

**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking to Consider Alternative-
Fueled Vehicle Programs, Tariffs, and Policies

Rulemaking 13-11-007
(Filed November 14, 2013)

**OPENING COMMENTS OF GENERAL MOTORS ON THE ORDER
INSTITUTING RULEMAKING TO CONSIDER ALTERNATIVE-
FUELED VEHICLE PROGRAMS, TARIFFS, AND POLICIES**

ALEXANDER KEROS, Advanced Vehicle & Infrastructure Policy, Public Policy

General Motors LLC
3050 Lomita Blvd
Torrance, CA 90505
310-257-3756
alexander.keros@gm.com

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OPENING COMMENTS OF GENERAL MOTORS ON THE ORDER INSTITUTING RULEMAKING TO CONSIDER ALTERNATIVE- FUELED VEHICLE PROGRAMS, TARIFFS, AND POLICIES

Introduction

General Motors is pleased to have the opportunity to provide its comments on the California Public Utilities Commission's (CPUC or the Commission) Order Instituting Rulemaking (OIR) R.13-11-007 to consider Alternative-Fueled Vehicle Programs, Tariffs, and Policies. General Motors appreciates the Commission's continued focus on the market development of advanced vehicle technologies and the necessary infrastructure to support their adoption and use.

Summary

As a committed and conscientious leader in the advancement of alternative-fueled vehicles, General Motors remains focused on near-term priorities to grow the nascent plug-in electric vehicle market, including driving cost and complexity from the vehicle and its associated charging infrastructure. With respect to this proceeding, General Motors asks the Commission to more clearly define vehicle-grid integration by identifying the primary goal or principle; General Motors believes this focus should be to ensure grid reliability.

The well-prepared Vehicle-Grid Integration White Paper has been an important step to foster dialogue across stakeholders. Complexity is an appropriate manner to prioritize the use cases; however, General Motors also encourages prioritization based on value to the grid, particularly to ensure low-cost, low-impact options such as AC Level 1 and/or time-of-use rate adoption are appropriately considered. To support this discussion, General Motors offers several value considerations, such as temporal effects, geographic distribution, and capacity/availability of PEV load. Furthermore, General Motors encourages a proper assessment of risk within the VGI framework as well as the suggestion to explore how other resources might compete with PEVs to deliver grid services.

General Motors agrees that PEV-specific rates are an important consideration. Important first steps should include reducing confusion about options (i.e. simplifying special PEV rates),

ensuring broad customer access to PEV-specific rates, and integrating AC Level 1 considerations into PEV-specific rate options without additional requirements (e.g. installing a second meter). We believe these foundational actions establish the confidence and comfort among PEV drivers, which in turn will consider participation in more complex grid services in the future. In addition, General Motors cautions against adding more complexity and cost by encouraging/incentivizing higher-power and/or requiring networked charging stations in any setting, including residential and workplace. As the industry addresses these fundamental challenges, we will then be able to move forward with broader understanding and consensus.

General Motors supports exploring an expanded role for utilities in participating in the charging infrastructure market. We encouraged a renewed look at their infrastructure involvement as well as an expanded role in education and outreach, particularly in underserved markets, such as multi-unit dwellings, workplace/commuter parking lots as well as ensuring reliable charging network growth.

Background

General Motors continues to invest billions of dollars to develop and sell alternative-fueled vehicles, including Plug-in Electric Vehicles (PEVs) and natural gas vehicles (NGVs).

- The Chevrolet Volt is the best-selling plug-in electric vehicle (PEV) in the United States.¹
- In June 2013, the all-electric Chevrolet Spark EV was launched in California and Oregon.
- In early 2014, the Cadillac ELR luxury coupe, an extended-range electric vehicle, will enter the PEV market.
- Along with its bi-fuel vans and trucks, General Motors will build the Chevrolet Impala that operates on gasoline and compressed natural gas. It will be the only manufacture-produced full size bi-fuel sedan and is expected to begin selling next summer.

General Motors is a committed and conscientious leader in the advancement of alternative-fueled vehicles. Significantly increasing the number of PEVs on California roadways is required before low carbon electricity can contribute at a meaningful level towards California's greenhouse gas

¹ Based on new vehicle registrations in the United States from December 2010 to November 2013.

reduction goals. Furthermore, increasing the number of PEVs is critical to enabling the Vehicle-Grid Integration (VGI) considerations being explored in this proceeding.

Vehicle-Grid Integration Discussion

General Motors remains focused on near-term priorities to grow the PEV market.

It seems prudent to state the obvious: a PEV's primary purpose, just as any other vehicle, is transportation and, in this context, it must always meet the expectations of consumers.

Therefore, General Motors remains focused on reducing cost and complexity across the vehicle, including the necessary infrastructure to support PEV market deployment.

With this perspective, General Motors strongly urges all stakeholders, including the California Public Utility Commission (Commission), to not lose sight of near-term priorities to foster and encourage the growth of the PEV market. First-generation models continue to be launched by various automakers, including General Motors' introduction of the Chevrolet Spark EV in mid-2013 and the Cadillac ELR in early 2014. An overwhelming majority of consumers have not had first-hand exposure to PEV technology. Secondary markets for these vehicles are now beginning to unfold. The first three years of charging infrastructure usage, preferences, and trends are just beginning to be statistically viable and are now being analyzed and reported back to industry stakeholders and decision-makers. We caution over-prioritizing long-term considerations, such as bi-directional flow/battery discharging to the grid, when near-term priorities remain.

General Motors comments to the Commission, as well as comments to other California forums such as Energy Commission's AB118 Investment Plan, the AB32 Cap & Trade Auction Proceeds, and the ZEV Action Plan have remained consistent around a theme of simplification and flexibility. General Motors agrees with the Commission that alternative-fueled vehicle market is rapidly evolving, but we are also careful not to confuse growing the PEV market with unlocking future value in a PEV or defining what is possible with a PEV.² In addition, the consumer value and impact on market growth as a result of enabling the PEV as a grid resource is yet to be determined. As characterized by the Draft VGI Roadmap, knowledge about the

² Order Instituting Rulemaking (R.) 13-11-007, issued 11/22/2013, page 14.

economic, environmental and grid benefits is underdeveloped, inconsistent or not validated.³

We believe as the market grows and becomes more firmly established there will be a time and place for broader considerations and additional complexities.

General Motors encourages the Commission to more clearly define VGI.

To ensure stakeholders are on common ground with respect to vehicle-grid integration (VGI), General Motors believes it is important the Commission more clearly define VGI within the context of this Proceeding. In other words, the Commission should define the overarching VGI goal or principle within the proceeding – for example, *is it to ensure grid reliability or to unlock potential long-term value within the vehicle to reduce vehicle cost of ownership?*

General Motors recognizes this definition or goal will need to evolve over time, but we believe it is critical to ensure consistent, comparable comments across stakeholders. These variations are highlighted within recent documentation. The OIR notes that this proceeding will explore “*financing opportunities to unlock the long-term value in PEVs...*”, but also references the VGI action items within the ZEV Action Plan which seeks to “*help reduce the negative impacts of peak-time charging and an opportunity to integrate renewables into the grid.*”^{4,5} The PUC staff’s Vehicle-Grid Integration White Paper (VGI White Paper) suggests VGI “*can harness the usage of characteristics of and technology within PEVS to allow them to serve as a grid asset...*”⁶ California ISO’s (CAISO) Roadmap provides a definition of VGI with its index of terms: *The term vehicle-grid integration, as used in this roadmap, encompasses the many ways in which an electric vehicle can provide grid services. This may be through managed charging of a vehicle or the two-way interaction between a vehicle and the grid.*⁷ These examples highlight a challenge that will likely be wrestled with throughout this proceeding as stakeholders identify solutions to various PEV market objectives. However, we strongly encourage the Commission to focus on integrating PEVs into the grid (e.g. grid reliability, off-peak charging) as the primary goal. As the costs and benefits of grid services offered by PEVs become more

³ California Vehicle-Grid Integration (VGI) Roadmap: Enabling vehicle-based grid services [DRAFT] November 27, 2013. Page 6. <<http://www.caiso.com/informed/Pages/CleanGrid/VehicetoGridRoadmap.aspx>>

⁴ Order Instituting Rulemaking (R.) 13-11-007, issued 11/22/2013, page 3

⁵ Order Instituting Rulemaking (R.) 13-11-007, issued 11/22/2013, page 15 (“*ZEV Action Plan at 13 and 17*”)

⁶ Langton, Adam & Noel Crisostomo. October 2013. Vehicle-Grid Integration: A Vision for Zero-Emission Transportation Interconnected throughout California’s Electricity System. California Public Utility Commission. OIR R.13-11-007. Appendix A, page 2.

⁷ California Vehicle-Grid Integration (VGI) Roadmap: Enabling vehicle-based grid services [DRAFT] November 27, 2013. <<http://www.caiso.com/informed/Pages/CleanGrid/VehicetoGridRoadmap.aspx>>

clearly understood across parties, we will learn if these values are meaningful to foster PEV market development.

Moreover, General Motors believes VGI will require a strategic definition that appropriately reflects a broad range of services. As General Motors highlights in these comments, VGI should properly account for the usefulness and value of charging with AC Level 1 (120V, 16A) and time of use (TOU) rates as a credible energy efficiency strategy for PEV charging. In parallel, the VGI framework should avoid unintended consequences, such as creating additional costs to install infrastructure or establishing vehicle-level distinctions (e.g. battery electric versus plug-in hybrid). And it may be important to explore if the focus should be on the grid service itself rather than the grid service provided by the vehicle due to competing resources. In this context, General Motors believes it is also important to highlight the State's commitment to energy efficiency goals and the potential conflict that a narrow definition of VGI may pose, (e.g. expanding energy efficiency policies while supporting more powerful PEV charging equipment).

1. Is the VGI framework proposed in the White Paper a reasonable way to organize VGI activities and scenarios?

General Motors would like to commend the Energy Division's staff on the preparation of the VGI White Paper. It is well-prepared and has initiated critical discussions across stakeholders on many facets of VGI. Furthermore, it is appropriately broad in scope which ensures flexibility in decision-making across current and future dialogue.

General Motors interprets the current framework of the VGI White Paper to be characterized by complexity, where the prioritization of use cases is based on adding players (stakeholders) and/or technology. While certainly one way to organize VGI activities, it may also be important to perform a parallel exercise of organizing around potential value to the grid. These values would presumably be spread across the PEV driver/utility customer, the utility (distribution), the system operator (transmission), and third parties managing the relationships between the above parties.

Analyzing the value perspective will require a more complex assessment; however, it would undoubtedly provide additional insight into prioritization and potentially reconcile competing

interests. For example, demand response for a large fleet may offer the least complexity, but minimal overall value to the grid. However, demand response for workplace charging at large employers may offer more complexity, yet more value to the grid. Here, priority would need to be placed on the more complex workplace charging scenario by resolving and defining the resource, aggregation, and primacy challenges. Another potential outcome of this evaluation may be that AC Level 1 charging coupled with whole house TOU rates may offer more value than any demand response program. These examples highlight why General Motors believes it is critical to reconcile both complexity and value within the VGI framework.

In the context of understanding the value, it is also important to acknowledge many VGI services discussed in the VGI White Paper imply technology which presumably adds costs. Whether increased capability on the vehicle (such as 3.3 kW versus 6.6 kW charging, a bi-directional inverter) or the communication requirements (networked charging stations, vehicle telematics), these costs and complexities should be properly characterized in the analyses.

Another important consideration is the autonomy of the premise or facility owner (MDU, workplace, public, commercial, etc.) to determine how their internal energy management system communicates to its end use load devices and controls load in regards to demand response, demand charges, and participation in aggregation services. The PEV is only one component of their internal electrical load structure and the premise/facility owner unilaterally determines how the aggregated facility load is managed in response to external commands. Therefore, site ownership and control presents added complexity to the communications technology and the determination of stakeholder roles, business policies, and value to the PEV driver.

2. Do you agree with Energy Division's prioritization of the VGI scenarios?

As discussed above, General Motors believes the challenge of understanding VGI scenarios includes describing the value to individual stakeholders. While General Motors understands the need to prioritize VGI based on complexity, we do not believe it provides a complete picture to properly understand where priority should be placed in the near, medium, and long term.

General Motors believes the following value considerations, beyond complexity, will need to be reconciled within the model to better understand how to prioritize VGI scenarios:

- Temporal Effects (e.g. time of day, seasonal) – will the grid service be most valuable at night or at peak? During summer months? When renewables are available (solar, wind)?
- Competition – what grid resources will compete with PEVs such as those being discussed in the storage proceeding?⁸
- Geographic – do the local requirements match the PEV market or vehicle use patterns?
- Sustainability (of provided services) – will policy or market forces change over time rendering a grid service more or less valuable?
- Capacity – will the local or regional saturation of PEVs (e.g. the availability of PEV load capacity) enhance or degrade the value of the VGI activity or scenario?

In summary, if PEV grid services are not equally valuable to stakeholders, the Commission should work with stakeholders to characterize the various benefits. The Commission and stakeholders should reconcile value considerations, such as temporal effects and competition. Stakeholders should then overlay against the complexity and determine if reprioritization is necessary.

Reprioritizing in this manner will help ensure a comprehensive understanding of the merits and drawbacks of various VGI activities. For clarification, General Motors believes near-term actions can and should still occur as these analyses are undertaken—universally beneficial practices should not require full-blown analyses to begin implementation. Furthermore, General Motors believes this exercise will need to be a data-driven process where new or expanded pilot projects will be undertaken by stakeholders and the investor-owned utilities (IOUs).

3. Does the White Paper capture all the utility regulatory barriers to VGI?

Within our expertise, General Motors believes there are two areas worth addressing. First, potential conflict may arise by explicitly defining the vehicle service (as opposed to generally defining the grid service or performance requirement) where prescriptive regulatory frameworks

⁸ Order Instituting Rulemaking (R.) 10-12-007, issued 12/16/2010. Pursuant to Assembly Bill 2514 to consider the adoption of procurement targets for viable and cost-effective energy storage systems.

around the PEV may create unintended consequences. Defining the grid service more generally may provide flexibility as the market evolves, such as when time-of-use rates adjust or additional renewable energy is integrated into the grid. Similarly, VGI may become hindered if the system is designed around one or two services, such as around a particular rate design.

Secondly, General Motors believes the risks associated with VGI will need to be properly characterized in order to define its full benefits. With various actors—customer, utility, system operator, third party(ies) (automaker, service provider, or otherwise)—value will ultimately be defined by how risk is managed by the market or by the regulatory framework. For example, a grid management tool may be seen to benefit all ratepayers, may enable emerging business models for ancillary services, or may directly benefit fleets or building services. How risk is assigned will influence the efficacy of each service and, potentially, its market adoption.

4. How should we address any potential safety and reliability concerns associated with VGI?

General Motors believes a data-driven process with new or expanded pilot projects will help ensure safety and reliability concerns are addressed in a meaningful and controlled manner. In addition, it is important the Commission support the utilities' role in codes and standards development and ensure VGI activities in California conform to national standards. Ultimately, global harmonization will be imperative for successful, consistent implementation of VGI. General Motors and many other automakers are working closely together to define communication and safety standards related to VGI within SAE, IEC, and ISO.

Alternative Fuel Vehicle Rate Design Policy Discussion

1. What is the utility experience to date regarding customer election to use PEV-specific tariffs?

Generally speaking, General Motors' experience working with our California customers suggests current PEV-specific rates can be complex, confusing, and intimidating. Furthermore, obtaining a dedicated PEV-rate through the installation of a second meter can also be costly, which is a

clear barrier for consumers.⁹ Therefore, General Motors believes rate design considerations should be an important market and regulatory priority in California. General Motors encourages utilities and the Commission to simplify PEV-specific rate options to address potential gaps and increase customer adoption.

2. What issues need to be considered when designing PEV rates for residential charging?

General Motors believes VGI activities will be greatly enhanced by establishing a relationship between PEV drivers and their utility. The foundation of this relationship will be establishing consumer knowledge and comfort with PEV-specific rates. Therefore, asking PEV drivers that have not participated in PEV-specific rates to opt into more complex VGI programs will likely be a challenge. And with only limited participation of PEV customers participating in PEV-specific rates in California, progress is necessary.¹⁰

General Motors' data show most charging is already occurring during off-peak, regardless of rate choice.¹¹ However, many PEV drivers do not take advantage of lower-cost PEV TOU rate programs for a variety of reasons—cost to install a second meter, risk that occasional/routine on-peak usage will remove the benefit of charging off-peak, or inability to leverage a PEV-rate that supports simple, low-cost AC Level 1 charging. In addition, many Volt customers have noted a specific gap in the PEV rate designs offered by several California's utilities - that is, there is no viable TOU option for those PEV drivers who rely on regular on-peak usage (e.g. work from home, home childcare) and find it cost-prohibitive to install the required separate PEV meter.

General Motors also encourages utilities and the Commission to incorporate AC Level 1 (120V, 16A) charging into the rate design considerations. AC Level 1 charging offers an important step

⁹ In line with other stakeholder data and assessments, General Motors, and our EV charging station installation partner (Bosch Automotive Service Solutions) have reported the incremental cost of adding a second meter averages \$900-\$1,000. These do not include non-installed, outlier estimates that have been known to go beyond \$3,000 for a second meter installation.

¹⁰ Southern California Edison provided insight into the PEV customer profile in their service territory, highlighting that ~21% of PEV drivers are adopting PEV-specific rates and ~60% of PEV customers do not initiate a conversation related to TOU rates at all. Furthermore, of those that do initiate the conversation, ~16% do not complete the process. Presentation to the California Plug-in Electric Vehicle Collaborative on July 23, 2013.

http://pevcollaborative.org/sites/all/themes/pev/files/Kjaer2_SCE_20130719AD%20PEV%20Customer%20Experience_PEV%20Collaborativ e.pdf

¹¹ Multiple reports, including EV Project Data and the Joint IOU Electric Vehicle Load Research Final Report, point to the general conclusion that a majority of charging is occurring during off-peak/super off-peak times from 6pm-6am. These reports also highlight how the use of TOU rates can further influence customer charging behavior by directing to the lowest-cost hours.

INL Presentation: <http://pevcollaborative.org/sites/all/themes/pev/files/Francfort%20-%20PEV%20Collaborative%20UC%20Davis%2011-6-13.pdf>

Alt-Fuel Vehicle Proceeding / Joint IOU Report: <http://www.cpuc.ca.gov/PUC/energy/altvehicles/>

to market adoption by offering a simple, low (no) cost solution. Therefore, customers should be properly rewarded (i.e. not penalized) for using Level 1 by expanding TOU windows to account for a normal commute. Similarly, we believe there is a role for the Commission to work with stakeholders to ensure charging power levels appropriately match consumer needs.

General Motors believes well-crafted PEV-specific rates prevent concerns or surprises from arising during PEV ownership and usage. And while consumer choice is necessary to ensure flexibility for all PEV owners, it is important for the Commission to establish rates and policies and to create sufficient awareness of these PEV-rate options. While the importance of education and outreach has been repeatedly noted as a high-priority across all California PEV forums, work remains to raise awareness and establish a stronger relationship with PEV consumers. For example, as the definition of on-peak and off-peak evolves (e.g. through the integration of renewable energy), it will be important to have this strong foundation.

3. Should the Commission consider new rate tariffs for workplaces providing PEV charging?

The Commission should focus on simplifying the customer experience, providing customer-friendly information and outreach, and providing consumer incentives that remove any real or perceived barriers to market entry of plug-in vehicles. Introducing new rate tariffs for workplace facilities (or commuter lots) will create additional complexity when stakeholders are working to have large and small employers install the most important infrastructure after residential charging. Unless there is a definitive, broad benefit to PEV drivers and employers, we encourage the Commission to explore this consideration when a more mature PEV market develops—where the industry more clearly understands common policies (i.e. best practices) across employers and how PEV drivers react/use charging equipment.

4. How can residential and workplace PEV rates incentivize smart charging and allow controlled charging?

At this early stage, GM believes a critical action the Commission can take is to ensure simplicity and consumer choice. In other words, residential and workplace PEV rates should not encourage more complexity and cost by incentivizing higher-power, networked charging stations. If the

Commission's goal is to minimize impacts to the grid, rates should properly support options such as non-networked or AC Level 1 charging. These options will inevitably reduce barriers, increase consumer options and PEV consideration, and support PEV market adoption.

5. How should the Commission address demand charges for medium - and heavy-duty plug-in electric vehicles?

General Motors: No Response

6. What changes, if any, are needed to tariffs related to compressed natural gas vehicles?

General Motors: No Response

7. What other issues related to alternative fuel vehicle rates should the Commission address?

With recent high-profile bankruptcies offering a reminder about the continuing challenge to derive a profit from installing and operating charging infrastructure, especially in a public setting, General Motors encourages stakeholders and the Commission to take a fresh look at the utilities' role in participating and rate-basing the installation and/or operation of a responsible amount of charging infrastructure. This renewed look would provide an understanding of how new rate designs might be integrated across platforms and locations. Furthermore, it also provides the opportunity to more holistically integrate and value many of the VGI concepts discussed in the VGI White Paper.

As noted earlier, we believe a renewed commitment to education and outreach continues to be a critical element at this early stage of the PEV market. We encourage the Commission to continue to work with all stakeholder organizations in California and to leverage national stakeholder groups who are active in this area. While the Phase 2 Decision (March 15, 2011) limits the role the utilities can take with respect to education and outreach, we encourage the Commission to review and contextualize the utilities' roles in broadly promoting PEV adoption as a means to support market challenges, including the concerns highlighted in this proceeding— vehicle-grid integration (i.e. grid services) and rate designs (i.e. PEV-specific rate adoption).¹²

¹² Decision (D.) 11-070-029, issued 7/25/2011. Decision Establishing Policies to Overcome Barriers to Electric Vehicle Deployment and Complying with Public Utilities Code Section 740.2. < http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/139969.PDF>

General Motors has been a strong supporter for utility engagement and education programs, and it is increasingly apparent the critical role the utilities have played nationwide in enabling and promoting this market.

Financing

1. Should the Commission direct the utilities to provide financing to customers to encourage PEV adoption? If so, what financing options should be considered?

There are highly successful examples of states allowing for utility-provided financial incentives to help drive the PEV market. In the largest program of its kind, Michigan's Public Service Commission (MPSC) authorized DTE Energy, Consumer's Energy, and AEP Michigan to provide the first 5,000 PEV buyers in the state with a \$2,500 rebate to cover the cost of installing a residential 240V charge station to support PEV market development. In return, this program also ensures the utility has access to the significant amount of charging data being collected, which is proving invaluable to the utilities (and the MPSC) as the early market grows rapidly. General Motors believes exploring how utilities may participate directly in infrastructure development, financial or otherwise, is an important consideration. These programs will likely be most critical in underserved markets, such as multi-unit dwellings (MUDs), workplace or commuter parking lots as well as establishing charging in public areas that do not have a clearly defined business case (yet network critical).

Similar to characterizing the value of grid services, General Motors cautions the Commission and stakeholders to address the sustainability of any given incentive or financing model. As noted, if risk and long-term value are not properly assessed across the value chain, enticed consumers may react negatively given varying (e.g. lower) values over time. Furthermore, primacy challenges may emerge if utility incentive and financing models are not properly characterized. General Motors believes these challenges can be addressed by both market and regulatory frameworks and should be explored in more detail.

General

1. What changes to the Commission's Rules or new Rules are needed to facilitate the goals outlined in this OIR?

General Motors: No Response

General Motors thanks the Commission for the opportunity to submit these comments and will continue to work closely with the Commission, the IOUs, and the other parties to ensure the successful commercialization of PEVs while ensuring a safe, reliable electrical grid.

Dated: December 13, 2013

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Alexander Keros". The signature is fluid and cursive, with a large loop at the end.

ALEXANDER KEROS,
Advanced Vehicle & Infrastructure Policy
General Motors LLC
3050 Lomita Blvd, Torrance, CA 90505
310-257-3756
alexander.keros@gm.com