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DOCKET

10-ALT-1

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Re: Docket No. 10-ALT-01

On behalf of General Motors (GM), thank you for this opportunity to provide comments on the *2011-2012 Investment Plan for the Alternative and Renewable Fuel and Vehicle Technology Program, Draft Staff Report*. The transportation industry is over 90% reliant on petroleum, half of which is imported from foreign sources. GM commends the California Energy Commission (CEC) for taking a portfolio approach to developing and deploying alternative and renewable transportation fuels through its *Investment Plans* to help attain California's climate change policies while addressing energy security issues.

GM believes there is no "silver bullet" to addressing climate change and energy security challenges. Consistent with the CEC, GM is developing and deploying a diverse portfolio of technologies to reduce greenhouse gas emissions, reduce fuel consumption, displace petroleum, and improve local air quality. In fact, GM is actively pursuing the commercialization of fuel cell electric vehicles (FCEVs) with over 1.9 million miles accumulated on its fleet of nearly 100 FCEVs, many of these miles on California roads. GM has developed and is currently selling the world's first electric vehicle with a range extender. GM's other product offerings that round out its portfolio consist of vehicles powered by compressed natural gas (CNG), liquefied propane gas (LPG) and flex-fuel vehicles (FFVs) capable of using E-85 fuel. GM is the clear leader in FFVs production. Currently there are nine million FFVs on the road worldwide and five million of them are GM vehicles.

Each energy pathway, fuel, and corresponding technology plays an important role addressing climate change and energy security issues. GM looks forward to our joint efforts working towards a solution. Therefore, GM is pleased to offer the following comments and recommendations on this year's *Investment Plan*.



Hydrogen and Fuel Cells

GM is fully committed to fuel cell technology. GM's "Project Driveway" is the largest ever test fleet of light duty fuel cell electric vehicles (FCEVs) for general public use accumulating to date over 1.9 million test miles traveled and accomplished over 20,000 fills. GM is very confident FCEVs are a viable option for personal transportation and continues to develop and improve its FCEV technology. While GM plans to commercialize FCEVs in the near future, two barriers remain that need to be overcome, namely high costs and lack of a refueling infrastructure. GM is actively working on cost reduction measures as many driving factors are within its control. However, the refueling infrastructure is largely outside the control of GM and still requires substantial industry and government support in order to meet customer's expectations, both technically, commercially, and geographically ahead of the early production and sale of fuel cell vehicles.

To this point, we commend Energy Commission (CEC) and its partners for awarding construction of eight new hydrogen stations and upgrading three existing stations in 2010. Over the last three to five years, many milestones, such as the first retail-style station, have been accomplished in California with the support of private and public partnerships, but more needs to be done.

The automobile manufacturers (OEMs) and the California Fuel Cell Partnership (CaFCP) analyzed the most recent OEM fuel cell vehicle survey. The results noted 11 areas with hydrogen shortfalls, or gaps in the infrastructure, through 2014 unless stations are funded and built. These areas represent continued development within a particular targeted region (i.e. cluster) as well as development within a corridor between clusters (i.e. connector) and key "destination" locations. GM's evaluation and input reflected its key learning and feedback from "Project Driveway" to ensure the network of hydrogen refueling stations (i.e. Los Angeles) meet early market and customer requirements.

Of the approximately \$10M-\$13M allocated in the *2010-11 Investment Plan*, General Motors concurs with similar analysis by CaFCP that approximately five to seven new stations may be supported, representing about half of the 11 identified gaps. Therefore, a gap of four to six stations will remain.

In reviewing the *2011-12 Investment Plan*, GM has significant concerns with the zero'ing out in funding year-over-year as it relates to light duty fueling stations. Typically, from start to finish the development and construction of a hydrogen fueling station takes one to three years. Any reduction, let alone a zeroing out of funding for public hydrogen stations as proposed in this *Investment Plan*, puts California's commitment and leadership in this area in question right at a time when OEMs are preparing to launch their respective commercial fuel cell vehicle programs. Therefore, GM respectfully recommends the following:



- Restore hydrogen funding similar in the *2011-12 Investment Plan* to *2010-11 Investment Plan* levels - \$10-\$13M to ensure all currently identified fueling shortfalls can be funded.
- Support flexible, multiple-use options (e.g. transit-LDV station) for hydrogen fueling infrastructure provided it meets the needs of all stakeholders.
- Work closely with CaFCP and its members on the design of grant proposals and program opportunity notices to:
 - Ensure fueling equipment technology development (e.g. commercial-scale equipment, capacity variation) remains a priority in the next three to five years.
 - Continue to promote overall reductions in equipment (i.e. capital) and installation (i.e. streamlining) costs.
 - Ensure the development of the hydrogen fueling infrastructure aligns with early market expectations, such as continuing targeted infrastructure support in clusters, but also ensuring connector stations are available to support the ability to move about the region and key destination location are available to enable a no-compromised experience.
- Engage CaFCP and other stakeholders to support CEC's outreach efforts to ensure broad / continued momentum of fuel cell technology through early commercialization in 2015.

Electric Vehicle Charging Infrastructure

In November, 2010, GM successfully launched the world's first mass produced electric vehicle with a range extender, the Chevrolet Volt. The Volt is on track to meet or exceed its stated 2011 production target of 10,000 units with 100's of them already on the roads in California. To help plug-in electric vehicles (PEVs) move from niche products to mainstream as quickly as possible, GM is working closely with key stakeholders, both independently and through PEV Collaborative. Examples of external stakeholders GM is working with include:

- Key California Utilities: Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, Los Angeles Department of Water and Power, Sacramento Municipal Utility District
- City Officials: Inspector and Contractor Training in coordination with National Electrical Contractors Association (NECA), International Association of Electrical Inspectors and through Electric Vehicle Infrastructure Training Program (EVITP)
- First Responders: Emergency Responder training with National Fire Protection Agency
- Electric Vehicle Service Providers: GM's preferred home installation partner, SPX, as well as demonstration programs with customer incentives such as the Department of Energy/Energy Commission programs with Coulomb and Ecotality.

A key purchase consideration for the Chevrolet Volt, and other PEVs as well, is the ability to easily obtain access to a charging location. Based on GM's evaluation of U.S. Department of Transportation information, vehicles are parked nearly 90% of the time at the owner's



residence or at their workplace. Of the 90%, a significant percent of that is residential parking. The remainder of the time, the vehicles are being driven or parked in other locations. Based on our customer requirements, where PEVs will be parked the longest and have the greatest opportunity for recharging, and the Alternative and Renewable Fuel and Vehicle Technology Program stated goal, GM believes the following priority should be established in the *2011-2012 Investment Plan* for charging infrastructure:

- I. Residential charging- (single-family homes)
- II. Residential charging - Multi-family home charging (condominiums, apartments)
- III. Workplace charging (including large public parking garages used by employees)
- IV. Public charging

Regarding workplace charging, GM believes prioritizing this area after residential charging offers significant benefits to California. In addition to being the second most likely place for extended charging opportunities, workplace charging may increase the amount of vehicle miles traveled by electricity in certain types of PEVs. Furthermore, workplace charging may offer a suitable, cost-effective solution for people in multi-dwelling units without access to charging stations. These benefits will be important early commercial market enablers.

GM also believes, like home charging, workplace charging will take place primarily during off-peak times during the morning hours. This can be easily managed by vehicle on-board metering, and workplace policies that encourage or only allow charging during the morning hours. Therefore, GM encourages the Energy Commission to support broad-based incentives for workplace charging, including the education and outreach to business owners.

As one moves down the above list, charging solutions become increasingly more complex, more costly, and less utilized. Thus, we encourage the Commission to follow prioritize this year's investments on EV charging infrastructure in a similar manner and respectfully offer the following comments and recommendations:

- Broad-based PEV Readiness activities which coordinate within and across regions will ensure best practices and lessons learned are communicated and implemented more widely. Specific efforts should include permitting streamlining, city official training and outreach, codes and standards compliance.
- A customer's experience will be largely impacted by the cost and complexity of residential charging installation. CEC should increase the \$1M support for residential to public charging and decrease the \$2.5M support for approximately 700 public charging installations currently allocated in the *2011-12 Investment Plan*.

Furthermore, the Commission identifies approximately a 0.2-0.3 ratio of public charging points to support each PEV. Along with General Motor's overall strategy for installation priorities, we would recommend a more balance funding of residential and public installations. For example, \$2M residential charging funding could fund



2,000 installations (at \$1,000/location) and \$1.5M public charging funding could fund 450 installations (at \$3,500/unit). This more closely aligns with the Commission's proposed ratio.

- Development of multi-dwelling unit options as well as workplace charging locations should be strongly considered for funding since these two locations have a significant potential to convince many people considering the purchase of a new automobile to consider and select a PEV.
- Based on early feedback and learning from initial installations, General Motors recommends incentive programs allow the customer to choose the charging equipment and/or installer. Consumers are likely to avoid programs that are too prescriptive and limit choices
- Public charging funding should complement programs currently being implemented through current additional Federal, State, and Regional funding opportunities.

General Motors considers fast-charging or (Level 3 DC charging) to be in the early stages of development as SAE standards have not been created or agreed upon and technology considerations (on both the battery and distribution grid) are still being evaluated by numerous stakeholders. Nevertheless, properly deployed fast-charging may offer a suitable infrastructure solution as we learn its benefits and manage potential shortcomings. With numerous fast-chargers already funded by additional programs, such as the DOE and BAAQMD, GM recommends a more conservative approach towards incentives for fast-charging, which prioritizes data evaluation, usage patterns, and recommendations from existing PEV owners using the initial placement of fast-chargers in the State. For example, one approach might include evaluation of key corridors and ensuring the existing allotment of fast-chargers can be quickly updated to meet the upcoming SAE standard.

Natural Gas

Compressed Natural Gas (CNG) continues to play a key role in GM's advanced technology and alternative propulsion product portfolio. GM recently announced the production of full size dedicated CNG vans for U.S. fleet customers. This type of vehicle is very attractive for commercial customers for numerous reasons. It offers full functionality, lower operating cost and lower GHG emissions. Infrastructure is key to the success of this technology and GM commends and supports the Energy Commissions continued efforts regarding additional infrastructure and expanding the incentives for CNG vehicles.

Propane

Like CNG, liquid propane gas (LPG) powered vehicles have proven to be a tried and true technology. Propane is currently the third most commonly used fuel behind gasoline and



diesel and offers a CO₂ benefit over a similar gasoline powered vehicle. GM recently announced, for 2011 a dedicated LPG system for cut-away vans for fleet and commercial applications. GM supports the Energy Commission in its efforts to expand this type of infrastructure and offer incentives for LPG vehicles.

Biofuels

For over a decade, GM has been producing flex fuel vehicles (FFVs) or vehicles capable of operating on E85, actively advocating for more biofuel infrastructure, and investing in companies working on the next generation of ethanol, or cellulosic ethanol. Over this period of time, GM has become the outright leader in vehicles capable of running on biofuels. In fact, of the nine million FFVs on the road today, five million are GM vehicles. Furthermore, GM recently announced that its diesel engines were now capable of running on twenty percent bio-diesel or B20.

Even with all of GM's efforts, and the efforts of other automobile manufactures and stakeholders, there continues to be a significant gap between the number of FFVs on the road and the E85 infrastructure to support them. For example in the Los Angeles area the gap between vehicles and stations is large. In one of GM's last studies, this region would need to add over 195 stations to fully support the FFVs in the area if they were to run on E85 exclusively.

Therefore, GM applauds the Energy Commission's focus on biofuels, especially in alternative biomass-based feedstocks. However, GM is concerned to see that the Energy Commission has lowered its forecast for funding year over year from \$16.5 million to \$12.5 million to support this technology. The \$16.5 million represented approximately 15% of the *2010-11 Investment Plan* budget and GM recommends that the Commission maintains that 15% spending level in this year's 2011-12 Investment Plan since this technology is currently being used in large volumes in the State of California, much of the innovation in alternative biomass-based feedstocks is occurring in California, and the benefit of lower GHG emissions.

Thank you again for this opportunity to provide the above comments. Please do not hesitate to contact me should you and or your staff have any questions on GM's comments and recommendations.

Sincerely,

A handwritten signature in blue ink that reads "David J. Tulauskas".

David J. Tulauskas
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