

DOCKETED

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*Comment Received From: Anna Bella Korbatov
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**Public Comment on AB 2127 Electric Vehicle Charging
Infrastructure Assessment**

Additional submitted attachment is included below.



February 26, 2021

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

Via: CEC Docket #19-AB-2127

Re: Public Comment on AB 2127 Electric Vehicle Charging Infrastructure Assessment

Dear California Energy Commission,

Fermata LLC, d/ba/ Fermata Energy (Fermata), is pleased to submit comments on the California Energy Commission's (CEC) AB 2127 Electric Vehicle Charging Infrastructure Assessment.

Fermata was created for the dual purposes of accelerating the adoption of electric vehicles ("EV") and accelerating the transition to a renewable energy future. As an equipment manufacturer and service provider, Fermata is one of very few technology companies actively working to advance commercial implementation of vehicle-to-grid ("V2G") and vehicle-to-x ("V2X") technology.

Fermata has the first commercially available, UL-certified offboard V2G-DCX charger for light-duty fleet vehicles. In March 2020, Fermata's first generation charger, the FE-15, [received its UL certification](#). The FE 15 is a 15 kW offboard DC bidirectional charger and is UL 1741 and UL 9741 certified, however it is not UL 1741SA certified, so it does not meet California's Rule 21 requirements. Fermata plans all future chargers to be certified per UL 9741 with UL 1741-SA or other then-current Rule 21 requirements. In addition to developing hardware and software required to perform V2X activities, Fermata has a decade of experience analyzing use cases, monetization mechanisms, and business models to maximize the benefits of V2X technologies.

Fermata appreciates the CEC's recognition of the need to support bidirectional charging in the AB 2127 Electric Vehicle Charging Infrastructure Assessment. Fermata also greatly appreciates the work of the Commission and staff in organizing and leading the recent V2B Workshop on January 25, 2021. The workshop served as an invaluable opportunity for stakeholders, including academia, automotive OEMs, utilities, and industry members such as Fermata, to discuss market, technology, and regulatory needs and barriers to deploying bidirectional plug-in EVs and chargers.

Fermata believes the Commission should prioritize addressing current barriers to V2X, which have been identified by Fermata and other V2X service providers and stakeholders. Specifically, five areas need to be addressed:

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

Fermata, along with Rhombus and Nuvve, are industry leaders in developing the hardware and software necessary to support V2X applications. Fermata is actively deploying V2G-DC technology across the nation, and plans to be among the first companies to list a V2G inverter on the CEC's Grid Support Inverter List (List). Utilities in California and across the country use the CEC inverter list as a streamlining mechanism to qualify inverters for interconnection in their territories. Listing with the CEC has become an important gating requirement for many customers. The credibility of the CEC's list is such that while it is possible for IOUs to interconnect V2G-DC systems without a CEC listing, the lack of a listing can severely impact manufacturers with new V2G-DC devices when approaching end-users. In summary, the CEC's inverter list has become an essential component for commercialization of new grid supportive inverter-based devices such as V2G-DC.

Fermata plans to receive all relevant certifications and submit all necessary documentation to CEC's Renewable Energy Division (RED) to be included on the CEC's Grid Support Inverter List. Recently, Rhombus Energy apparently submitted similar documentation for their higher powered V2G-DC solution. While the RED acknowledged that Rhombus had submitted all the required information, they stated that they could not list Rhombus' charger because the RED is legislatively limited by SB1. The Grid Support Inverter List was originally established specifically for solar inverters and was later adjusted to include battery inverters via Title 24 of the Building Code. It is evidently the case that the RED cannot include V2G inverters on the Grid Support Inverter List because while they are technically battery inverters, they are inside EVSEs and thereby not eligible for listing.

The CPUC has cleared the way for interconnection of V2G systems, confirming in Decision 20-49-035 that V2G-DC 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. The CPUC Decision confirms that for interconnection purposes there is no difference between a V2G-DC inverter and a stationary battery inverter. Fermata's V2G-DC chargers comply with interconnection requirements for stationary storage inverters, and therefore Fermata respectfully requests that these inverters be able to be included on the CEC inverter list. Barring inclusion on the existing list, Fermata respectfully requests that the CEC develop a new V2G-specific list to include currently compliant and commercially available V2G-DC inverters, and to include in the future V2G-AC inverters when standards are available to determine listing requirements.

- **UL9741 Certification for V2G-DC chargers:** The Rule 21 Revisions (CPUC Ruling – based on Rulemaking 17-07-007) relating to the inclusion of V2G-DC (consensus proposal 23c) stated that “V2G-DC/EVSE systems (stationary inverter for DC charging of vehicles) may be interconnected under the current Rule 21 language, with no Rule 21 language changes or additional authorization needed, provided that the EVSE meets all Rule 21

requirements, including UL 1741 SA and other updated smart inverter standards.”¹ This guidance to require Rule 21 compliance per UL1741 SA and other smart inverter standards does not explicitly call out UL 9741 as required. UL 9741, entitled “Outline of Investigation for Bidirectional Electric Vehicle (EV) Charging System Equipment,” is the only reference certification that includes both the grid interaction of the V2G-DC inverter as well as the interoperability and safety compliance of the charger with the bidirectional vehicle. Fermata recommends that the CEC clarify that certification to UL 9741 is an additional requirement prior to deployment in California. As UL 9741 references relevant aspects of UL 1741, UL 2202, and UL 2231, it forms a superset of regulatory compliance that encompasses both the grid interactive inverter and EV charger aspects of V2G-DC applications

- **CCS and ISO 15118:** While Fermata’s current hardware is designed for the CHAdeMO charging standard, we acknowledge and agree with the CEC’s assessment that a significant portion of the auto industry is moving toward the Combined Charging System (CCS), and that CHAdeMO is decreasing in prevalence.² Fermata is also aware that the CEC requirement for dual CCS-CHAdeMO connectors on DC chargers for CEC-funded and/or CEC-sanctioned programs may be limiting for some companies. Requiring both standards for this segment adds cost, time, and complexity to DC chargers of all types, including V2G-DC chargers.

It is worth noting that while requiring both a CCS and a CHAdeMO connector can expand the usability of a DC charger, it is not on its own sufficient to enable bidirectional power transfer from each type of interface. The communications protocol both between the network and the charger and between the charger and the vehicle must also carry the correct messages to enable bidirectional power transfer. The currently published version of the ISO 15118 protocol that generally pairs with CCS and the CCS1 Combo connector does not support reverse power transfer.³ Vehicle and charger manufacturers can cooperatively develop custom charger/EV implementations that utilize the DIN 70121 standard that is required of all CCS DC chargers, however such implementations are not standard on any DC chargers or OEM vehicles today.

The CHAdeMO standard includes both a V2H/L and V2G specification and is the only charging standard on the market today that fully supports bidirectional power transfer as a commercially available product. The various manufacturers involved in the V2G market (Rhombus, Fermata, Nuvve, IoTecha, and others) continue to support the expansion of ISO 15118 to include use cases and messages required for the realization of bidirectional power transfer. Currently, the updated version of this standard (15118-20) is in draft form and is expected to be voted on in the near future.

The convergence of the auto industry on CCS as a charging standard of significance in the US has meant that ISO 15118 and its revision are of growing importance to the

¹ <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M347/K953/347953769.PDF>

² 2021 California AB 2127, Page 53

³ <https://www.iso.org/standard/55365.html>

development of V2G-DC applications. Until the 15118-20 standard is issued and widely accepted by both vehicle and charger manufacturers, CHAdeMO-based V2G-DC chargers and CCS-based solutions that employ proprietary communications protocols, and proprietary extensions to existing standards, will remain necessary to enable V2G-DC. Therefore, near term V2G-DC programs should not be based solely on the use of ISO 15118 as the communications and control protocol for the chargers.

- **New Framework to Support VGI:** To create a self-sustaining, continually accelerating market to facilitate California's TE and climate-related goals, Fermata strongly encourages 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.

Fermata respectfully requests the CEC to review and examine new frameworks that encourage VGI applications. Such new frameworks could include piloting a structure such as the 'avoided cost of charging' model proposed in the IEPR.⁴ The avoided cost model would help demonstrate whether 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 home and plug their vehicles in to recharge. VGI and smart charging both represent positive mechanisms to mitigate the impact that such a sudden increase in load can place on the grid. Fermata recommends that the CEC require and/or incentivize both of these capabilities. Smart charging will help align charging with renewable energy generation, and bidirectional power transfer through V2G-capable chargers will enable vehicles to supply stored electricity to homes, buildings, other vehicles, or the grid to earn revenue.

Fermata appreciates the opportunity to provide feedback to the CEC relative to the AB 2127 Electric Vehicle Charging Infrastructure Assessment. The Commission's work to promote understanding around V2X advancement in California is something that Fermata supports. Fermata also commends the Commissioners and staff for their continuing commitment to supporting this critical piece of the state's transportation electrification framework. As

⁴ <https://www.energy.ca.gov/comments-sessions-1-2-and-3-june-22-and-24-2020-joint-agency-workshop-vehicle>

discussions on these topics continue, Fermata would be happy to provide staff with additional feedback on these and other issues related to V2G-DC adoption in California.

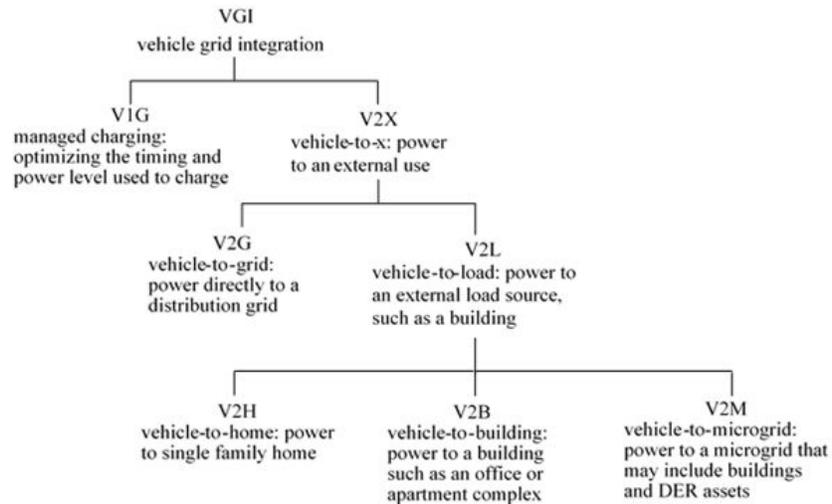
Sincerely,

A handwritten signature in blue ink that reads "John Wheeler". The signature is fluid and cursive, with a long horizontal stroke at the end.

John Wheeler
CFO & Co-Founder, Fermata Energy
john@fermataenergy.com

Fermata Backgrounder

Fermata Energy designs, supplies, and operates technology that integrates EVs with buildings and the electricity grid, turning EVs into valuable storage assets that combat climate change, increase energy resilience, and reduce energy costs. Fermata enables utilities to add more renewable energy to the grid more quickly, and V2G, V2L, and V2X revenue makes clean electric vehicles more cost-effective. Fermata offers a solution to two major challenges we face today: the integration of clean, renewable energy, and the adoption of clean transportation. See the diagram below for our proposed typology:



Because of Fermata’s leadership position in V2X, we served as a major content contributor to the California Vehicle-Grid Integration Working Group (“VGIWG or VGI Working Group”). Fermata has identified California’s critical need for cost effective solutions to PSPS, peak reduction, and the transition to renewable energy as key market applications for V2L and V2G. As a provider of V2X technology and services, the outcome of this proceeding will impact Fermata’s ability to introduce this technology to the California market where it is most needed.

Fermata is unique from other V2X services providers because we have the only commercially available, UL-certified off-board bidirectional Direct-Current (DC) V2X charger for light-duty fleet

vehicles. Most V2X companies are offering AC onboard mobile inverters, while Fermata and Rhombus are offering V2B technology with DC off-board bidirectional chargers. Fermata's FE-15 bidirectional charger is the first UL 9741 certified bidirectional charger in the world. Fermata is the only fully vertically integrated V2X services provider in the industry, with proprietary cloud-based software, a UL-certified bidirectional DC fast charger, and full enterprise operations. In addition to developing hardware and software required to perform V2X activities, Fermata Energy has spent nearly 10 years studying the value streams that V2X can unlock from an EV, which of these value streams are commercially viable today without regulatory intervention, and how to best monetize these value streams. Fermata has extensive experience with

analyzing use cases, monetization mechanisms, and business models to maximize the benefits of V2X technologies. Our revenue model includes system sales and recurring sources of income.

In addition to our experience piloting V2G use cases, we also have a network of strategic partnerships. In 2018, Nissan North America announced that they chose Fermata Energy for a major V2G pilot project at their North American Headquarters. And in 2019, TEPCO Ventures, the investment arm of Tokyo Electric Power Company Holdings, Inc., made a \$2.5M strategic investment in Fermata Energy.

Many V2X startups focus on publicly-funded pilots and academic partnerships to prove the business case of their technology. Fermata's "straight to commercial" go-to-market strategy of commercial deployments and privately-funded pilot projects with utility, municipal, and commercial fleet partners also differentiates us from other V2X startups in the industry. We are currently launching our product with several utility partners and fleet customers across the U.S. Fermata currently has seven publicly announced pilot projects across the US, and many more deployments with utility and fleet partners planned for 2021. Most notably, we have active pilots with the City of Boulder, Colorado; Green Mountain Power (an electric utility in Vermont); Roanoke Electric Cooperative (a rural electric cooperative in North Carolina); and Bigelow Tea Company.

Previous Pilot Projects:

- **2016 City of Danville, VA** – V2G Frequency Regulation Pilot Demonstration at Wastewater Treatment Plant and City Courthouse

Active Fermata Pilot Projects

- [2019 Danville, VA: V2B Demand Charge Management Demonstration Project at a Commercial Site](#)
- [2020 Green Mountain Power, Colchester, VT: Utility Partner Demonstration of System-Wide Load Management and DERMs Integration with Virtual Peaker](#)
- [2020 City of Boulder, Boulder, CO: V2B Demand Charge Management Pilot](#)
- [2020 Roanoke Electric Cooperative, Aulander, North Carolina: Utility Partner Demonstration of V2B Demand Charge Management, System-Wide Peak Shaving, and DERMs Integration](#)
- [2020 Bigelow Tea Company, Louisville, KY: V2B Demand Charge Management Pilot](#)

Future Pilot Projects

- [2021 Alliance Center, Denver CO: V2B Demand Charge Management Pilot - installation scheduled for Q1 2021](#)
- [2021 Center at Donaldson, Plymouth, IN: V2B Demand Charge Management Pilot - installation scheduled for Q4 2021](#)
- **2021** - Pilot with Investor Owned Utility in Texas (not yet announced)

- **2021** - Pilot Municipal Utility in Florida (not yet announced)
- **2021** - Several commercial V2B demand charge management and utility demand response pilots in the Northeast with private partners