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**Rhombus Energy Solutions Comments on Implementation of AB
2127**

Additional submitted attachment is included below.

February 25, 2021

CEC Commissioners and Staff
California Energy Commission
Research and Development Division
1516 Ninth Street
Sacramento, CA 95814

Re: Comments for AB 2127 Electric Vehicle Charging Infrastructure Assessment

Dear California Energy Commission,

Rhombus Energy Solutions appreciates the opportunity to provide comments on the California Energy Commission's (CEC) AB 2127 Electric Vehicle Charging Infrastructure Assessment. We take the opportunity to support the deployment of high-powered, integrated, bidirectional charging to help achieve the goal of 5 million zero-emission vehicles (ZEVs) by 2030 very seriously, and look forward to doing our part to make this happen.

Rhombus Energy Solutions (Rhombus), based in San Diego, CA & Dearborn, MI, is a leader in the development and production of high-power charging infrastructure for M/HD EV fleets. Rhombus bi-directional chargers are specifically designed to meet the requirements of medium and heavy-duty (M/HD) electric vehicle (EV) fleets – they are designed for extremely high reliability, ease of maintenance, and the ability to operate continuously at full rated power output and designed to meet the needs of tomorrow as well. All our chargers are capable of bi-directional operation, making Rhombus one of the only providers of commercially available vehicle-to-grid (V2G) capabilities in high-power M/HD EV chargers. Rhombus chargers have the intelligence to interface and provide vehicle data to a variety of systems in the charger ecosystem and seamlessly integrate with third-party applications and services. This allows Rhombus chargers that are purchased today to meet customer needs in the future. The results: M/HD fleet operators utilizing Rhombus charging solutions can successfully electrify their fleets, reduce transportation sector emissions, achieve air quality goals, and simultaneously reduce power consumption and fleet operating costs.

Rhombus greatly appreciates the CEC's recognizing the need to support bidirectional charging in the AB 2127 Electric Vehicle Charging Infrastructure Assessment. Our specific comments include:

- **Inclusion of DC V2G Inverters in CEC Grid Support List**

Rhombus, along with Nuvve, are industry leaders in developing the hardware and software necessary to support V2G functionalities and are among the first to attempt to list a V2G inverter on the CEC's Grid Support Inverter List (List). Utilities in California and across the country use this List as a streamlining mechanism to qualify inverters for interconnection in their territories. Listing with the CEC has become a de facto gating requirement to deploy V2G charging systems. The credibility of the CEC's List is such that while IOUs can interconnect V2G DC systems without CEC listing, lack of listing severely hampers the credibility of new devices when approaching end-users. In summary, the CEC's List has become an essential component for commercialization of new grid supportive inverter-based devices.

Rhombus has received all relevant certifications and submitted all necessary documentation to CEC's Renewable Energy Division (RED) to be included on the CEC's Grid Support Inverter List. While RED acknowledges we have submitted everything required, they informed us they cannot list the inverter because they are legislatively limited by SB 1. The Grid Support Inverter List was established specifically for solar inverters and was later adjusted to include battery inverters via Title 24 of the Building Code. The CEC's RED has

been as helpful as possible but have informed us that they cannot include V2G inverters, which, while technically battery inverters, are inside EVSEs.

The CPUC has cleared the way for interconnection of V2G systems, confirming in Decision 20-49-035 that DC V2G systems are a form of storage and sufficiently addressed by Rule 21 as currently written. The IEPR, the Vehicle Grid Integration (VGI) Roadmap, and the VGI Working Group have together laid the groundwork for a V2G industry. Rhombus' invertors comply with all interconnection requirements for stationary storage inverters. The CPUC Decision confirms that for interconnection purposes there is no difference between a DC V2G inverter and a stationary battery inverter; therefore, we respectfully request that these inverters to be included on this List. Barring inclusion on the existing List, we respectfully request that the CEC develop a new V2G-specific list to include currently compliant and commercially available DC V2G inverters, and to include in the future V2G AC inverters when standards are available to determine listing requirements.

- **Inclusion within the March 2019 UL Power Control System Certificate Requiring Decision (PCS CRD)**

In addition to inclusion of V2G inverters, we also respectfully request the CEC consider the inclusion an optional component of a listed inverter system in the March 2019 PCS CRD. The CPUC's Decision 20-49-035 refers to this CRD as an enabling mechanism to install V2G stations in uni-directional mode. The CRD can further obviate the need for a potentially cost-prohibitive relay in cases of Rule 21 non-export interconnections. These two applications will make the CRD a common if not essential element for V2G interconnection, and a logical inclusion to the CEC's grid support inverter list.

We encourage the CEC RED staff to consider accepting essential software-based components from companies who have not manufactured the hardware component. The evolution to include components for the interconnection and integration of distributed resources is essential for the CEC's List to remain a useful streamlining mechanism. This CRD will likely only become more significant as new and aggregated distributed resources are connected to the grid over the next decade, and the time is now to initiate a process to recognize CRD in the CEC's List.

- **CCS and ISO 15118**

We acknowledge and agree with the CEC's assessment¹ that the auto industry is moving toward CCS, and that CHAdeMO is decreasing in prevalence. Specifically, the V2G school bus segment has already converged on CCS, largely because the CEC V2G school bus program required ISO 15118, which by default indicated CCS connectors. CCS is the de facto connector standard for electric school buses, specifically V2G school buses. Therefore, we strongly recommend that the CEC no longer require the dual CCS-CHAdeMO connector requirement for CEC-funded and/or CEC-sanctioned programs. Requiring CHAdeMO as an option for this segment adds cost, time, and complexity, without increasing functionality or accessibility for the current cohort of electric school buses in California.

We also want to help clarify that the CCS, or CHAdeMO, connector is not on its own sufficient to enable bi-directional power transfer. The communications protocol must also carry the correct messages to enable the EVSE's smart inverter. The published version of the ISO 15118 protocol² that generally pairs with CCS does not currently support bi-

¹ 2021 California AB 2127, Page 53

² <https://www.iso.org/standard/55365.html>

directional power transfer. Rhombus, Nuvve, and IoTecha have agreed to collaborate in ISO 15118 extensions that will enable bi-directional power transfer.

While the convergence on CCS - and therefore the convergence on ISO 15118 - continues, CHAdeMO, proprietary communications protocols, and proprietary extensions to existing standards will remain necessary to enable V2G for the next few years. Therefore, we caution requiring ISO 15118 in near-term programs meant specifically to include V2G functionalities.

- **New Framework to Support VGI**

To create a self-sustaining, continually accelerating market to facilitate California's TE and climate-related goals, we strongly encourage the CEC and the California Public Utilities Commission (CPUC) to examine new frameworks that encourage VGI applications and leverage private investment. As included in the AB 2127 Electric Vehicle Charging Infrastructure Assessment, SB 350 programs are meant not to compete with private investment in transportation electrification. Unfortunately, in practice non-utility actors with VGI solutions, particularly V2G, must convince end-users to eschew the established programs designed around ratepayer-funded frameworks to attempt co-siting of EVs and other loads and resources. EV rates are then designed around the structure of the TE programs, which include assumptions appropriate for utility operations and financial structures.

We respectfully request the CEC review and examine new frameworks that encourage VGI applications. This could include piloting a structure such as the avoided cost of charging model proposed by in the IEPR³ to understand if utilities and third parties can compete for customers on a level playing field with a result that works best for the customer. While this market may not be a perfect fit for existing utility rate of return business models, it will help the industry evolve and mature beyond dependency on publicly funded transportation electrification.

- **Aligning Charging Infrastructure with Renewable Generation and Grid Needs**

The rapid electrification of consumer vehicles will inevitably lead to increased demand on the California power grid, especially during peak load hours when most consumers return from home and "plug in" their vehicles to charge. VGI represents a positive way to mitigate this impact, as will smart chargers. We strongly suggest that the CEC require and/or strongly incentivize both of these capabilities. Smart charging will help automatically align charging with renewable energy generation, and bidirectional technologies will enable vehicles to supply stored electricity to homes, buildings, other vehicles, or the grid to earn revenue.

We greatly appreciate the opportunity to provide feedback on the CEC's AB 2127 Electric Vehicle Charging Infrastructure Assessment. We look forward to continuing to work together to help accelerate the deployment of charging infrastructure, including bidirectional, throughout California.

Thank you,

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³ <https://www.energy.ca.gov/comments-sessions-1-2-and-3-june-22-and-24-2020-joint-agency-workshop-vehicle>