

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

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

Rulemaking 13-11-007

**COMMENTS OF HANK MCGLYNN ON ASSIGNED COMMISSIONER'S RULING SEEKING  
COMMENT ON VEHICLE-GRID INTEGRATION COMMUNICATION PROTOCOL WORKING GROUP  
ENERGY DIVISION STAFF REPORT**

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I, Hank McGlynn, participated in Vehicle-Grid Integration Communication Protocol Working Group meetings and contributed use cases, glossary terms, and other content to the effort. As team leader for the SAE working group that created the SAE documents related to Vehicle to Grid (J2836/3<sup>TM</sup>, J2847, and J3072), I was able to bring SAE V2G perspective to this project. I also participate in the California Smart Inverter Working Group and brought that perspective, regarding Rule 21, Distributed Energy Resources (DER), and Smart Inverter Functions.

I thought the leaders of this project did an outstanding job guiding this effort and I agree with the scope and content of the draft report. A response to the specific questions is provided below in Part 1 and a specific recommendation is included in Part 2.

**Part 1: Response to Questions**

1. Overall feedback on Staff Report
  - 1.a. The Staff Report is well written and accurately reflects all discussions in which I participated.
  - 1.b. See Part 2, herein, for a recommended clarification regarding V2G.

1.c. The referenced Deliverables appear complete. All content that I provided is appropriately represented in the various documents and worksheets. The website, as of today, is missing a link to the “Requirements Sub-Working Group Final Report,” although the report is otherwise fine.

## 2. Scope of EVSE hardware performance requirements

2.a. The rationale in the Staff Report for excluding single-user EVSE is reasonable.

2.b. It is not appropriate to exclude workplaces or fleets from EVSE requirements, except for possibly billing functions. It is likely that fleets may need to engage in smart charging applications and need to adapt to future protocols. EVSE used to serve utility fleets or at utility sites for use by utility employees or visitors should conform to requirements, even if not procured using ratepayer investment. California state and local government entities should also follow the recommendation for EVSE procured using public funds. Private sites and fleet owners will make their own economic decisions regarding EVSEs, but it may be prudent for them to follow Staff Report recommendations.

2.c. Third parties are not required to conform to the Staff Report recommendations; it will apply to utility procurement of EVSEs as determined by the CPUC for IOUs. It may be prudent for other entities to follow the recommendations to be able to accommodate future EVs that may support VGI protocols which are not supported at the time of the initial EVSE installation. This would become a business case of first cost and either upgrade or replacement cost and the value of benefits to the aggregator and their customer.

## 3. Identifying future VGI work

3.a. CEC project EPC-14-086, “Distribution System Aware Vehicle to Grid Services for Improved Grid Stability and Reliability,” is led by EPRI and it is the first evaluation of an EVSE and EV that conform to SAE J3072. This is a specific implementation for use case SAE V2G-AC (which helped define the Rule 21 requirements used as part of the assessment of the various protocols in the Staff Report).

3.b. The California Smart Inverter Working Group (SIWG) has been primarily focused on the integration of solar PV systems with the utility grid, but with reasonable consideration given to

stationary energy storage systems (ESS). EVs have been regarded as loads which are not relevant to Rule 21, and if V2G is raised it is just assumed that an EV with an onboard inverter should be treated by Rule 21 the same as an ESS, except it just sits on wheels. Should EVs with onboard inverters be required to implement the smart inverter functions now required by Rule 21 or should they be allowed to just engage in bidirectional flow? Does it really matter for a nascent V2G fleet or will the requirement just serve to kill V2G in California at the outset? The EV roams between sites, service areas, and even states, and the smart function curves are specific to a location. How does the utility plan to provide curve data to the EV when it connects to an EVSE? What system is planned to perform this task? Will the EV get the data from a utility server when it connects to the EVSE? Does the utility plan on providing the data to the site owner and expect the site owner to get it into the EV when it arrives? There are many technical issues associated with roaming EV inverters that need to be considered and resolved for V2G to happen.

3.c. CPUC proceeding R.17-07-007, "Order Instituting Rulemaking to Consider Streamlining Interconnection of Distributed Energy Resources and Improvements to Rule 21," is directly relevant to V2G. The October 2, 2017 Scoping Memo defined task 23 on page 6 under the category of Application Processing and Review Issues (Working Group Four) as: "Should the Commission consider issues related to the interconnection of electric vehicles and related charging infrastructure and devices and, if so, how?"

CPUC should establish an approach for IOUs to review and approve a Rule 21 application by a public charging site utility customer to allow various EV models with onboard inverters (use case V2G-AC) to connect and discharge at the site. The EVSE information is available to the utility customer at the time of installation, but the EVSE (and site) does not contain an inverter and is not by itself a generating facility. It becomes a generating facility when a roaming EV with an onboard inverter connects to discharge. While a homeowner could include the specific model EV as part of a Rule 21 application, a public site owner would not know exactly which mix of EV models would be discharging at the site, particularly over the lifetime of the site. A roaming inverter is an unprecedented situation.

## Part 2: Recommendation

Add a statement to section 5 in an appropriate location:

The proposed EVSE is not required to be capable of supporting V2G applications, either at initial installation or by using the described update capability, except by control of the rate of charging only (V1G). An EVSE capable of supporting a PEV with an onboard inverter which conforms to Rule 21 Section Hh (Smart Inverter Generating Facility Design and Operating Requirements) might exceed the economic update capability of the proposed EVSE and a replacement EVSE may be required to support V2G in the future.

### Background and Rationale.

This working group performed an extensive analysis of the use of communication protocols to support Rule 21 (Generating Facility Interconnections) Section Hh (Smart Inverter Generating Facility Design and Operating Requirements). The data sets to be used by the inverter for some of the functions defined by Rule 21 are specific to the connection point of the inverter on a distribution feeder and may also vary possibly by season or even time of day. Because an EV with an onboard inverter (use case SAE V2G-AC) may roam from site to site, the curves must be loaded into the PEV inverter at the time that the PEV connects to the EVSE. The site data sets can be provided to the PEV by the EVSE, a BMS, or even PFE. IEEE 2030.5 is the only assessed protocol that currently provides the capability to transfer data sets associated with autonomous functions, such as volt-VAR. It is possible that other protocols could provide this capability in the future, so the recommendation to not require a specific protocol at this time is reasonable.

A utility customer of record must apply to the utility and be authorized by the utility before a generating facility can legally interconnect and discharge energy to the grid. The technical requirements and the application and review procedures are defined by Rule 21. In the case of use case SAE V2G-AC, the utility customer installs the EVSE, but the EVSE does not contain an inverter and the customer may not know in advance which PEVs could possibly connect to the EVSE over its operating lifetime. V2G-AC demonstration projects in California and other states

have secured utility approval only after significant interaction and testing by project and utility engineers with specific EVSE and PEV models. This approach is not viable for enabling any widespread deployment of V2G-AC capability in California. SAE J3072 defines certification requirements for EVSE models and for PEV inverter system models and defines a process where a utility could approve a site application for V2G-AC without the need to simultaneously specifically approve specific PEV inverter system models to be used at the site. Because this is only an emerging market, Rule 21 does not yet have an approval process for V2G-AC sites or recognize J3072. A J3072-compliant EVSE is a more complex EVSE than that required only for smart charging. It is reasonable for CPUC to delay establishing requirements for an EVSE to support V2G until Rule 21 defines an approach for SAE V2G-AC.

**Conclusion**

I appreciate the opportunity to participate in the Working Group and to submit these comments.

Respectively submitted,

A handwritten signature in black ink, appearing to read 'H. J. McGlynn Jr.', with a stylized flourish at the end.

H. J. McGlynn Jr.

Date: March 21, 2018