

DOCKETED

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Comments of Nuvve on CEC's V2G GSIL

Additional submitted attachment is included below.



Comments of Nuvve Holding Corp on the CEC 19-AB-2127 regarding establishment of a V2G Grid-Supportive Inverter List

Nuvve is a San Diego-based company operating across the U.S. and internationally whose mission is to lower the cost of electric vehicle (“EV”) ownership while supporting the integration of renewable energy sources, such as wind and solar. Nuvve’s Grid Integrated Vehicle platform (“GIVe”), transforms EVs into grid assets when those vehicles are connected to a bidirectional charger while guaranteeing the expected level of charge at the time the owner or driver needs it for transportation.

The aggregation of thousands of parked EVs plugged into bidirectional chargers turns an EV fleet into a virtual power plant using Nuvve’s GIVe platform. This allows Nuvve to provide EV drivers and fleet owners with additional value through earning revenue from participating in electricity markets with a power capacity and capability compared to traditional stationary storage systems. Using our proprietary vehicle-to-grid (“V2G”) technology, Nuvve’s GIVe platform produces real benefits to society by reducing the cost of electric infrastructure to support transportation electrification. In addition, V2G helps to reduce harmful emissions beyond those associated with switching from liquid fuels to electricity for transportation by supporting the integration of variable sources of generation including solar and wind. These benefits can be realized across all types of EVs including light-duty vehicles (both battery-only and plug-in hybrids) and medium- to heavy-duty vehicles, such as school buses and other short-haul fleets.

We appreciate the opportunity to address CEC’s questions regarding establishment of a new V2G Grid-Supportive Inverter List (“V2G GSIL”).

Questions:

1. Which certifications should the V2G Inverter List track at launch? UL 1741, UL 1741-SA, UL 1741-SB, or a combination thereof?



CEC should track at launch any inverter-related standards that have been approved by the CPUC and adopted by utilities in advice letters. Using this framing, CEC should include all three of the above-mentioned standards at launch:

- a. UL 1741: Decision 21-12-015 and corresponding California IOU advice letters confirm that UL 1741 is sufficient for V2G DC systems interconnecting for Emergency Load Reduction Program participation. Particularly given the potential for extension of the ELRP program through 2027, CEC's V2G GSIL should reflect that this is a valid certification under these conditions. Nuvve recommends inclusion of UL 1741.
- b. UL 1741SA: UL 1741SA is the current standard for grid-interactive inverters operating in parallel in California. It is necessary for Rule 21 interconnections of V2G DC systems outside of the ELRP and optional for ELRP participation. As Southern California Edison noted in its presentation during CEC's May 17th V2G Inverter List Workshop, UL 1741SB will take full effect April 1st 2023. Decision 20-09-035 and California IOUs' corresponding Advice Letters note that V2G DC systems connected and energized in "charge-only" mode using the UL 1741 Power Control Systems CRD from March 2019 may interconnect up to five years from their installation date, obtaining Permission To Operate using the standard that was in force at the time of installation. California could therefore see DC EVSEs interconnecting using the UL1741 SA standard into 2027 or 2028. It is clearly essential that the proposed V2G GSIL include UL 1741 SA, even if the V2G GSIL is launched after UL 1741 SB has come into force. Nuvve recommends inclusion of UL 1741 SA.
- c. UL 1741SB: Given that the V2G GSIL will likely not launch earlier than Q4 2022, CEC cannot reasonably neglect to include a standard that will be in effect in at close of Q1 2023. That said, the California IOUs have noted that they will accept the standard as an acknowledgment of early adopters seeking to comply with the version of IEEE 1547 already in force from which UL 1741 SB springs. Therefore, even if the V2G GSIL is launched in Q3 2022, those stakeholders who have chosen to take advantage of the early adopter option should benefit from the streamlining effects of V2G GSIL along with



those waiting for UL 1741 SB to become mandatory for interconnection in California. Nuvve recommends inclusion of UL 1741 SB.

2. To what extent should the V2G Inverter List attempt to accommodate onboard inverters (AC V2G) at launch, versus focusing on offboard inverters (DC V2G)?

Nuvve looks forward to release of UL 1741 SC as the culmination of years of work by multiple stakeholders in California and across the country. That said, as SAE, UL, and utility stakeholders collaborate on development of this standard to accommodate the safety and certification needs of both the automotive and electric industries, various elements remain up in the air. The “EVSE as Gatekeeper” model may require that only the EVSE itself be listed, or that pairs of on-board inverters and EVSEs be listed, or perhaps an entirely different method of identifying a compliant system will emerge before the process is complete. California has only recently achieved harmonization of IEEE 1547 2018. Rather than again establish California as an outlier out of step with the rest of the country by potentially guessing incorrectly what may come out of the UL 1741 SC working group, Nuvve recommends the CEC wait and instead establish the best practice for V2G AC registration and interconnection that will be emulated or copied by other states and potentially other countries.

Just as it is not for the CEC to establish interconnection requirements for a standard that has yet to be published, it is also not for this agency to choose interim standards or work-arounds. If the CPUC approves standards and methods for V2G interconnection other than the coming UL 1741 SC, CEC’s V2G GSIL should reflect those.

Once a standard has been confirmed by standards organizations and adopted by CPUC as a required certification for Rule 21 compliance, CEC should add those standards to the V2G GSIL. If somehow these standards are completed, published, integrated into Rule 21, and certification tests developed prior to launch of the CEC’s V2G GSIL those standards and requirements should be reflected. In the more likely case that the new V2G GSIL launches ahead of those milestones, CEC should include

specific holding places for those new standards, and specify an integration process that will take place when those milestones are met. CEC could accelerate its acceptance of these coming standards by participating in the Rule 21 integration process and preparing new list categories in parallel.

3. Should the V2G Inverter List track the model numbers of chargers that contain inverters, or the model numbers of the inverters themselves?

CEC should track model numbers of DC V2G inverters as well as model years to accommodate delayed interconnections. CEC should not risk the confusion of contemplating how the framework being established for V2G DC systems can accept AC configurations when the actual standards for those AC V2G remain unpublished. CEC should instead clearly indicate on the website that requirements for V2G AC systems will be added when standards are complete and integrated into Rule 21 by the CPUC, clearly delineate any other triggering mechanisms or gating items, and establish a streamlined process for adding those as soon as possible once those milestones have been confirmed.

4. Should any parameters besides UL certification be tracked as part of the V2G Inverter List? For example, connector type, communication standards, and so on?

Nuvve recommends that CEC stick to standards approved by CPUC and those officially required by programs that fund V2G devices while making mechanisms for the V2G GSIL to be easily added to or changed to reflect fast evolving standards. While a rigorous assessment process will be necessary, establishing a new V2G GSIL that is overly rigid will simply re-establish CEC's List as a source of barriers and delays rather than a streamlining mechanism. UL 9741, for example, is only an outline, and is not included anywhere in California interconnection rules and regulations. There is no reason for it to be on the V2G GSIL at this point and would merely lead to confusion. However, it may at some point in the next few years be completed by UL and adopted by the CPUC. Nuvve recommends that CEC develop an iterative process



to add new standards and reflect new interconnection requirements and options as the CPUC approves them rather than waiting to initiate a new revision cycle.

Nuvve advises against specifying connectors, communications protocols, or any other aspects of an EVSE beyond those required by CPUC for interconnection of inverters. As these elements are irrelevant to interconnection. If, for example, an inverter in a DC V2G configuration can receive IEEE 2030.5, DNP3, or Sunspec Modbus signals it should be irrelevant if those signals come via a CHAdeMO connector, via a CCS connector, or potentially via telemetry. That inverter has met the requirements of California's Rule 21 and should be interconnected. Rather than trying to encompass all potential connectors and ancillary communications standards (ISO 15118, OCPP), Nuvve recommends that CEC remain truly agnostic and ignore them entirely for the time being, allowing industry to innovate within the actual rules set out by the CPUC. Only additional technical requirements the utilities assign to either V2G DC or V2G AC with approval of the CPUC should be reflected on this list.

In keeping with the original intent of SB1 for solar inverter funding, CEC's Grid Support Inverter List includes minimum technical requirements for safety and performance. Connectors and communications protocols come under neither heading. Similarly, Energy Star requirements not included in program and funding structures do not currently belong on this list. If and when efficiency levels for V2G inverters are official requirements to qualify for a program, CEC should include them. CEC is recording compliance with interconnection requirements set by CPUC and performance requirements CEC may set for inclusion in funding programs; CEC need not begin inventing new requirements specifically for inclusion on the GSIL that do not exist elsewhere.

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