SOUTHERN CALIFORNIA EDISON
An *EDISON INTERNATIONAL* Company

Manuel Alvarez
Manager, Regulatory Policy and Affairs

July 15, 2014

California Energy Commission
DOCKETED
14-IEP-1B
TN 73421
JUL 17 2014

California Energy Commission
Docket Office, MS-4
Re: Docket No. 14-IEP-1B
1516 Ninth Street
Sacramento, CA 95814-5512
docket@energy.ca.gov

Re: *Southern California Edison Company's Comments on the California Energy Commission Docket No. 14-IEP-1B: Lead Commission Workshop on Transportation – Electricity and Natural Gas*

Dear Commissioner Scott:

As part of the 2014 IEPR Update process, on June 23, 2014, the California Energy Commission (Energy Commission) held a Lead Commissioner Workshop on Transportation—Electricity and Natural Gas ("the Workshop"). Southern California Edison (SCE) participated in the Workshop and appreciates the opportunity to provide these written comments.

During the Workshop, many stakeholders and panelists focused on aspects of vehicle-grid integration (VGI). SCE is pleased to see the topic of VGI gaining prominence in the IEPR, as well as in other policy forums. SCE has been actively involved in working groups and proceedings focused on various aspects of transportation electrification, including VGI and Vehicle-to-Grid (V2G) technology. In addition, for over twenty years, SCE has been collaborating with original equipment manufacturers (OEMs) and battery manufacturers on the development of plug-in electric vehicles (PEVs) and energy storage. For instance, since SCE established its Electric Vehicle (EV) Technical Center in 1992, it has collaborated with many OEMs, battery manufacturers, and technical developers to test the interoperability of their products with the electric grid. SCE has learned a great deal through this collaboration, and has continuously shared its findings with the EV industry and other stakeholders.

Based on its experience and collaboration with these stakeholders, SCE recommends the following comments for the Energy Commission's consideration. First, to accelerate plug-in electric vehicle (PEV) adoption, PEV adoption drivers and near-term, low cost VGI solutions should be prioritized over more sophisticated and potentially higher cost VGI solutions. Second, SCE proposes that the Energy Commission adopt eleven VGI policy considerations. Third, SCE supports the Energy Commission's continued funding of activities identified in the California VGI roadmap. Fourth, as noted in previously filed comments, SCE continues to encourage funding for market education and outreach to support PEV adoption. Fifth and finally, SCE recommends that the Energy Commission establish a working group on the interconnection of energy storage technologies, including V2G.

A. To Accelerate PEV Adoption, the Energy Commission Should Prioritize Adoption Drivers and Near-Term, Low Cost Solutions Over More Sophisticated and Potentially Higher Cost VGI Solutions

The state's immediate goal should be to accelerate the PEV market so that there are sufficient PEV sales to support more sophisticated business cases that typically provide greater benefits, but also increase consumer costs. To that end, SCE recommends that in the short-term, policy discussions and funding support should focus on accelerating transportation electrification and PEV adoption programs with low cost, no-regret solutions for grid optimization, such as time-of-use rate adoption and/or demand response.

To date, of the 5 million customers SCE serves, 26,000 have PEVs, of which 61 percent drive plug-in hybrid EVs (PHEVs), consisting of mostly Chevy Volts (35 miles electric range), Ford's (20 mile electric range) and Toyota Prius (10 mile electric range). In SCE's experience, most PEV drivers fully charge their vehicles at night before they leave home in the morning and 70 percent drive less than 40 miles per day. As a result, the need for away-from-home charging is relatively small (compared to home charging) and the cost of electricity for away-from-home charging is a low 5 cents per mile for a total of between 25 cents to one dollar each day. So far, SCE's grid has been able to meet charging needs, and may in fact be ahead of the immediate future needs. Shaping or shifting load may become necessary, however, in the long-term when the market is more robust and grid-support opportunities are better defined.

In addition, time-of-use rates can optimize nighttime charging, which is most common for most charging segments. And in the future, daytime charging for most of the year can address the problem associated with solar over-generation that is expected to occur over the next decade.

Because the PEV technology and market as well as the needs of the grid are evolving, the need for more sophisticated, higher cost VGI is an evolving issue. It is premature to shift the state's policy and financial support to exploring potential benefits of more sophisticated types of VGI, such as smart or managed charging and V2G. Policy support in the immediate future should be focused on growing the PEV market to a level where smart charging, V2G and other sophisticated types of VGI could cost-effectively offer benefits towards grid optimization, resource utilization, net customers' costs and the state's environmental goals. As discussed below, certain Energy Commission actions are appropriate now to support the more sophisticated types of VGI that may be developed in the future.

B. The Energy Commission Should Adopt Eleven VGI Policy Considerations

VGI is essentially grid-optimization of the transportation electrification load. As noted above, to best support the growth of the PEV market, the focus should be on low-cost solutions, especially in the near-term before large-scale investing in costlier alternative technologies in this nascent and evolving market.

SCE is currently working on VGI pilots including Irvine Smart Grid Demonstration (ISGD), the residential PEV submeter pilot, the Department of Defense V2G pilot, and SCE

employee workplace charging demand response projects. These demonstration projects could shed meaningful light on how to most efficiently design long-term VGI solutions. SCE looks forward to collaborating with the Energy Commission and other stakeholders, and sharing lessons-learned and best practices from these pilots to inform VGI efforts going forward. SCE recommends that the Commission should defer policy decisions for VGI until these and other demonstration projects are completed, the results published and the respective value propositions of the various VGI solutions are ascertained.

In the meantime, regardless of when the relevance, efficacy, need for and benefits of VGI are addressed, the Energy Commission should adopt the following eleven policy considerations to guide its future decisions on VGI.

1) As a threshold and fundamental matter, the Energy Commission should ensure that proposed VGI solutions do no harm to the grid or ratepayers before they are implemented.
2) The primary goal of VGI should be to support the grid rather than to lower the cost of vehicle ownership and operation. Accordingly, the Energy Commission should identify the grid-related problems that can benefit from VGI before investing in solutions. For instance, smart charging and V2G may be needed and cost-effective solution in the upcoming decade if PEV markets develop to reach five or ten percent of all electricity consumed. The market should include light, medium and heavy duty, and off-road vehicles.
3) Before authorizing funding or policy support for VGI, the Energy Commission should compare the benefits of other alternative and competing technologies. For instance, the Energy Commission should explore how VGI compares to compressed air storage, stationary batteries, flywheels, etc. The Energy Commission should make the comparison by using appropriate metrics it is developing through its Alternative and Renewable Fuel and Vehicle Technology Program (ARFTVP).
4) The Energy Commission should minimize the risk of stranded assets, such as unused infrastructure, expensive or redundant back-office costs, communication and control technologies, cybersecurity and protective systems by, for instance, utilizing existing technologies and infrastructure when practicable.[1]
5) The Energy Commission should favor VGI solutions that reduce overall net consumer costs.
6) The Energy Commission should establish the value/benefit of contributing components, including distribution peaks, daily generation peaks, critical summer peaks, ramping requirements, voltage/frequency issues, intermittency issues with renewables.

[1] *See* SCE Comment Letter on Measuring the Success of ARFVTP, at page 4, available at: http://www.energy.ca.gov/2014_energypolicy/documents/2014-06-12_workshop/comments/SCE_Comments_on_CEC_Lead_Commission_Workshop_on_Measuring_the_Success_of_ARFVTP_TN-73278_2014-06-26.pdf (discussing how to best value the benefits of the ARFTVP program through metrics and measurements.)

7) The Energy Commission should also examine the tradeoffs that will have to be made. For instance, charging at 10kW may be better for V2G, but could increase consumer costs or have unexpected consequences with the distribution and generation peaks.

8) The Energy Commission should recognize special PEV rates and other rate treatments as a form of VGI. For example, time-of-use rate adoption, lower charging levels or combination of the two could prove more beneficial to the grid. Similarly, the Energy Commission can compare battery electric vehicle (BEV) charging at 10kW at home plus VGI away from home to plug-in hybrid electric vehicles (PHEV) charging at 1.4 kW at home and away.

9) The Energy Commission should avoid added complexity that can frustrate adoption by confusing PEV customers, dealers, automakers, and other stakeholders.

10) The Energy Commission's policies should be technology and business model neutral.

11) The Energy Commission should understand and prioritize charging market segments e.g., residential, workplace, fleet, public access) and charging market sub-segments (e.g., single family homes, short or long-dwell time public access locations).

C. The Energy Commission Should Continue to Fund Activities Identified in the California VGI Roadmap

SCE supports the 2014 State VGI Roadmap's comprehensive approach to VGI and is committed to participate in the on-going VGI roadmap process. SCE supports the Energy Commission's continued funding of workshops and other activities identified in the VGI Roadmap. For instance, SCE supports more workshops like the four in-depth VGI roadmap workshops led by the CAISO and funded by the Energy Commission) attended by a diverse groups of participants.

SCE also recommends coordinating transportation electrification proceedings with other proceedings, including storage, demand response, smart grid, resource adequacy, renewables integration, and interconnection. Such coordination could yield benefits to the grid that are much cheaper and cost-effective, and help address the complexity inherent in the VGI topic.

D. Education, Outreach and Marketing Are Critical For PEV Adoption and Market Acceleration

To make VGI a reality while maintaining a safe, reliable, resilient electricity grid for all customers, utilities will have to make additional investments in communications and control technologies, including smart grid interoperability systems, load control systems, back-office computing links, cybersecurity, and protective technologies. The success of such investments relies on a robust PEV market, which will only occur if customers are sufficiently well-informed to adopt the technology and support the state's goals.

SCE recommends that awareness and education about PEVs, VGI, energy storage interconnection, renewables integration and related technologies should be advanced through targeted education, outreach and marketing initiatives. These efforts would ensure continued

market expansion and customer awareness and could instruct both utilities and the Commission in making prudent investments to optimize grid and resource utilization.

PEV market education and awareness programs are essential to the advancement of the state's long-term energy, transportation, and climate goals. As noted in previously filed comments, SCE recommends a Commission supported marketing, education, and outreach promotional campaign, funded at approximately $10 million per year, for commercially available near-zero and zero-emission transportation, including electric transportation technologies to further propel the market.[2]

E. The Energy Commission Should Establish A Working Group on the Interconnection of Energy Storage Technologies

SCE agrees with the California Independent System Operator (CAISO) representatives', Heather Sanders' and Steve Berberich's, Workshop comments regarding the important role of and need for further investigation of the interconnection process for energy storage, including V2G technology. Interconnection may play an important role in the commercialization and ultimate success of electric transportation technology. SCE recommends that the Energy Commission create a working group consisting of the California Public Utilities Commission (CPUC), CAISO, and V2G energy storage subject matter experts to assess the interconnection process for storage and V2G issues. The working group should attempt to leverage the Department of Defense's V2G ongoing initiative and related efforts.

In conclusion, SCE appreciates the Energy Commission's consideration of these comments and looks forward to its continuing collaboration with the Energy Commission. Please do not hesitate to contact me at (916) 441-2369 with any questions or concerns you may have. I am available to discuss these matters further at your convenience.

Very truly yours,

/s/ Manuel Alvarez

Manuel Alvarez

[2] See SCE Comments on Transportation Technology Over the Next Ten Years, available at: http://www.energy.ca.gov/2014_energypolicy/documents/2014-04-10_workshop/comments/Southern_California_Edison_Comments_2014-04-24_TN-72967.pdf