James Kwon
Climate Protection Partnerships Division
U.S. Environmental Protection Agency
Washington DC 20460

June 25, 2018

Subject: ENERGY STAR® EVSE Draft v1.1 Specification and Test Method Discussion Guide Questions

Dear Mr. Kwon:

This letter contains comments from Pacific Gas and Electric Company (PG&E), San Diego Gas and Electric (SDG&E), and Southern California Edison (SCE) on the ENERGY STAR® Electric Vehicle Supply Equipment (EVSE) Version 1.1 Specification and Test Method Discussion Guide. We thank the United States Environmental Protection Agency (U.S. EPA) for the opportunity to comment on the Discussion Guide.

PG&E, SDG&E and SCE represent some of the largest utility companies in the western U.S., serving a combined customer base of over 34 million people. As progressive energy companies with an extensive portfolio of efficiency programs, we understand the potential for efficiency specifications and standards to cut costs and save energy while maintaining or increasing consumer satisfaction. We have a responsibility to our customers to advocate for sensible test procedures, specifications, and standards that accurately reflect the climate and conditions of our respective service areas, so as to maximize the positive effects of these efforts. We believe that the Version 1.1 Specification and Test Method for DC Output EVSE can facilitate energy efficiency and demand response efforts by utility companies. We encourage U.S. EPA to continue these efforts and look forward to continuing our support.

Question 1:	*It is important to note that the input power measurement would be taken at the input to the EVSE, not at the utility panel. For a DC EVSE that has a separate cabinet containing the AC/DC converter, and a dispenser that connects to the vehicle, the input power measurement would be taken at both the cabinet and the dispenser. Should EPA accommodate a lower voltage (120 V) connection to the dispenser (i.e., there may be two input voltages)?*

PG&E, SDG&E and SCE recommend testing these units at both input voltages because the efficiency of the unit could vary based on the input voltage.

Question 2:	*For … EVSEs with a separate cabinet and dispenser, how should EPA factor in the losses in the DC cable connecting the two enclosures?*

Please see our response to question 12 below.

Question 3:	*EPA is requesting stakeholder feedback on the proposal to test at the representative temperatures listed in Table 2 [i.e. 20 ˚F, 68 ˚F and 95 ˚F with an allowable window of +/- 5 ˚F for each]. Are these temperatures representative of climates across the United States? EPA would also welcome data on the variations in efficiency that result from charging in different climates.*

PG&E, SDG&E and SCE agree that the test method should require testing DC output EVSE under representative conditions, especially because higher temperatures may result in higher energy use due to EVSE cooling. We recommend evaluating any information that is available from manufacturers to ensure that cooling systems will be active during the proposed 95˚F test condition, which effectively allows testing between 90-100˚F.[1]

Question 4:	*Do laboratories have atmospheric-controlled testing chambers to do the above proposed testing; if not, is acquiring this capability doable? Are there alternative methods for conducting temperature testing that could minimize potential testing burden?*

PG&E, SDG&E and SCE do not currently have information about the availability of temperature controlled EVSE testing facilities. We note that other standards require temperature controlled testing such as AHRI Standard 340-360 (2015) for heating, ventilation, and air conditioning (HVAC) equipment.[2]

Question 5:	*EPA requests feedback around the ±5°F variation around the temperature conditions.*

PG&E, SDG&E and SCE support stakeholder suggestions during the June 4, 2018 webinar to allow testing above the specified high temperature condition, which should be less favorable to manufacturers and thus yield conservative results. We understand that manufactures could have other reasons to conduct tests at a temperature higher than 100˚F (the maximum allowable temperature for the 95˚F test). If so, manufacturers should report the actual temperature.

Question 6:	*EPA welcomes feedback on whether DC-output EVSE are commonly custom builds, and if so, suggestions of how to select representative configurations for test to minimize testing burden.*

PG&E, SDG&E and SCE understand that this question refers to modular units. Please see our response to question 19 below.

Question 7:	*Are there other relevant modes for DC Output EVSE, besides No Vehicle and Operation Mode, which should be accounted for in this test procedure?*

Please see our response to question 17 below.

Question 8:	*How should EPA best account for the power required to provide liquid cooling to the cables?*

PG&E, SDG&E and SCE recommend measuring the total energy used by DC output EVSE, including liquid cooling for cables handled by customers, so that the test will capture total EVSE energy usage. If liquid cooled cables provide additional functionality, such as lighter weight and

[1] Detailed information regarding atmospheric temperature conditions is available in ANSI/ASHRAE 169-2013 and Chapter 14, Climatic Design Information, from the 2017 ASHRAE Handbook—Fundamentals. Both are available here: https://www.ashrae.org/technical-resources/bookstore/ashrae-climate-data-center

[2] This standard is available at http://www.ahrinet.org/App_Content/ahri/files/STANDARDS/AHRI/AHRI_Standard_340-360_2015.pdf.

easier handling, U.S. EPA can consider an allowance during specification development or allow manufacturers to provide additional information on this feature on the ENERGY STAR website.

Question 9:	*EPA has learned from stakeholders that DC EVSE manufacturers are moving away from 25 kW or 50 kW stations and toward 150 kW and 350 kW stations. However, there will continue to be legacy vehicles that charge at a maximum of 50 kW, dropping below 30 kW as the battery approaches a fully charged state. As a result, EPA has included these lower charging states in Table 3 as testing conditions.* *a. EPA welcomes feedback on the appropriateness of the testing conditions in Table 3. Should EPA consider different testing conditions to determine the efficiency of On Mode charging?* *b. In addition, EPA welcomes feedback on an appropriate testing voltage for the various testing conditions.*

First, PG&E, SDG&E and SCE agree that testing conditions should address the voltages and amperages that are representative of charging rates for existing vehicles - including 30 kW and 50 kW charging rates as shown in Table 3 - so that the results reflect real-world performance.

Second, row #2 of Table 3 indicates that the required test voltage for a specific power output may vary between models based on the unit's maximum capacity. We recommend revising Table 3 so that the voltage is consistent between models for a given test power output unless there is a specific technical reason to test them at different voltages. For instance, the voltage for a 500 kW, a 350 kW and a 150 kW capacity EVSE should be the same when tested at 150 kW. Similarly, the voltage for testing a 500 kW, a 350 kW, a 150 kW and a 50 kW capacity EVSE should be the same when tested at 50kW so that test conditions are consistent across units.

Question 10:	*EPA has learned that the cooling system of EVSEs will typically turn on after the EVSE reaches a particular temperature (either due to the ambient temperature or internal heating from operating at high power). EPA is interested in learning about cooling strategies to minimize cooling and increase the efficiency of the overall charge. EPA welcomes feedback on the typical operating characteristics of cooling systems and how to structure and sequence tests so they are representative.*

PG&E, SDG&E and SCE do not currently have comments on this topic.

Question 11:	*EPA has learned that some EVSE may contain battery banks for the purpose of reducing peak demand (kW). As a result, EPA would like stakeholder feedback on the following testing proposals to account for energy loss from the battery itself:* *a. Should EPA consider conducting a 24-hour test?* *b. Should EPA require that the battery is disabled for one test and enabled for a second test?*

PG&E, SDG&E and SCE recommend requiring testing these units without the battery installed (if sold in this configuration) and with the battery installed but disabled. These tests will provide results comparable to other EVSE without batteries.

PG&E, SDG&E and SCE suggest that U.S. EPA also consider developing a test procedure with the battery bank installed. The test could be useful for informational purposes, and the duration of the test should be based on the amount of time necessary to achieve representative battery

cycle(s). However, we do not recommend mandating this test or setting a specification for the battery bank at this time, because these topics would significantly increase the scope and complexity of developing the Version 1.1 Test Method and Specification.

Question 12: For DC EVSE, with a separate cabinet (containing the AC/DC converter) and dispenser (connects to the vehicle), should EPA consider an alternative testing approach that involves splitting up the cabinet and dispenser into separate tests?

a. The No Vehicle Mode testing may be most applicable for the dispenser, perhaps in light and dark conditions, with a variety of temperatures.

b. The Active Mode testing may be more applicable for the cabinet at a variety of output powers (without lighting or temperature variations).

PG&E, SDG&E and SCE generally recommend testing systems that perform a similar function under similar conditions regardless of how the system is packaged so that consumers can easily compare between products with similar functions. The test method should require testing the cabinet and dispenser connected by a cable that has a representative diameter and length unless U.S. EPA identifies a specific technical reason for testing the dispenser and cabinet separately.

If U.S. EPA does require testing cabinets and dispensers separately, we recommend the following in response to questions 12a and 12b:

- The dispenser should be tested during Active Mode to capture connector cable cooling.
- The cabinets should be tested under the same range of temperatures as other EVSE (as discussed in Question 3) because the amount of energy needed to cool the cabinet may be affected by ambient temperature.
- Losses from the cable connecting the dispenser and cabinets should be calculated based on a cable with representative length and diameter.

Question 13: Does the proposed definition of DC EVSE appropriately account for DC Output products?

U.S. EPA has proposed the following definition:

> " dc: A galvanically-connected EVSE that includes an off-board charger and provides dc current greater than or equal to 80 amperes dc."

Instead, PG&E, SDG&E and SCE recommend harmonizing with the J1772 definition shown below to avoid potential confusion. This definition does not exclude products below 80 amperes:

> "DC CHARGING: A method that uses dedicated direct current (DC) EV/PHEV supply equipment to provide energy from an appropriate off-board charger to the EV/PHEV in either private or public locations."

Question 14: The SAE J1772 standard contains definitions for Level 1 and Level 2 DC EVSE. Should EPA align with these definitions?

PG&E, SDG&E and SCE recommend harmonizing any definitions that are adopted for Level 1 DC EVSE and Level 2 EVSE with the criteria in J1772 to avoid potential confusion. For instance, Table 13 of J1772 specifies that Level 1 DC EVSE can operate at up to 80 amperes at 600 volts DC; and Level 2 DC EVSE can operate at up to 400 amperes at 600 volts DC.

Question 15:	*Would purchasers benefit from additional information on more efficient distribution transformers, as presented in the ENERGY STAR Distribution Transformers Buying Guide 2 document because a transformer may need to be purchased for specific sites where DC EVSE will be installed?*

PG&E, SDG&E and SCE believe that referencing the ENERGY STAR Distribution Transformers Buying Guide in future ENERGY STAR EVSE program promotional materials may be helpful since the consumer may also be purchasing a distribution transformer, as noted by U.S. EPA.

Question 16:	*Wireless charging: Should EPA consider including wireless charging units in Version 1.1? What are the benefits and barriers for this technology that would make it appropriate or inappropriate for consideration at this time?*

PG&E, SDG&E and SCE recommend deferring consideration of wireless charging until these units are more widely commercially deployed. Including wireless charging would raise significant challenges because limited data is available for this product and because a separate testing protocol may be required.

Question 17:	*Are there other modes that should be considered besides No Vehicle and Operation Mode? Do stakeholders have additional information on power consumption to share?*

First, PG&E, SDG&E and SCE recommend testing in "Partial On" and "Idle Mode" for DC output EVSE that operate at power levels similar to Level 2 AC units (if DC output EVSE with these power levels are within the scope of v1.1). This testing is currently required for Level 2 AC units, and represents some of the typical operating conditions for units with this capacity.

Secondly, some DC output units operating above 80 amps may participate in demand response programs. The California IOUs recommend including a procedure for testing DC output EVSE in "Partial On" when a vehicle is connected and able to accept energy, but the EVSE is not providing energy. This mode may occur when a vehicle is participating in a demand response program and awaiting a charging event. At a minimum, the U.S. EPA should include an option for manufacturers to test in this mode and voluntarily report this data on the ENERGY STAR website to inform consumers and utilities.

Question 18:	*What other features or functions are missing from the above list that should be taken into consideration for setting criteria for maximum power consumption?* *a. EPA would welcome data on the power consumption of any of these features.*

PG&E, SDG&E and SCE do not currently have comments on this topic.

Question 19:	*Would the testing approach outlined here [testing at minimum and maximum configurations] be appropriate for modular EVSE products that can be configured to be larger or smaller depending on the application?*

PG&E, SDG&E and SCE understand that U.S. EPA is considering requiring testing modular EVSE in the configurations that provide the maximum and minimum power capacity. If the products pass in these two configurations, all configurations would pass (similar to the uninterruptable power supplies (UPS) Specification). We believe that U.S. EPA should defer this question until a draft EVSE Version 1.1 Specification has been identified. The future EVSE Version 1.1 Specification may be more complex than for the specification for UPS because these

products are very different. Thus, testing two configurations may not be representative of all possible configurations.

In conclusion, we wish to reiterate our support to U.S. EPA for establishing an ENERGY STAR program for EVSE, and we encourage U.S. EPA to carefully consider our comments.

Sincerely,

Patrick Eilert
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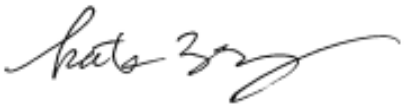
Pacific Gas and Electric Company



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