissions benefits. Additionally, the cap on PHEV credits as a

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[2] Air Resources Board. *California's Advanced Clean Cars Midterm Review. Appendix B: Consumer Acceptance of Zero Emission Vehicles and Plug-in Hybrid Electric Vehicles.* January 28, 2017. (page 50)

[3] See, for example, Figure 13 and Table 18, Air Resources Board, California's Advanced Clean Cars Midterm Review, Appendix G: Plug-in Electric Vehicle In-Use and Charging Data Analysis.

fraction of automaker compliance should be increased to provide flexibility. We also strongly support the continuation of the US06 credit, which will encourage additional automakers to design stronger, more capable PHEVs with more all-electric trips and fewer cold starts.

Credits for BEVs and FCEVs should not be reduced. Some stakeholders have argued that credits for long-range BEVs should be reduced, perhaps even going so far as a total program overhaul that would provide just one credit per vehicle. GM strongly disagrees with this suggestion. Reducing credits for vehicles like the Bolt EV would undercut the massive investments GM and other automakers are making in these vehicles and would discourage future investments. The ZEV program was designed to incentivize longer range and greater capability. This ultimately helps advance the program goals by steering investment toward vehicles that can appeal to more customers and electrify a greater percentage of total miles traveled. Moreover, long-range BEVs contribute more to increasing the production capacity of key components (e.g. total battery kW-hrs) than shorter range BEVs and PHEVs. Given the added expense involved in building long-range BEVs and fuel cell vehicles, the regulatory incentives are justified and further expansion should be studied.

It is premature to begin work on post-2025 ZEV standards. It is clear that ARB and stakeholders are focused on 2030 targets and standards. GM strongly agrees with the Alliance that ARB staff should wait until 2019 to begin the process of developing 2026+ regulations, with the goal of a board hearing in 2020. This timing would strike the right balance between providing time for the technologies and markets to better develop, while also allowing necessary lead time for automakers to plan for the new standards. If it has not happened already, there should also be a review of the Section 177 state ZEV market and adjustment made to their pre-2025 requirements to address any differences compared to the California market.

Greenhouse Gas Standards

GM strongly agrees with the Alliance comments on the GHG program. Having one national program between EPA, NHTSA and CARB is of utmost importance to the entire industry. GM supported the inclusion of a midterm review process when the 2017-2025 EPA greenhouse gas requirements and NHTSA's augural CAFE standards were established in 2012 and GM has been actively engaged with EPA, NHTSA and CARB on the steps of the process. GM feels that additional time and data are needed to fully evaluate the realities of vehicle and powertrain technology effectiveness and the willingness of customers to pay for incremental fuel efficiency gains. The need for this review is underscored by publicly available information that industry is expected to be non-compliant to the CAFE program for both the 2016 and 2017 model years. Against this backdrop about current market realities, it makes sense for all parties to continue dialogue and technical review of the appropriateness of the standards for 2022-2025. GM looks forward to continuing to work with ARB, EPA, NHTSA, and other stakeholders on these issues.

Particulate Matter

As detailed in the Alliance letter, we support the staff recommendation not to accelerate the 1 mg/mi PM standard from its current timeline. GM is actively working on reducing PM emissions through improvements to the engine and fuel delivery system. These types of improvements require long lead-times to allow for implementation across the fleet. Pulling ahead the timing of the 1 mg/mi PM standard would divert these efforts and force gasoline particulate filters, which have several drawbacks as detailed in the Alliance comments.

Maintaining the current 2025 timing also provides valuable time for continuing to improve PM measurement technology.

Additional detail on all of these recommendations can be found in the Alliance filing. GM appreciates the opportunity to provide some context and perspective on our position. We look forward to continued dialogue and collaboration with ARB and your staff to meet our shared goals.

Sincerely,

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