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

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| Order Instituting Rulemaking on the Commission's Own Motion to Consider Alternative-fueled Vehicle Tariffs, Infrastructure and Policies to Support California's Greenhouse Gas Emissions Reduction Goals. | Rulemaking 09-08-009 (Filed August 20, 2009) |

# OPENING COMMENTS OF PACIFIC GAS AND ELECTRIC COMPANY (U 39 E) ON ALTERNATIVE-FUELED VEHICLE TARIFFS AND POLICIES

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# OPENING COMMENTS OF PACIFIC GAS AND ELECTRIC COMPANY (U 39 E) ON ALTERNATIVE-FUELED VEHICLE TARIFFS AND POLICIES

## I. INTRODUCTION

PG&E appreciates the opportunity to provide opening comments on the California Public Utilities Commission's (CPUC or the Commission) Order Instituting Rulemaking (R.)09-08-009 on electric vehicles and other alternative-fueled vehicles ("OIR"). This OIR is timely and urgently needed. The Commission is to be commended for initiating what may be the first comprehensive proceeding in the nation to consider the impacts of electric vehicle markets on electric industry infrastructure, and evaluate the need to upgrade electric utility infrastructure to meet the needs of electric vehicle owners, operators, sellers, and service providers.

## II. EXECUTIVE SUMMARY

The mass marketing of electric vehicles beginning in 2010 presents one of the greatest regulatory challenges the Commission has faced in many years. On the one hand, successful development of electric vehicle markets is potentially one of the greatest single actions that can be taken globally in the next twenty years to reverse the growth in greenhouse gas emissions. On the other hand, managing the increased electricity consumption and load attributable to electric vehicles in order to avoid adverse impacts on the safety and reliability of the electric grid may be one of the most difficult management challenges that electric utilities will face over the same period.

This opportunity and challenge are made more difficult because the marketing and demand for electric vehicles are largely outside the planning and control of utilities and utility regulators, and instead rest largely in the hands of motor vehicle

manufacturers and consumers. Unlike the task of planning to meet overall electric load based on macro-economic indicators, the utilities and their regulators face greater uncertainties and volatility in planning for electric vehicle loads because of factors not normally considered in utility planning, such as the timing of the availability of new battery designs for electric vehicles; the strategic business and marketing plans of motor vehicle manufacturers; the segmentation and geographic location of consumer markets for new and used motor vehicles; and the overall supply and demand for new and used motor vehicles in vehicle markets.

Despite these large uncertainties regarding the timing and growth of electric vehicle markets and the electricity loads associated with those markets, the OIR correctly points out that there are certain discrete issues and tasks on which utility regulators and utilities can and should focus on *right now*, in order to avoid the risk that inaction in the face of uncertainty will materially thwart the development of electric vehicles. PG&E agrees with the OIR's call to action on these important electric vehicle issues. These issues include, *inter alia*, what additional utility infrastructure is needed to streamline and make convenient and accessible the electric charging facilities needed to support electric vehicles; what changes in electric rates and tariffs are needed to meet and manage the new electric loads associated with electric vehicles; what metering equipment and other devices and technology should utilities employ to make sure the electricity needs of electric vehicle owners and operators are met universally, safely and at a reasonable cost; and what incentives should be provided to utilities, their customers and other electric vehicle service providers to ensure that the operation and maintenance of electric vehicles is as seamless and convenient for customers and electric vehicle sellers as possible.

In addressing these electric utility-related issues, the Commission should be mindful that utility regulators and the utilities themselves have a more limited role in nascent electric vehicle markets than they have in other electric utility services. The Commission also should take into account the likelihood that electric vehicle manufacturers and consumers may view the Commission and utilities as needing to follow, not lead, the development of the standards and mass markets for electric vehicles across the country and world, not just in California. Thus, it will be important that this

OIR choose regulatory policies that are flexible and adaptable to national and global market developments, many of which may take some time to crystallize as electric vehicle standards and markets develop. If all this OIR does is give utilities and their customers the tools to ensure that the necessary electric charging infrastructure and tariffs are in place when customers bring home their electric vehicles, it will be a success.

As PG&E's responses to the OIR's specific questions below indicate, PG&E believes that the Commission can and should adopt certain interim electric vehicle regulatory policies immediately. These interim regulatory policies are needed to ensure that PG&E and other utilities can put electric charging infrastructure in place immediately, not only to support customers who buy electric vehicles beginning in 2010, but also to carefully and successfully manage the new and unique electric loads and costs that electric vehicles will impose on the electric grid. PG&E is moving forward from its end to prepare for electric vehicles on our system, but we need clear, flexible and expedited regulatory policies and approvals from the Commission to ensure that we can actually implement our plans for electric vehicles on a timely and cost-effective basis for the benefit of all our customers.

PG&E looks forward to working with the Commission and all interested parties on these important tasks in the OIR.

## III. SCOPE, SCHEDULE AND OTHER PROCEDURAL RECOMMENDATIONS

PG&E recommends that the Commission issue an interim policy decision in this proceeding no later than March 2010, authorizing utilities to file individual applications for new electric vehicle tariffs and for electric vehicle infrastructure investments needed to serve the initial mass marketing of electric vehicles within their service territories beginning in 2010.

Subsequent to the interim policy decision, the Commission should issue an overall policy decision by the end of 2010 that adopts specific policies and regulatory guidelines regarding 1) the role and regulation of third-party electric vehicle service providers, particularly in the public charging arena and in the markets for in-home devices and equipment; and 2) the recovery by utilities of additional costs and

investments required on their primary and secondary distribution systems due to increased and localized electric vehicle loads.

PG&E believes this sequencing of tasks in this OIR will help streamline the required actions by utilities and electric vehicle manufacturers during the early stages of electric vehicle marketing, and make the initial roll-out of new electric vehicles as seamless, streamlined and convenient for consumers as possible.

## IV. RESPONSES TO SPECIFIC QUESTIONS

**Residential Charging Infrastructure and Policy**

**1. What types of residential metering arrangements are appropriate for PHEVs and BEVs and why? Should the Commission require a particular metering arrangement, or should it allow more flexibility in metering arrangements by investor-owned utilities or others? If so, why?**

**PG&E Response:**

Residential metering arrangements for plug-in hybrid electric vehicles (PHEVs) and battery electric vehicles (BEVs) should build upon the Home Area Network (HAN)-enabled platform to offer the following benefits:

- Convenience of auto-shifting charging to off-peak hours,
- Flexibility to manage load for reliability and safety,
- Information for customer and regulatory uses, and
- Two-way communication.

The Commission should allow flexibility in metering arrangements within the constraints of standardized communication protocols and technical specifications.

**2. How will electric vehicle meters or sub-meters and EVSEs interact with the advanced meters currently being installed across the service territories of investor-owned utilities? What policies does the Commission need to consider concerning any such interaction?**

**PG&E Response:**

In a Smart Energy 2.0 HAN architecture, Electric Vehicle Service Equipment/ Electric Vehicle (EVSEs/EV) meters communicate with AMI meters through ZigBee/SmartEnergy 2.0 wireless; the AMI meters then send meter reading information through the AMI network to the utility back office; the utility can also send demand response and other control signals through the AMI network to the AMI meter, and then through ZigBee/SmartEnergy 2.0 wireless to electric vehicles.

The Smart Energy 2.0 HAN architecture is a viable solution. In the future, when more HAN enabled devices come into customers' homes, they will connect to the AMI meter (directly or through a HAN gateway device) through ZigBee/SmartEnergy 2.0 wireless. However, SmartEnergy 2.0 standard is yet to be defined, thus both EVSEs/EV meters and AMI meters should be upgradeable to comply with SmartEnergy 2.0 when the standard is finalized.

In addition to this communication architecture, other paths such as cellular and internet-based networks may be needed in areas where the AMI network cannot reach or does not cover.

Every communication method has its applications and constraints. The Commission should allow utilities to choose the most efficient and cost effective method(s) for EVSE devices to communicate with the utility, including utility back offices. However, the communication paths should always be based on standardized communication protocols.

**3. What kinds of equipment and electrical improvements will typically be needed to support residential charging for PHEVs and BEVs, e.g., EVSEs, metering, electrical system upgrades? Who should pay for residential equipment and improvements required to support PHEVs and BEVs, and why?**

**PG&E Response:**

The requirements for equipment and electric improvements will depend on each consumer's charging choice: 120V (Level 1) or 240V (Level 2) charging. PG&E expects that consumers will overwhelmingly favor the more rapid 240V charging,

which, compared with 120V charging, puts higher requirements on EVSEs and is likely to require a home wiring upgrade.

If consumers choose to charge at 120V, they can plug electric vehicles into an existing dedicated 15A or 20A rated circuit, using a J1772™ approved cord set with an incorporated in-line EVSE device.

To charge in 240V, customers need to use a J1772™ approved EVSE, either wall-mounted or on a pedestal, and charge from a dedicated 240V circuit, which, as noted above, may require customers to upgrade their home wiring.

Considering the likely benefits of 240V and smart charging to all stakeholders, including those without electric vehicles, the Commission should encourage utilities to provide a streamlined EVSE installation and 240V home wiring upgrade solution in order to support and accelerate the adoption of electric vehicles.

**4. What policies should the Commission adopt to encourage competition and innovation in the market for residential infrastructure development for PHEV and BEVs?**

**PG&E Response:**

The Commission should adopt the following regulatory policies as soon as practicable in order to encourage competition and innovation in the development of residential electric charging infrastructure for PHEVs and BEVs:

a. Support the accelerated development of standardized and streamlined vehicle charging infrastructure protocols and technical specifications among electric vehicle manufacturers, electric vehicle retailers, electric utilities, and third-party electric charging providers. If possible, these standards should be national in scope and based on a consensus among the key participants in the manufacture, sale and support of electric vehicles, including vehicle manufacturers, utilities and third-party service and component providers. The consensus standards should be adopted not only by national standard-setting bodies, but also by the National Association of Regulatory Utility Commissioners and similar national associations of governmental agencies with regulatory jurisdiction over electric vehicles and vehicle infrastructure.

The Commission and other regulators must encourage universal plug-in standardization and a common means of payment accessibility for EV charging infrastructure. EV architecture should be open access and standardized across all consumer PHEV and BEV platforms to ensure universal access to charging and unimpeded use across utility and state boundaries. Modular approaches that offer a range of consumer feedback and upgrade capabilities will also allow consumers to choose an appropriate level of feedback from their at-home charging device (at minimum a "charging" and "fully charged" indicator), allow self-programmed upgrades as they grow more sophisticated in the day-to-day use of their EVs, and allow periodic technology upgrades through plug and play, minimizing the costs of upgrades to end-users.

b. Authorize utilities to make capital investments in electric vehicle charging infrastructure, including meters, submeters, external “bridging” communications devices, Electric Vehicle Service Equipment (EVSE), related wiring upgrades, back-office information technology (IT) and billing system hardware and software to support the infrastructure, and other equipment and devices needed to provide utility customers and vehicle owners with “end-to-end” convenient and efficient electric vehicle charging services. The capital investments should be recoverable in utility rate base. In order to ensure robust competition and innovation, the utilities should be required to demonstrate that they have procured this equipment and these devices on an open, fully competitive basis from unaffiliated vendors on a “least cost” basis, and that the equipment and devices are subject to “open standards” protocols to the maximum extent practicable, similar to the standards adopted for the utilities’ procurement and deployment of advanced metering infrastructure (AMI). The depreciation schedules for electric vehicle infrastructure investments should be accelerated enough to anticipate and encourage technological advances and improvements in the equipment and devices, but also long enough to incent utility customers to switch from gasoline-fueled vehicles to electric vehicles based on balancing the life-cycle costs of the investments to utility customers overall against the overall life-cycle societal, environmental and load-spreading benefits of the electric vehicles.

c. Provide expedited approval for time-variant electric vehicle tariffs and rate designs requested by electric utilities that incent electric vehicle owners to charge their vehicles off-peak, thus providing significant environmental, load shifting and cost-spreading benefits to utility customers in general.

d. Support local, statewide and national legislation as needed to standardize and streamline the building and installation permits required by utilities and third-party contractors and vendors to install and maintain electric vehicle charging meters, devices, and related equipment.

e. Assert the Commission's jurisdiction over both electric utilities and other electric vehicle charging service providers as necessary to ensure that electric vehicle charging equipment and devices meet uniform technical standards for safety, inter-operability and also do not adversely impact local distribution and transmission reliability. At the same time, apply light-handed regulation to non-traditional utility service providers so that those providers are free to competitively price their customer-side equipment and services offered beyond the utility's meter on a deregulated or "lightly regulated" basis, as long as they demonstrate that they do not have market power. The form of non-price regulation of non-traditional utilities would be similar to the manner in which the Commission currently oversees non-traditional utilities to ensure adherence to resource adequacy and maintenance standards.

Collectively, these immediate policies and regulatory actions would go a long way toward catalyzing the robust and unfettered initial development of a mass market for electric vehicles in California and across the country, while at the same time ensuring that electric vehicle charging services and equipment maintain and enhance the reliability and safety of the electric grid.

**5. Should the Commission consider allowing utilities to invest in and rate-base residential electric vehicle charging in order to encourage and support early adoption of PHEVs and BEVs? If so, what components of the infrastructure should the utility be authorized to invest in, e.g., wiring upgrades, EVSE? Should utility investment continue once the market matures? What impact might this**

**have on the competitive marketplace relating to electric vehicle charging infrastructure by non-utility entities?**

**PG&E Response:**

Yes, as discussed in the response to Question 4, the Commission should authorize utilities to invest in electric vehicle charging infrastructure, including equipment and devices such as meters, EVSE, and wiring upgrades, but subject to the "least-cost" competitive procurement of the equipment and devices from unaffiliated vendors on an open-standards basis. The utilities' recovery of their investment in rate base also should be subject to the ability of vendors to directly market devices and equipment to customers in competition with the utilities on the "customer-side" of the meter; i.e., beyond the metering, sub-metering, EVSE and Home Area Network (HAN) platform that are on the utility side of the meter and upstream from the customer. The utility investments should be subject to traditional review and regulation by the Commission, including the requirement that the utility demonstrate that the investment put into utility rate base provides overall benefits to customers in general; e.g., through reduced fixed or energy costs, increased environmental benefits, and/or increased societal benefits.

One of the keys to successful utility management of new loads associated with charging electric vehicles is the ability of both utilities and customers to control and track these unique loads. Equipment and devices that track usage and provide consumers and utilities with feedback on their electric vehicle charging profile and performs demand side management (DSM) functions can play vital roles including:

- Load control (staging, shedding, ramp up and down) to reduce end user costs, achieve grid reliability and intelligently charge EVs;
- Reward consumer behavior for optimal charging profiles through feedback;
- Track electricity used in transportation applications for purposes of tracking carbon credits, displaced petroleum, and estimate a wide range of social benefits.

Further, as outlined in the response to Question 20, load control at the distribution level will be essential to minimizing and managing impacts of initial neighborhood clusters of EV customers on the local distribution grid.

**6. If a utility proposes to own customer-premises EVSEs, how will the Commission ensure that near-term EVSE and metering capital investments are interoperable with future generations of PHEV and BEV technology?**

**PG&E Response:**

The Commission can require that EVSE equipment be compliant with the current draft versions of proposed industry standards such as SmartEnergy 2.0, SAE J1772™ and J2847, and have the ability to upgrade once these standards are finalized. However, as with other new consumer technologies, the early phases of market development may result in unanticipated shifts in the design and engineering of electric charging solutions, and render existing equipment obsolete earlier than expected. The Commission's ratemaking policies must be flexible enough to allow for accelerated obsolescence and adjust accordingly.

**7. What approaches are there to provide PHEV and BEV charging for owners who do not have regular access to a garage for residential recharging (including single family dwellings and multiple dwelling units (MDUs) like apartments, condominiums, and duplexes)? What regulatory issues does the Commission need to address relative to infrastructure for such residents?**

**PG&E Response:**

The Commission can and should encourage the installation of MDU charging equipment and infrastructure and provide incentives for property owners to install such infrastructure, using standardized metering and tariffs that take into account the tradeoffs already made for existing retail electric service to MDUs.

PG&E anticipates that a significant number of its customers who live in MDUs will purchase electric vehicles, and will therefore require electric charging services. MDU customers are a very important group and are the most challenging to serve for EV charging. PG&E is already considering and developing MDU charging solutions specific to these customers' particular parking and lifestyle attributes.

The MDU solution should have the following features:

1) Support multiple user accounts and build in access control;
2) Be able to send meter reading information, including energy consumption on each user account and aggregated energy consumption, to the utility and its billing and IT back office;
3) Have default charging profile for off-peak;
4) Allow customer ability to override their charging profile during EVSE connection;
5) Have ability to respond to demand response and load control command and control signals.

PG&E understands that the MDU scenario presents a classic incentive misalignment problem, where owners do not have the incentive to install new equipment or devices, and tenants will benefit from the installation but do not want to or cannot install it themselves. In order to align the interests of property owners and renters, PG&E is examining different initial strategies and incentives, such as making the cost of charging stations free or at a minimum cost and coordinating with other public agencies who regulate landlord-tenant relationships, in order to standardize EVSE installation requirements for new and existing MDUs.

**8. How can the Commission, in coordination with utilities, relevant state agencies, federal authorities, local governments, and other entities, streamline EVSE permitting, installation, and approval processes from the time of PHEV and BEV purchase to EVSE activation? What jurisdictional barriers should be assessed to achieve a streamlined permitting, installation, and activation process for residential EVSE?**

**PG&E Response:**

The most important action the Commission can take to streamline and expedite the permitting, installation and approval processes for electric vehicle charging equipment and devices is to encourage utilities, auto manufacturers, electrical contractors, local governments and equipment vendors to adopt standards and protocols

that give electric vehicle owners and utility customers a level of convenience and seamless operation equivalent to the "plug and play" standards that personal computer and home appliance manufacturers and retailers have achieved in the mass markets for their products. The Commission should also encourage and support coordinating the notification of PHEV/BEV purchases among auto manufacturers, utilities, and state and local agencies. The Commission itself can play a very pro-active role as a catalyst for standardization by using this OIR as a forum for all the key players in nascent EV markets to achieve a California-wide consensus on the required protocols and standards.

**Commercial and Public Charging Infrastructure and Policy**

**9. How should electricity used for PHEVs and BEVs be metered at commercial and public charging facilities?**

**PG&E Response:**

Metering arrangements at commercial and public charging facilities for PHEVs and BEVs should be based on the same principles applicable to other customers; e.g., based on the same HAN-enabled platform used for other customers. This standardized approach offers the following benefits:

- Convenience of auto-shifting charging to off-peak hours,
- Flexibility to manage load for reliability and safety,
- Information for customer and regulatory uses, and
- Two-way communication.

**10. Who should pay for commercial and public meters, EVSE, and related upgrades?**

**PG&E Response:**

Utility investments in meters, EVSEs and related upgrades should be recoverable in utility rate base because those investments provide environmental and load benefits to all customers. The depreciation schedules for electric vehicle infrastructure investments should be accelerated enough to anticipate and encourage technological advances and

improvements in the equipment and devices, but also long enough to incent utility customers to switch from gasoline-fueled vehicles to electric vehicles based on balancing the life-cycle costs of the investments to utility customers overall against the overall life-cycle societal, environmental and load-spreading benefits of the electric vehicles. The costs should be allocated to customers based on the overall benefits of supporting PHEV and BEV adoption.

Public meters should be treated the same as other utility investments, including meters provided by third party electric service providers who are selling electricity at retail and thus are public utilities. PG&E believes that the extent that these payments should be subject to the Commission's regulation should be evaluated in a separate phase of this proceeding, in which non-traditional third-party electric vehicle service providers can provide information to the Commission on the types and scope of equipment and services they propose to provide on a deregulated or "lightly regulated" basis. The Commission can then decide based on the public record the level of appropriate regulation that may be needed in order to ensure a balance among competition, electric system reliability and consumer protection.

**11. How should the Commission ensure that commercial and public charging facilities are cost-effective, openly-accessible, and interoperable with a Smart Grid system?**

**PG&E Response:**

PG&E believes that the Commission should regulate third-party electric vehicle service providers under Public Utility (P.U.) Code Sections 216 and 218. The appropriate level of regulation will need to include non-price regulation of the safety, inter-operability, and reliability of the providers' equipment and services. However, the Commission may consider requiring less than traditional cost-based regulation of third-party providers' pricing, as long as the providers demonstrate that they do not have market power in relevant product and geographic markets.

**12. Are additional building codes needed for residential, commercial and public charging facilities to supply sufficient electrical services to PHEVs and BEVs? What role, if any, can the Commission play in this regard?**

**PG&E Response:**

Current building codes are a hodgepodge of different requirements and processes across the utilities' service territories. The CPUC should participate at the CEC and with local government organizations to assist in the standardization and streamlining of building codes and permitting to facilitate the improvements needed to supply charging to PHEVs and BEVs.

**13. What policies should the Commission adopt to facilitate competition and innovation in the commercial and public infrastructure market?**

**PG&E Response:**

The Commission should establish its authority to regulate third party providers of electricity for electric vehicles and establish the standards needed for the regulation of the safety, inter-operability, and reliability of the providers' equipment and services. By setting this level playing field with respect to the criteria above, the Commission can establish the predictability and consistency needed to support innovation and universal electric vehicle support services in all electric vehicle markets.

**14. What issues need to be addressed related to the relationship between regulated electricity utilities and third-party electric vehicle service providers that are proposing and/or implementing charging services at residential, commercial and public locations?**

**PG&E Response:**

PG&E will provide utility service to third-party retail providers at time-variant rates. Further, special facilities or line extensions may be required and provided under

utility tariffs to third-party retail providers. To the extent that the third-party is selling electricity at retail, it is a retail utility under the Commission's jurisdiction.

**Legal Issues Related to the Ownership and Operation of Charging Infrastructure**

**15. Under what circumstances are third-party electric vehicle service providers public utilities and/or electrical corporations pursuant to Pub. Util. Code § 216 and Pub. Util. Code § 218? What implications do Pub. Util. Code § 216 and Pub. Util. Code § 218 have on the competitiveness of the third-party electric vehicle service provider market? If the Commission has jurisdiction over third-party electric vehicle service providers, what is the appropriate level of regulatory oversight?**

**PG&E Response:**

Under P.U. Code Sections 216 and 218, third-party electric vehicle service providers are public utilities and electrical corporations to the extent that a primary or significant component of the services or products they sell at retail is electricity. Because these providers are public utilities and electrical corporations, the Commission is required to regulate them in the public interest under the Public Utilities Code. However, the Commission has discretion to determine the level of regulation, both price and non-price, that should be applied to the providers if they are not already regulated as traditional public utilities or affiliates of public utilities. PG&E believes that the appropriate level of regulation will need to include non-price regulation of the safety, inter-operability, and reliability of the providers' equipment and services, but may not need to require the same level of traditional cost-based regulation of their pricing, as long as they demonstrate that they do not have market power in relevant product and geographic markets. The Commission's decision on the appropriate level of regulation should be subject to a separate phase of this proceeding, in which non-traditional third-party electric vehicle service providers can provide information to the Commission on the types and scope of equipment and services they propose to provide on a deregulated or "lightly regulated" basis. The Commission can then decide based on the public record the level of appropriate regulation that may be needed in order to ensure a balance among competition, electric system reliability and consumer protection.

**16. What statutory changes, if any, should the Commission propose to the legislature to encourage innovation and competition in the charging infrastructure market?**

**PG&E Response:**

None at this time. PG&E believes that the Commission's existing authority and discretion under the Public Utilities Code are sufficient to strike an appropriate balance between regulation and market competition in order to encourage innovation and consumer protection in electric charging infrastructure markets.

**Codes and Standards**

**17. Please identify current and pending Society of Automotive Engineers vehicle design and interface technical requirements, the Underwriters Laboratory listed components and systems, and the National Electric Code, California Electric Code, and California Building Code Regulations that govern the installation, operation, and maintenance of charging infrastructure at the residential, commercial, and public charging EVSE. How does the timeframe for each code and standard adoption impact current and future vehicle and EVSE products? What role, if any, can the Commission play in improving or encouraging this process?**

**PG&E Response:**

- J1742; Connections for High Voltage On-Board Road Vehicle Electrical Wiring Harnesses
- J1766; Recommended Practice for Electric and Hybrid Electric Vehicle Battery System Crash Integrity Testing
- J1673; High Voltage Automotive Wiring Assembly Design
- J1772; Electric Vehicle and Plug In Hybrid Electric Vehicle Conductive Charge Coupler
- J1797; Packaging of Electric Vehicle Battery Modules
- J1798; Performance Rating of Electric Vehicle Battery Modules

- J2293; Energy Transfer System for Electric Vehicles
- J2344; Guidelines for Electric Vehicle Safety
- J2836; Use Cases for Communication between Plug-in Vehicles and the Utility Grid
- J2847; Communication between Plug-in Vehicles and the Utility Grid
- J2894; Power Quality Requirements for Plug-In Electric Vehicle Chargers
- UL 2202; Electric Bus Charging System Equipment
- UL 2231; Personnel Protection Systems for Electric Bus Charging Circuits
- UL 2251; Plugs, Receptacles, and Couplers for Electric Vehicles
- NEC/NFPA 70 Article 625; Electric Vehicle Charging System Equipment
- California Building Standards Code, Title 24, California Code Of Regulations (CCR), Part 11, California Green Building Standards Code; A406.1.5.2.1 Electric vehicle supply wiring

Major efforts are currently underway to review and update the key codes and standards that will be needed to support the rollout of new electric vehicles in the coming months. The key standard, SAE J1772™ will be balloted in the coming weeks and should be approved by late this year. This would allow for vendors to begin design and testing of approved couplers to support the need for new infrastructure.

The Commission can support this standardization effort by recognizing the role the electric utilities have in advancing the safe and efficient charging of electric vehicles and the importance of being involved in the standards development process to champion the needs and requirements the utilities have when providing clean energy to this new market sector.

**18. How important is consumer choice as to Charging Levels ((Level 1, 2 or DC)? If important, how may the Commission best balance driver and grid benefits for all residential, commercial, and public charging infrastructure?**

**PG&E Response:**

Level 1 (120V AC) or convenience charging is readily available to all consumers provided that they have the proper cord set to reach any nearby 110V outlets rated at least for 15 Amps.

What is important to consumers is that they are able to charge their EVs quickly; at least within the time their EV is not in use and parked at home or at work. We expect Level 2 (240V AC) charging will be capable of accommodating this expectation since the maximum charging rate has been increased from 32 Amps to 80 Amps. This gives the user more options on choosing charging rates and installing the necessary infrastructure at home, where the majority of charging is likely to occur. Considering planned PHEV/EV battery pack capacities (8 - 53 kWh), a 7 hour off-peak window (midnight to 7am) will provide ample time in most cases for staging the onset of charging, numerous vehicles charging on the same circuit, strategic DSM events and smart charging approaches (regulation down to charge and providing ancillary services, for example).

It is premature to evaluate the feasibility or safety of Level 3 fast charging equipment (600V DC at a 400 Amps charging rate) because such charging may require large investments in infrastructure and load management constraints in order to prevent "mini-peaks" and localized impacts on grid reliability. Because of the expense, safety and management challenges associated with Level 3 fast charging, PG&E expects that EV markets will focus on Level 2 charging, at least until further evolution occurs in charging technologies.

**19. What role can the Commission play to ensure EVSE compatibility with a unified EVSE conductive charge coupler standard (J1772) for all residential, commercial, and public charging EVSE within regulated utility service territories? What role can the Commission play to ensure that EVSE be forward-compatible with emerging Society of Automotive Engineers loads, messages, and programs communication standards (J2293, J2836, and J2847)?**

**PG&E Response:**

The Commission should continue its support of the utilities' role in codes and standards development. PG&E currently chairs the EPRI infrastructure working council (IWC) charged with supporting codes and standards development for the emerging electric vehicle market. All work being done by these groups and supported by utilities across the country are focused on common standards and the need to guarantee interoperability.

The IWC has been productive and continues to make progress. To date, the IWC has been instrumental in making needed changes in NEC article 625 in the last code revision cycle to allow two-way energy flows, and is currently working on the next phase of NEC revisions for 2010. All proposed changes are key safety issues that need to be addressed. PG&E is also very active and working on the SAE task forces referenced to support the utilities position of safe and efficient charging of EVs while minimizing grid impacts.

The focus on standards is important, and the Commission can work with the CEC and California Air Resources Board (CARB) to require that any new infrastructure that will be funded by State funds must be SAE J1772 compliant. Also, any utility-based incentives can be based on compliance with SAE J1772.

**Electrical System Impacts**

**20. What are the potential electrical distribution system impacts associated with geographically concentrated PHEV and BEV charging in the near-term? How will utilities anticipate these impacts and make capital investments needed to ensure service network reliability? How should the utility capital investments be paid for and recovered?**

**PG&E Response:**

The magnitude of the potential electrical distribution system impacts associated with geographically concentrated PHEV and BEV charging are not precisely known at this time. However, the basic impacts can be broken up into two areas. These areas are:

*1) Primary Distribution System*

The Primary Distribution System includes the substation transformer banks and main feeder lines serving distribution customers in a relatively large geographic area (a few to several thousand customers in an area). PG&E's analysis is currently ongoing both internally and with EPRI. However, the preliminary analysis shows that the impacts associated with Level 1 (120V AC) and Level 2 (240V AC) charging on the distribution primary system are expected to be relatively small, at least initially based on the currently available information about charging technology and the associated demand. However, given the nascent state of this technology, it is difficult to know whether the current information and assumptions are valid or will change. The primary distribution system assessment has not yet included Level 3 (600V DC, 400 amps) high impact charging stations. High impact charging stations would include stations that support drive-up, short duration charging at voltage levels currently not handled by most consumers.

The ultimate impact on the primary distribution system will likely be based upon five significant drivers; 1) the time of day customers return home from work and plug in their vehicles, 2) the distance a customer drives and the amount of energy necessary to recharge their vehicle, 3) the size of the vehicle battery, 4) the likely charging system capacity (120V or 240V), and 5) the potential impact of pricing on customer behaviors. On average, the best information available indicates that the average charging demand for all electric vehicles is 0.7kw, which is significantly less than the full peak charging demand of 1.7-15 kw for one electric vehicle due to the diversity of the five factors described above across the area served by the primary distribution system. Based on the available information, PG&E expects the impacts at the primary distribution system levels to be similar to normal demand growth, at least initially. However, there is a great deal of uncertainty in this currently available information.

*2) Distribution Line Transformers, Secondary and Services*

The impacts of electric vehicle charging are expected to be much more pronounced at the distribution line transformer, secondary and service level immediately as electric vehicles go into service. Engineering analysis at this lower level in the distribution system is also ongoing to determine system impacts more precisely.

However, significant impacts can be expected. These impacts are driven by the number of vehicles connected to the system, whether the electrical system in the house was designed to support air conditioning, whether the vehicle will charge at the same time as when the air conditioning is in use, whether a customer has more than one PHEV/BEV, or whether neighbors also have such vehicles charging at the same time. PG&E is conducting further analysis to understand the potential operational and cost implications. Customer-by-customer analysis will be required, at least initially, to assess the specific changes and the associated costs. Current tariff treatment would have any service upgrades treated as a new business type-application (at least when PG&E is made aware of the added load). This type of application is normally a shared cost arrangement between all customers and the individual customer adding the load. Any work upstream of the service (secondary or transformer) normally would not be charged to the individual customer adding the load.

**21. What commercial and public infrastructure options are most likely to be deployed, e.g., Level 1 charging facilities, Level 2 charging facilities, "service station" model DC charging facilities, and/or battery swap stations? Should the Commission adopt policies to favor certain charging options taking into consideration cost-effectiveness, grid benefits, ability to meet PHEV and BEV driver charging demand, and ability to reduce BEV driver "range anxiety"?**

**PG&E Response:**

It is not known at this time what commercial and public infrastructure options may be deployed and the implications of that deployment. However, as PG&E noted above, public charging options are subject to constraints regarding the feasibility, safety, availability and cost of Level 3 (600V DC) fast charging infrastructure and customer preference for minimal delay in charging away from a home or commercial parking garage.

While it is very early in the market emergence to predict which charging approaches will become dominant, Level 2 (240V AC) public charging at workplaces and public transit hubs (BART) appears to be potentially viable.

**22. What potential load shape impacts associated with PHEV and BEV charging should utilities anticipate in the near-term? How can time variant pricing, demand response programs, and advanced meters mitigate load spikes associated with uncontrolled, simultaneous charging found to occur at specific times of day, for example, when drivers arrive home from work? How should the Commission address potential load spikes if a large number of customers begin charging simultaneously when lower electricity rates apply under TOU rate schedules?**

**PG&E Response:**

PG&E expects that PHEV and BEV charging will change customer load factors and load duration curves regardless of the implementation of pricing or demand reduction programs. However, PG&E believes that moving electric vehicle charging to off-peak hours through various means is important for the following reasons:

- Costs to all customers are minimized by reducing the need for new peaking generation;
- Generally lower costs for off-peak energy procurement;
- New T&D system upgrade costs may be lowered if additional peak demand can be avoided;
- Customer reliability impacts are minimized; and
- Greenhouse gas emissions may be further reduced due to greater use of off-peak resources with lower emissions.

Load control strategies may be necessary to manage potential load spikes if a large number of customers begin charging simultaneously when lower electricity rates apply under TOU rate schedules. See PG&E's Response to Question 5 for further detail.

**23. In the long term, what are the benefits and drawbacks on electric generation and transmission associated with projected PHEV and BEV market growth in California?**

**PG&E Response:**

The benefits are that PHEV and BEV charging may be beneficial in situations where excess off-peak power is generated and cannot currently be used. Even when there is no off-peak power generated in excess of load, PHEVs/BEVs can add contribution to margin that can benefit all ratepayers. The drawbacks are that PHEV and BEV charging could increase peak demand resulting in higher overall customer costs, reduced grid safety and reliability, and greater environmental impacts from electricity generation if not carefully managed.

**Tariff-related**

**24. Should the Commission authorize a default time variant electric vehicle rate applicable to all residential electric vehicle tariff customers? What changes, if any, to the rate protection provisions of AB-1X are needed to authorize a default time variant electric vehicle rate applicable to residential customers?**

**PG&E Response:**

Yes. The Commission should consider a time-variant rate as a mandatory or default rate schedule for electric vehicle charging customers to encourage vehicle charging in the off-peak.

Electric vehicle charging represents a new and substantial increase in residential load. In addition, the substantial load increase resulting from electric vehicle charging has the potential to result in lower efficiency, higher GHG emission generating units to be used to meet peak load if electric vehicle charging occurs during peak or partial-peak periods.

In light of the need to shift electric vehicle loads off-peak, PG&E is considering proposing to close its currently available electric vehicle tariff and replace it with either a new time-of-use whole house electric rate schedule or a separate electric vehicle-only tariff. Neither of these approaches would require changes to the AB1X rate protections.

Under current residential tiered rate structures, electric vehicle charging load has the potential to result in substantial residential customer usage in the more costly upper tiers of residential rate schedules. The cause is two-fold: 1) increased usage and 2)

baseline quantities established based on domestic usage that does not include vehicle charging. This can create a strong disincentive for residential customers to purchase electric vehicles.

If vehicles can be separately metered, though, this disincentive can be avoided. Separately metered vehicle-only tariffs can be developed that have time-variant rates but no tiers, which provide more accurate price signals to customers and also are much easier for customers to understand. The tiered rate structure consistent with AB1X would still apply to the primary house meter (with all loads other than the electric vehicle).

If separate metering proves to be technically or economically infeasible and whole-house metering is necessary, one possible solution to address 'the AB1X issue' is to specify a limited number of off-peak kilowatt-hours (kWh) that would be charged a flat off-peak rate and would not count towards the baseline quantities. This limited kWh quantity would be derived from information on customers' average charging loads. However, vehicle charging loads vary significantly depending on vehicle type, charging capacity and miles driven, thus complicating the calculation (i.e., some customers would get too many kWh at the flat off-peak rate while others would get too few).

**25. What rates should apply to customers charging their PHEVs or BEVs at commercial, industrial, and public charging facilities that are in the same service territory as their home utility?**

**PG&E Response:**

All non-residential customers are expected be on a mandatory TOU rate schedule by 2012 under the provisions of Decision (D.)08-07-045. As discussed in response to Question 24 above, a new TOU vehicle-only rate might be appropriate, perhaps accompanied by market price signals and/or demand response and load control requirements.

The location of a charging facility in relationship to the service territory of a PHEV or BEV owner's home utility is irrelevant to the question of what rate class should apply to vehicle charging. All customers charging a PHEV or BEV at a given

public charging facility should pay the same rates regardless of the location of their home or business.

**26. What rates should apply to third-party operators of commercial charging facilities? Should the Commission establish new rates for commercial charging facilities taking into account the costs and benefits created by these entities?**

**PG&E Response:**

As a general matter, electric service to commercial, industrial, and public charging facilities is appropriately provided within the existing commercial or industrial rate classes. PG&E recommends that the Commission focus in this proceeding on establishing appropriate rate structures for energy service to commercial (and residential) vehicle charging loads, regardless of where the charging occurs.

**27. How should a customer pay when charging a PHEV or BEV in another utility's service territory? Please evaluate options set forth below, or suggest alternative approaches:**

**a. A customer pays a posted price for electricity to a specific electric charging provider at the time of the transaction, similar to how gasoline is purchased.**

**b. The second utility bills the customer's home utility and the home utility adds the electric vehicle electricity cost to the customer's energy bill. A third-party clearing house could facilitate these transactions.**

**d. A customer has a relationship with a third party charging provider and pays that third party wherever the customer charges.**

**e. A customer has a choice of all or some of the above options.**

**PG&E Response:**

a. Using the existing gasoline station model, pay via cash or credit card. A recharging facility may choose to offer differing price points depending upon factors such as charge voltage or time required to effect recharge.

b. No. This model is overly complex and appears to yield little value for what is likely to be moderate costs comparable or less than the gas station alternative.

c. Note that no "option c" was included in the question.

d. Yes. This model appears to be the same as option a.

e. No. Option b is too complex and, therefore, expensive.

**28. What types of costs and benefits are generated by electric vehicle adoption on different aspects of the electricity system, including transmission, distribution and procurement costs?**

**PG&E Response:**

See response to Question 20.

**29. Should the electric vehicle rate structure be designed to align rates with the system costs and benefits of PHEVs and BEVs, and if so, how? Should the Commission assign additional costs and benefits attributable to PHEVs and BEVs to specified electric vehicle rate classes or socialize the costs and benefits attributable to PHEVs and BEVs to all customer classes? Should the PHEV and BEV rate classes bear existing rate component costs?**

**PG&E Response:**

If separate metering is feasible, the electric vehicle-only rate should be time-variant without tiers in the off-peak period to provide cost-based rates that provide customers considering a PHEV or BEV with accurate price signals with which to compare costs relative to gasoline-powered vehicles. If separate metering is not feasible, default time-variant whole-house rates should apply to provide incentives for customers to charge during off-peak hours. A whole house electric vehicle rate may not need to have tiers in the off-peak if such a rate can be designed in a revenue neutral manner.

Residential PHEV and BEV should include the same rate components as the residential class generally. Similarly, non-residential rates should include the same rate components as otherwise applicable electric rate options.

**30. Should the electric vehicle rates reflect the marginal cost of service, particularly for off-peak electricity charging and, if so, how?**

**PG&E Response:**

Yes, the electric vehicle rates for incremental electric vehicle charging should be designed to be time-variant to reflect different marginal costs at different times of day. However, as a general matter, marginal cost pricing should be a goal rather than a mandate, given the difficulties inherent in calculating actual marginal cost.

**31. Should rate incentives be created for electric vehicles to be paired with distributed generation incentive programs, such as the California Solar Initiative (CSI) and Self-Generation Incentive Program? Should rate incentives be created for electric vehicles to be paired with demand response programs? How should these incentive programs be incorporated into electric vehicle rate structures? Who should pay for such incentives?**

**PG&E Response:**

PG&E believes this question merits further evaluation and investigation. Many demand response programs may be incompatible with generally motivating customers to charge in the off-peak. For example, customers may have an incentive to charge on-peak if a Peak Time Rebate event is anticipated in the near future. To the extent that off-peak charging may be compatible with a Demand Response (DR) program, customers utilizing their electric vehicle to participate in demand response should receive incentives for participation comparable to the incentives provided to demand response program participants in return for their participation in the current program.

**32. Under what circumstances can utilities and third parties aggregate PHEV and BEV services to participate in California Independent System Operator (CAISO) ancillary service markets? What policies, if any, does the Commission need to consider in this regard?**

**PG&E Response:**

It is premature to determine whether electric vehicle charging equipment, devices and tariffs can successfully evolve so as to provide ancillary services in reliability and resource adequacy markets. Under the recent decision in the 2009-2011 Demand Response Programs proceeding, PG&E is undertaking a pilot program to begin investigating this question.

**Low Carbon Fuel Standard**

**33. What recommendations, if any, should the Commission make to the California Air Resources Board regarding the treatment of electricity under the Low Carbon Fuel Standard?**

**PG&E Response:**

The Commission should make the following recommendations to the California Air Resources Board regarding the treatment of electricity under the Low Carbon Fuel Standard (LCFS):

First, the LCFS should be amended to ensure that LCFS credit value in the electricity sector is used to minimize consumer costs and to ensure environmental integrity. The most effective way to meet this objective is to return electric fuel credit value to electric utility customers through their regulated utilities under the supervision of the Commission. The current LCFS proposal to allocate credits to third parties with no requirement that the credit value be passed through, dollar for dollar, to electricity consumers, provides no assurance that this goal would be met.

Second, the LCFS should be amended to acknowledge and address the fact that electric fuel used in PEVs and BEVs will increase statewide electricity consumption and the greenhouse gas (GHG) emissions associated with that consumption. Those

increased GHG emissions will result in higher electricity costs, which electricity customers will bear through increased rates, even though society on a net basis will enjoy lower overall GHG emissions due to reduced transportation sector emissions. To offset these increased costs, the LCFS should be amended to provide that the value of LCFS credits in the electricity sector will be returned to electric utility customers through their electric utility provider, and that any remaining net increased costs due to increased electric sector emissions under the LCFS will be addressed through allocation of GHG allowances under AB 32's cap and trade program. The current LCFS proposal to give credits to third party electricity providers offers no guarantee that electricity consumers, who ultimately bear the costs of providing electric fuel, will be able to offset their increased costs under the LCFS with the value of the LCFS credits that are generated in the electricity sector.

Third, the LCFS should be revised to ensure that it is not inconsistent with or in conflict with broader public policy issues being considered in other regulatory or legislative forums. In particular, the Commission's OIR will address (a) the treatment of electricity and electric fuel provider credits under the LCFS; (b) public policies that should be considered to encourage competition and innovation in electric vehicle markets; and (c) the status of electricity fuel providers as regulated utilities subject to the CPUC's pricing and sales regulation under the Public Utilities Code. In addition, Congress in the American Recovery and Reinvestment Act as well as in climate change and other pending energy legislation is providing specific incentives and financial assistance for electric vehicles and electric vehicle infrastructure, and these legislative and financial incentives should be taken into account by the LCFS. For these reasons, the LCFS proceeding should remain open so that the LCFS can be adjusted to take into account recommendations by the CPUC in its alternative vehicles rulemaking, as well as actions by Congress on national climate change and energy legislation.

Currently, ARB staff recognizes third party, public charging subscription service providers as eligible to receive LCFS credits for electricity sold through charging infrastructure they provide. The LCFS is a fuel standard, not an infrastructure standard and Load Serving Entities (LSEs) are responsible for offsetting the carbon cost associated with grid sourced electricity. The LCFS credit is intended to both offset the

carbon cost of and reward the use of electricity in the transportation sector. LSE's should receive any LCFS credits associated with the sale of electricity as a transportation fuel for the purpose of passing through the value to all ratepayers in the interest of keeping electric rates as low as possible. There is no guarantee that third parties will pass credit values through to end-users--one party suggests it will retire credits, an approach that would drive up the cost of transportation fuels by limiting the pool of credits in play.

A remedy for the Commission to consider is to include the cost of carbon in rates charged to third party charging service suppliers; this will have the effect of redirecting the LCFS credit value to the ratepayers that bear the cost for offsetting the carbon in electricity in the first place.

**34. If a utility generates and sells credits under the Low Carbon Fuel Standard regulation due to customers' use of electricity as a transportation fuel, what should the utilities do with the revenue from the credits?**

**PG&E Response:**

The revenue should be returned to customers or used for the direct benefit of customers under the supervision of the Commission, or (in the case of local publicly-owned utilities) under the supervision of the governing body of the utility. A secondary benefit of passing through the value of LCFS credits to ratepayers is that it will help keep electric transportation fuel costs low relative to displaced higher carbon fuels (RFG gasoline and ULSD diesel). Maintaining a wide gap between baseline fuels and electricity is a beneficial price signal and incentive to encourage the shift in transportation fuel demand. LCFS credit values can be applied to hold customer rates down and to mitigate costs associated with incremental load growth and the distribution circuit upgrades needed to accommodate that load growth and maintain system reliability.

**Programs and Incentives**

**35. Should utilities and/or government provide low-interest finance incentive programs for residential and commercial EVSE? Should these programs incorporate tax incentives available through the American Recovery and Reinvestment Act (ARRA) of 2009?**

**PG&E Response:**

Utilities can provide appropriate incentives through time-variant rates and streamlining access to appropriate charging and metering equipment. In addition, there are currently federal and state tax incentives and other forms of direct and indirect assistance for the development of electric vehicle markets. The role of the government is to address further incentives if necessary.

**36. Should utilities and/or government provide incentives that encourage customers to purchase higher-efficiency electric vehicles rather than less efficient electric vehicles, and if so, how should the incentives be structured?**

**PG&E Response:**

Time-variant tariffs will provide some incentive for customers to purchase higher-efficiency vehicles. However, as noted in the response to Question 35, there are currently existing federal and state tax incentives and assistance programs, and the relatively higher price of gasoline to electricity should also drive customers in their selection of vehicles. The government will determine if further incentives will be necessary.

**37. How should the Commission ensure that any policies developed related to electric vehicles provide a level playing field for transportation fuels and technologies?**

**PG&E Response:**

Commission policies should be supported by the overall costs and benefits of the technologies adopted by utilities. Comprehensive policies support the market in choosing the appropriate fuels and vehicles.

**38. How could electric vehicle adoption impact other Commission policies and initiatives including the Renewable Portfolio Standard, the Long-Term Energy Efficiency Strategic Plan, energy efficiency goals, and zero net energy homes goals?**

**PG&E Response:**

Customer adoption of electric vehicles provides an opportunity to reduce carbon emissions from gasoline use. However, as new load, additional PHEV sales will require additional RPS procurement, which in turn increases customers' costs. The Commission may want to consider ways to provide credit for CO2 reductions in implementing RPS and GHG policies (e.g., exempt new PHEV sales from the 33% RPS requirement, translating CO2 reduction into equivalent kWh of RPS, or other methods).

For the other three initiatives mentioned above (Long-Term Energy Efficiency Strategic Plan, energy efficiency goals, and zero net energy homes goals), electric vehicles were not part of the discussion. After the Commission gathers further information about electric vehicles, these initiatives can be looked at again and harmonized with electric vehicle issues. These interactions can be tracked for now, but there's nothing to hinder the Commission to move forward on addressing the electric vehicles issues. In addition, energy use for PHEVs/BEVs has not been sufficient for these issues to become a part of the energy efficiency discussions yet.

Energy efficiency goals have been considered in the context of the historical uses of electricity and natural gas. The use of either in transportation did not play a role in the setting of the goals. Any adjustment to these goals should occur after the Commission sets its policies in this OIR.

**Education and Outreach**

**39. What entities and programs best facilitate customer outreach and education regarding convenient and timely EVSE installation options and customer tariff education to ensure awareness of off-peak versus on-peak charging costs?**

**PG&E Response:**

PG&E believes the utilities are the best positioned to facilitate customer outreach and education programs on the electric charging support services and tariffs that will be available to support electric vehicle charging. The utilities already have in place customer outreach and education programs for customer-specific programs and tariffs that can be leveraged and used to educate and facilitate customer outreach on new electric vehicle tariffs and charging services. This outreach will need to address the need to coordinate the purchase of PHEV/BEVs with necessary internal customer wiring upgrades and utility system upgrades to support the customer's charging choice. However, the Commission will need to review and authorize these programs and the mechanism for utilities to recover the costs of the programs.

**Scope**

**40. Should the Commission consider natural gas vehicles as part of this rulemaking, or consider natural gas vehicle issues through utility filed Application(s) and/or Advice Letter(s)? What are the near-term tariff, infrastructure, incentive programs or other issues that the Commission should address with respect to natural gas vehicles?**

**PG&E Response:**

PG&E does not object to considering natural gas vehicle policies as part of this rulemaking. PG&E would like to consider the views of other interested parties, including natural gas vehicle manufacturers and retailers, before making recommendations on near-term tariff, infrastructure or incentive programs that may need to be addressed.

**41. Should the Commission consider medium-duty electric vehicles, heavy-duty electric vehicles, and off-road electric vehicles as part of this rulemaking? If so, what issues specific to these vehicles should the Commission consider?**

**PG&E Response:**

The Commission's ruling with respect to rates and infrastructure for PHEVs and BEVs should apply equally to services provided to customers charging light-duty electric vehicles, medium-duty electric vehicles, heavy-duty electric vehicles, and off-road electric vehicles.

**42. What other issues should the Commission consider in this rulemaking? What are your recommendations regarding those issues?**

**PG&E Response:**

See Executive Summary and Scope, Schedule and Other Procedural Recommendations, above.

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## V. CONCLUSION

PG&E looks forward to working with the Commission and other interested parties to implement the recommendations and policies contained in these comments.

Respectfully Submitted,
CHRISTOPHER J. WARNER

By: /s/
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Dated: October 5, 2009

CERTIFICATE OF SERVICE BY ELECTRONIC MAIL OR U.S. MAIL

I, the undersigned, state that I am a citizen of the United States and am employed in the City and County of San Francisco; that I am over the age of eighteen (18) years and not a party to the within cause; and that my business address is Pacific Gas and Electric Company, Law Department B30A, Post Office Box 7442, San Francisco, CA 94120.

On the **5th day of October 2009**, I served a true copy of:

**COMMENTS OF PACIFIC GAS AND ELECTRIC COMPANY**

[**XX**] By Electronic Mail – serving the enclosed via e-mail transmission to each of the parties listed on the official service list for **R.09-08-009** with an e-mail address.

[**XX**] By U.S. Mail – by placing the enclosed for collection and mailing, in the course of ordinary business practice, with other correspondence of Pacific Gas and Electric Company, enclosed in a sealed envelope, with postage fully prepaid, addressed to those parties listed on the official service list for **R.09-08-009** without an e-mail address.

I certify and declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

Executed on this **5th day of October 2009** at San Francisco, California.

/s/
*Rene Anita Thomas*

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Last Updated: October 2, 2009

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# THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA SERVICE LIST

Last Updated: October 2, 2009

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