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California Energy Commission
DOCKETED
12-EPIC-1
TN # 66711
AUG 16 2012

California Energy Commission
Dockets Office, MS-4
Re: Docket No. 12-EPIC-01
1516 Ninth Street
Sacramento, CA 95814-5512
Dockets@energy.ca.gov

August 16, 2012

STAKEHOLDER COMMENTS
of
COULOMB TECHNOLOGIES

FIRST TRIENNIAL INVESTMENT PLAN
ELECTRIC PROGRAM INVESTMENT CHARGE (EPIC) PROGRAM
California Energy Commission
California Public Utilities Commission

INTRODUCTION and OVERVIEW

Coulomb Technologies appreciates this opportunity to provide comments to the California Energy Commission and the California Public UtilityCommission for the First Triennial Investment Plan for the Electric Program Investment Charge (EPIC)Program. This program provides an opportunity to support the development and deployment of next generation clean energy technologies—specifically in the area of electric vehicle charging and grid integration.

Coulomb Technologies is a California based manufacturer and network services provider for electric vehicle services equipment (EVSE). Coulomb maintains the largest network of independently owned charging stations in the world and has developed the most sophisticated software platform to develop grid management services to support the integration of electric vehicles on the grid.

Founded in 2007 in Silicon Valley, Coulomb's mission is to ensure that people don't hesitate to buy EV's because they are concerned about charging their batteries. ChargePoint stations currently dispense over 600 Megawatt hours (MWh) of electric fuel each month; the annual equivalent of 1,500,000 gallons of gas avoided and 23 million lbs of Co2 emissions prevented. Drivers pluginto a ChargePoint station more than 3,200 times every day.

Coulomb has deployed more than 8,600 non-residential charging spots serving drivers while they are away from their home garages. More than 60% of the charging infrastructure is in California, including residential, MDU, workplace and public locations.

California has been at the forefront of policies that have embraced and encourage Electric Vehicle deployment and innovation technologies to support EVs by providing strong leadership, regulatory clarity and funding for manufacturing and deployment. California has become and will remain the preeminent market for electric vehicles.

Coulomb Technologies has partnered with the California Energy Commission to successfully deploy EV Charging infrastructure in California under the AB 118 program. We have developed manufacturing capabilities to enhance the software capabilities of the network in partnership with the Energy Commission under AB118. In addition, we have actively been engaged with the California Public Utilities Commission since May of 2009 to support the ground breaking policy decisions that have defined the terms of operation and rules of engagement for Electric Vehicle Service Providers in the State of California. These decisions include the Phase I OIR 09-08-009 "to consider Alternative Fuel Vehicle Tariffs, Infrastructure and Policies to Support California's Greenhouse Gas Emissions Reductions Goals" as well as the Phase II decision "to address other policies to overcome barriers to widespread use of electric vehicles and a policy approach that makes optimal use of this regulatory authority to achieve these goals."

The newly constituted EPIC program will be a critical resource to bring together the investment expertise of the CEC with the policy leadership of the CPUC to address the GAPs in R&D funding priorities and realize the enormous benefits that Electric Vehicles to the electrical grid.

We respectfully submit the following input for funding priorities to address the GAPS in Electric Vehicle Charging and Grid Integration.

FUNDING RECOMMENDATIONS

- Providing funding for funding areas that support the "next horizon" of EV issues by organizing a stakeholder Vehicle Energy ServicesCouncil
- Provide funding for third parties to develop and demonstrateenergy management capabilities for EVSE independent ofutility AMI networks and Smart Energy Profile 2. It's our contention that this should not be the exclusive, or even preferred way of signaling DR, Frequency Regulation, and TOU control to EVSE. Indeed we can demonstrate that these Smart Grid capabilities will move to market much, much faster without the requirement to use SEP2.
- Support for EVSE capabilities to provide ancillary grid services such as grid frequency regulation using electric vehicle charging, by developing and demonstrating a prototype

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electric vehicle charging systemthat will perform grid frequency regulation. This will help avoid blackouts and brownouts on the energy grid. It will also help facilitate the integration of renewable energies onto the grid.

- Support EV "Customer-Side Electricity Storage Projects" such as energy storage for peak load reduction, energy storage for load management or demand response and energy storage for integration of renewable generation that would utilize electric vehicles in a micro-grid demonstration and show the way to avoid demand charges in the rollout of high power vehicle charging.
- Support reduction of costs for ratepayers in EVSE deployment by funding the development of a submeter protocol and certification of submeters in the EVSE to make embedded meters a reality pursuant to the CPUC Phase II decision.

PROJECT SUMMARIES AND FUNDING AREAS

I. EV Energy Services Council (Market Facilitation-$15M/year)

The potential for Electric Vehicles to participate in various grid services markets – and thereby provide substantial additional revenue to vehicle owners -- has been well documented. Beginning in the 2001-02 period, the California Energy Commission and the California Air Resources Board have sponsored seminal studies of "Vehicle-to-Grid" (V2G) services, demonstrating that several hundred thousand California vehicles could participate in high-value energy services markets, such as Frequency Regulation, and thus potentially earn Energy Servicesrevenue of approximately $1,000 - $3,000 per vehicle per year. If fully realized, this revenue stream could substantially defray the high costs of Plug-in Electric Vehicles (PEV). With appropriate financing, EV Energy Servicesrevenues could lead to significantly lower up-front purchase price for PEVs and charging infrastructure, in addition to their lower operating costs. This "double-advantage" could provide the "tipping point" toward mass PEV adoption that is crucial for California to achieve its AB 32 goals for emissions reduction.

While the potential for Energy Servicesrevenue flow to PEV owners is substantial over the long-term (7-10 years), virtually all stakeholders agree that EV Energy Servicesmarket development will only occur in the near-term (2-5 years) *with a coordinated multi-stakeholder initiative.* Given the importance to the overall EV ecosystem of accelerated EV Energy Servicesmarket development, stakeholders in the Council would propose to:

- Accelerate development of the technical, commercial, and regulatory architecture needed to fully commercialize EV Energy Servicestransactions in California in the 2012-2013 timeframe, and to
- Ensure that currently planned and new investments in EV charging, communications, and metering infrastructure are EV Energy Servicescompatible to the maximum feasible extent and appropriate.

II. Interdependence of DR and AMI Networks (Technology Demonstration and Deployment $45M/year)

In Coulomb's five years of experience of working in the EVSE industry alongside utilities we have observed their preference for managing EVSE via the AMI network and Smart Energy Profile 2, especially for implementing Demand Response. It's our contention that this should not be the exclusive, or even preferred way of signaling DR controls to EVSE.

Alternative

We believe that an alternative architecture is not only possible but is superior to the AMI implementation. That alternative is to implement DR within an already necessary EVSE management network. Using independent networks for implementing DR has a successful history. It's used commonly to manage air conditioners as specific loads but also frequently within corporations to manage a variety of loads. We've analyzed networks in use internally at organizations like Google and Santa Clara University. These organizations have built their own signaling system for their loads, independent of AMI. They work well and have for several years. On the other hand there is not such a track record for implementing DR via AMI in commercial projects. In fact, tying DR to SEP2.0 has essentially inhibited the rollout of DR services.

Inadequacy of AMI network for shared EVSE functions

Most of the functions developed by the "smart charging" EVSE network providers are not appropriate for an AMI network. Functions like credit card clearing need to be processed within a few seconds. The AMI network is designed for longer latency applications like meter reading. Whereas Demand Response can work on an AMI network, other functions like credit card clearing cannot. Most utilities will agree that they do not want traffic for credit card processing, reservations, EVSE status, and other such functions to be intermixed with their AMI traffic.

Consequently there will be EVSE Networks

Since several of these functions cannot be done by the AMI network and yet need to be done, there are EVSE networks that connect EVSE together. Networks like ChargePoint, Blink, and GE Wattstation Connect have all described some level of DR functionality. These networks are already being used in pilots to manage Demand Response. DR technology is already developed and deployed at no cost in existing EVSE networks, it is wasteful, risky, incomplete, and unwarranted to require AMI and SEP2 to manage shared EVSE. Development of third party alternatives to AMI should be a priority.

III. GRID FREQUENCY REGULATION (Applied Research and Development ($55M/year)

The goal of this project is to determine the feasibility of grid frequency regulation using electric vehicle charging by developing and demonstrating a prototype electric vehicle charging system. The projects would contribute to helping address California's transportation energy as well as support the key principles of the EPIC Triennial Investment Plan including "advance the loading order" and enhance reliability and safety."

Ancillary services like regulation service are essential to keep the system balanced and prevent it from cascading into a blackout. The need for regulation services can dramatically increase as the amount of variable renewable resources is increased.

The competitive market does not already cover the proposed research, as frequency regulation has not been implemented in association with vehicle charging. The proposed funding will elevate existing technology to a higher level benefiting Industrial customers, utilities and California ratepayers.

IV. EV MICROGRIDS (Technology Demonstration and Deployment $45M/year)

The scope of the proposed effort is to deploy a self-sufficient micro-grid within the workplace/industrial setting to manage EV loads and available power assets including distributed renewable resources, building energy management systems, demand response technologies and systems, and EV-related infrastructure. Various companies have embraced EV deployment but have limited control over the sources of its available power assets since the resident utility provider feeds power under strictly regulated conditions. These regulations reflect challenges inherent to the integration of numerous small, highly variable (and historically unpredictable and uncontrollable) generation sources and loads.

Technology innovations in EVSE managementcould provide controlled energy and grid services within an innovative and custom-tailored framework of market-based incentives. In turn, the technology will interconnectenergy and ancillary services with utilitiesin accordance with California regulations and local requirements, with the overall goal of providing the commercial user with cleaner and higher quality power, with greater end-use efficiency, and minimized costs.

V. DEVELOPMENT OF SUBMETERS in EVSE (Applied Research $55M/year)

Support reduction of costs for ratepayers in EVSE deployment by funding the development of a submeter protocol and certification of EVSE to make embedded meters a reality pursuant to the CPUC Phase II decision. Development of meter certification process, developing a prototype for a "data management agent" function to facilitate the integration of the EVSE and the utility network, as well as support innovations and third party technologies to make subtractive billing by the utilities a cost effective reality

CONCLUSION

In conclusion, the opportunity to support projects such as these will provide IOU electric ratepayer benefits, increase competitiveness in the EV market, mitigate electric vehicle negative impacts on the grid and greatly assist technologies “overcome the valley’s of death.” These projects both complement and leverage the policy and funding priorities of the State of California as it related to Electric Vehicles and their capability to be a transformational technology to reduce environmental impacts as well as drive economic development

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