

Alan R. Weverstad
0755

**General Motors Statement
On the ARB's ZEV Technology Review
May 24-25, 2007 Board Meeting, San Diego, California**

Good afternoon, I am Alan Weverstad, Executive Director of Environment and Energy at General Motors. We appreciate the effort being put into this ZEV review process with the goal of better aligning the ZEV regulations with the technology. We met with the Expert Panel four times in four different locations, and believe all of the meetings were productive. These meetings gave us the opportunity to review our outlook on advanced technology vehicles in detail, including fuel cells.

We have reviewed the Panel Report, and we agree with its conclusion that "FCEVs continue to be a promising candidate for a mass market true ZEV". We told the Panel why we see so much promise in fuel cell technology. Indeed, much of that optimism stems from achievements made to date, including, most recently, our demonstration of 300 miles range on our Chevy Sequel fuel cell vehicle. We will continue to learn about the capabilities of current fuel cell technology and customer response to that technology through Project Driveway, a fleet of more than 100 Chevy Equinox fuel cell ZEVs that will be placed in California, New York and Washington, D.C. beginning later this year. But we must remember that forcing manufacturers to bring to market too many vehicles too soon didn't work with battery ZEVs and certainly won't work with fuel cell ZEVs.

We also told the Panel about the challenges we need to work through to fulfill that promise, and agree with the Panel that cost, hydrogen storage and refueling infrastructure continue to be big challenges to commercialization. As a result, we agree with the ARB Staff that the floor requirements under the alternative path need to be changed. It is important not only to look at the volume of vehicles required, but also the timing, such as the Staff did in its one suggestion of extending the Phase II compliance period to 2014. The timing must be considered to take into account manufacturers product plans for their next generation fuel cell ZEVs, as well as the availability of sufficient 700-bar hydrogen refueling to support the fuel cell ZEV fleets. Unfortunately, we are faced with the reality of non-existent publicly available 700-bar refueling today, and have had to pursue a path to purchase temporary 700-bar refueling to support our Equinox fuel cell vehicle fleet in Southern California.

Because we are also required to comply with the percentage requirements, it is equally important that the credit per fuel cell vehicle be changed as well. Otherwise, reducing the number of fuel cell vehicles will leave a hole in our ZEV compliance plan, resulting in increased requirements for AT PZEVs or other types of ZEVs.

The third fuel cell requirement that needs to be changed is the travel provision. With the Panel projecting that fuel cell volumes remain in the pre-commercialization phase over the next decade, and hydrogen refueling infrastructure lagging California or even non-existent in the other ZEV states, it makes no sense to require manufacturers to support fuel cell fleets in each ZEV state.

(over)

Therefore, we recommend that the Board direct Staff to develop regulatory changes for the fuel cell floor volumes and timing, the credits per fuel cell ZEV, and extending the travel provision, at least through 2014, with the 2015 and later requirements being the subject of a future review.

Regarding plug-in hybrids, we view this as an emerging technology that holds considerable promise. We announced plans for a plug-in Saturn Vue at the Los Angeles Auto Show last November. The future of plug-ins will depend largely on the progress of battery technology. We agree with the Panel that plug-ins help pure ZEVs by stimulating battery development and conditioning customers to plug in, but are not as optimistic as the Panel regarding battery technology. Abuse tolerance, life and cost continue to be major challenges for lithium-ion batteries. We are working closely with battery suppliers to try to address these challenges. As for nickel-metal hydride batteries, we simply do not see them as being capable of meeting the technical requirements for plug-ins. We would like to work with the Staff on adjustments to the AT PZEV credit levels to encourage the introduction of plug-ins, and on AT PZEV credits for "blended" plug-ins that are not designed to maximize all-electric range.

We would also like to work with Staff on appropriate credits for range-extending electric vehicles, a technology concept that GM showed last January with the E-Flex system in the Chevy Volt. The range extender may come in various forms, including a gasoline internal combustion engine or, as we recently showed in China, a fuel cell. We note that the Panel envisioned this technology combination as a long-term ZEV outcome.

Regarding hybrids, we agree with the Panel that high manufacturing cost is still an issue. While the Panel concludes that hybrids have helped pure ZEVs by "stimulating advances in electric drive systems, electric accessories, and battery technologies", these advances have done little or nothing to overcome the biggest hurdles to pure ZEVs, including fuel cell stack performance and cost, hydrogen storage, hydrogen infrastructure and high energy batteries. Due to the combined impact of the increasing percentage requirements, the phase-in of LDT2 trucks, and the phase-down of credit levels, the volume of hybrid AT PZEVs required for ZEV compliance grows too fast. We question how much this increased volume helps to advance pure ZEV technologies, and think it makes more sense to moderate the hybrid volume requirements so that manufacturers can focus more resources on pure ZEV technologies like fuel cells, and technologies that are closer to pure ZEVs like plug-in hybrids, as the ARB tries to fulfill its future vision for a zero emission vehicle fleet.

I would like to close by emphasizing that these are exciting times. We are putting forth more effort and resources than ever before into the development of a variety of advanced technology vehicles. But we need to work together on this. We need the help of suppliers, energy companies, and state, federal and local government to make the promise of these technologies become a reality. Thank you.

Therefore, we recommend that the Board direct Staff to develop regulatory changes for the fuel cell floor volumes and timing, the credits per fuel cell ZEV, and extending the travel provision, at least through 2014, with the 2015 and later requirements being the subject of a future review.

Regarding plug-in hybrids, we view this as an emerging technology that holds considerable promise. We announced plans for a plug-in Saturn Vue at the Los Angeles Auto Show last November. The future of plug-ins will depend largely on the progress of battery technology. We agree with the Panel that plug-ins help pure ZEVs by stimulating battery development and conditioning customers to plug in, but are not as optimistic as the Panel regarding battery technology. Abuse tolerance, life and cost continue to be major challenges for lithium-ion batteries. We are working closely with battery suppliers to try to address these challenges. As for nickel-metal hydride batteries, we simply do not see them as being capable of meeting the technical requirements for plug-ins. We would like to work with the Staff on adjustments to the AT PZEV credit levels to encourage the introduction of plug-ins, and on AT PZEV credits for "blended" plug-ins that are not designed to maximize all-electric range.

We would also like to work with Staff on appropriate credits for range-extending electric vehicles, a technology concept that GM showed last January with the E-Flex system in the Chevy Volt. The range extender may come in various forms, including a gasoline internal combustion engine or, as we recently showed in China, a fuel cell. We note that the Panel envisioned this technology combination as a long-term ZEV outcome.

Regarding hybrids, we agree with the Panel that high manufacturing cost is still an issue. While the Panel concludes that hybrids have helped pure ZEVs by "stimulating advances in electric drive systems, electric accessories, and battery technologies", these advances have done little or nothing to overcome the biggest hurdles to pure ZEVs, including fuel cell stack performance and cost, hydrogen storage, hydrogen infrastructure and high energy batteries. Due to the combined impact of the increasing percentage requirements, the phase-in of LDT2 trucks, and the phase-down of credit levels, the volume of hybrid AT PZEVs required for ZEV compliance grows too fast. We question how much this increased volume helps to advance pure ZEV technologies, and think it makes more sense to moderate the hybrid volume requirements so that manufacturers can focus more resources on pure ZEV technologies like fuel cells, and technologies that are closer to pure ZEVs like plug-in hybrids, as the ARB tries to fulfill its future vision for a zero emission vehicle fleet.

I would like to close by emphasizing that these are exciting times. We are putting forth more effort and resources than ever before into the development of a variety of advanced technology vehicles. But we need to work together on this. We need the help of suppliers, energy companies, and state, federal and local government to make the promise of these technologies become a reality. Thank you.