



**Comments of the Vehicle-Grid Integration Council (VGIC) on the California Energy Commission (CEC) Vehicle-Grid Integration Market Status and Funding Concepts Workshop**

Docket # 19-AB-2127

*Implementation of AB 2127 Electric Vehicle Infrastructure Assessments*

Ed Burgess  
Senior Policy Director

Zach Woogen  
Policy Manager

**VEHICLE-GRID INTEGRATION COUNCIL**  
10265 Rockingham Dr.  
Suite #100-4061  
Sacramento, California 95827  
Telephone: (510) 665-7811  
Email: [vgicregulatory@vgicouncil.org](mailto:vgicregulatory@vgicouncil.org)

Filed: August 12, 2022

Comments submitted via:

<https://efiling.energy.ca.gov/Ecomment/Ecomment.aspx?docketnumber=19-AB-2127>

## **I. Introduction**

The Vehicle-Grid Integration Council (“VGIC”) <sup>1</sup>, a 501(c)6 membership-based advocacy group, is pleased to provide comments in response to the California Energy Commission (“CEC”) Workshop on Vehicle-Grid Integration Market Status and Funding Concepts hosted on July 28, 2022.

VGIC is committed to advancing the role of electric vehicles (“EVs”) and vehicle-grid integration (“VGI”) through policy development, education, outreach, and research. VGIC supports the transition to decarbonized transportation and electric sectors by ensuring the value from EV deployments and flexible EV charging and discharging is recognized and compensated to achieve a more reliable, affordable, and efficient electric grid.

## **II. The CEC should host annual VGI market status updates.**

During the workshop, CEC staff, California Public Utilities Commission (“CPUC”) Energy Division staff, and representatives from industry and utilities identified vital policy and market developments for VGI solutions. Notably, the term “VGI” encompasses a wide array of strategies, including dynamic rates, direct and indirect managed charging programs, automated load management (“ALM”) and EV energy management systems, bidirectional charging interconnection, standards, programs, and rate design, and EV supply equipment (“EVSE”) integrated with co-located or integrated distributed energy resources (“DERs”). Meanwhile, the development of the VGI market to support California’s decarbonization goals hinges on actions taken by the CEC, CPUC, California Air Resources Board, California Building Standards Commission, investor-owned utilities (“IOU”), publicly-owned utilities, community choice aggregators, standards developments organizations, national laboratories and research institutions, testing laboratories, private companies, environmental justice groups, community-based

---

<sup>1</sup> VGIC member companies and supporters include American Honda Motor Co., Inc., dcbe, Enel X North America, Inc., ENGIE NA, Fermata Energy, FlexCharging, FLO EV Charging, Ford Motor Company, FreeWire Technologies, Inc., General Motors Company, Kaluza, Nissan Group of North America, Nuvve Holding Corporation, Sacramento Municipal Utility District, Stellantis N.V., Sunrun, Switch EV Ltd, The Mobility House, Toyota Motor North America, Inc., Veloce Energy, Inc., Wallbox USA Inc., and WeaveGrid. **The views expressed in these Comments are those of VGIC, and do not necessarily reflect the views of all individual VGIC member companies or supporters.** (<https://www.vgicouncil.org/>)

organizations, ratepayer advocates, customer groups, and more. Given the complex landscape of issues and relevant parties, VGIC believes the CEC should host an annual VGI market status update workshop to provide a “health check-up” on progress toward SB 676, discuss remaining roadblocks, and consider strategies to alleviate barriers to market development. VGIC believes annual workshops can also support the development of an update to the 2014 VGI Roadmap, should the CEC intend to lead or support such an effort in the future.

Regular VGI market status update workshops should feature stakeholders with differing perspectives and highlight funding opportunities, dynamic rate options, and critical challenges and opportunities for VGI, just as was done during the July 28<sup>th</sup> workshop. As noted during the workshop, dynamic rates are an effective approach to enable VGI and were adopted in the December 2020 VGI Strategies Decision (CPUC D.20-12-029) as a VGI strategy according to SB 676. However, VGIC recommends future VGI market status updates focus on and direct reference programmatic VGI approaches – in addition to rates – that have also demonstrated success for customers and market actors over the past few years. For example, Pacific Gas & Electric’s (“PG&E”) VGI Pilots, which pilot program design rather than technology, the Emergency Load Reduction Program (“ELRP”) EV/VGI Aggregator Pathway, Low Carbon Fuel Standard (“LCFS”) holdback-funded Resilient Charging Pilot, and demand response (“DR”) options that EVs may qualify for all represent proven or promising programmatic approaches to VGI. VGIC believes there is a significant education gap related to DR participation options for EVs, which was highlighted during the March 9, 2021 “EVs in DR” workshop and the May 10, 2021 workshop report.<sup>2</sup>

Additionally, VGIC notes the July 28<sup>th</sup> workshop did not prominently feature ALM solutions and options, which were adopted in the December 2020 VGI Strategies Decision as a near-term VGI priority. This is not unique to this workshop, as the requirement that IOUs implement ALM in EV programs, rules, and tariffs has been largely ignored (except for PG&E’s proposed EV Charge 2 program) to date.<sup>3</sup> Yet, ALM can accelerate EVSE deployment, reduce customer and

---

<sup>2</sup> EVs and DR: VGI-DR Workshop Report. May 10, 2021.

<https://static1.squarespace.com/static/5dcde7af8ed96b403d8aeb70/t/60a452d8c996a914d3c60f1d/1621381853358/VGI+DR+Workshop+Report.pdf>

<sup>3</sup> See *Comments of VGIC on Revised TEF* at pg 10 and *Reply Comments of VGIC on Revised TEF* at pg 6 and pg 8 footnote 17 for background on ALM implementation in CA:

system costs, and support other VGI use cases and desired policy objectives like demand management and increased EVSE uptime. With this in mind, VGIC urges the CEC to host annual market status updates that build on the July 28<sup>th</sup> workshop by additionally including programmatic VGI options and ALM as focus areas.

### **III. Recommended enhancements to VGI funding concepts.**

VGIC greatly appreciates the CEC staff’s focus and thoughtful development of VGI funding concepts presented during the July 28<sup>th</sup> workshop. VGIC generally supports the four funding concepts but recommends targeted modifications and enhancements to address critical gaps in the VGI market, detailed below.

#### **A. Bidirectional Charger Equipment Rebate and Make-Ready Support**

VGIC supports the CEC staff’s proposed Bidirectional Charger Equipment Rebate funding concept. Bidirectional charging equipment unlocks:

- Customer and community resilience by providing clean, low-cost backup power solutions
- Customer bill management opportunities by discharging from a vehicle to meet site load, performing energy arbitrage or demand charge management
- Revenue generation for customers and support for grid reliability and renewable energy integration through vehicle-to-grid (“V2G”) exports. Customers can currently participate in the ELRP EV/VGI Aggregation pathway and PG&E’s V2G Pilots. Additionally, VGIC is hopeful that PG&E’s pending Day-Ahead Hourly Real Time Pricing (“DAHRTP”) V2G export compensation mechanism settlement will be approved by the CPUC, which would provide a compelling year-round V2G export opportunity for commercial customers as early as October 2023.<sup>4</sup> Lastly, SDG&E’s

---

<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M471/K485/471485566.PDF> and <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M477/K591/477591920.PDF>

<sup>4</sup> *Joint Motion of Public Advocates Office, VGIC, Electrify America, and PG&E for Adoption of Joint Settlement Agreement in PG&E’s DAHRTP Commercial EV Proceeding on Non-NEM Export Compensation Pilot.* June 17, 2022.

<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M488/K538/488538216.PDF>

anticipated Real-Time Pricing Import/Export Rate<sup>5</sup> and the CPUC staff's proposed CalFUSE concept<sup>6</sup> may provide additional future opportunities for export compensation.

Despite the customer and grid benefits of bidirectional charging, deployment numbers and product offerings remain relatively nascent and the incremental costs of installing bidirectional chargers instead of unidirectional charging remain high – prohibitive in many cases. The CEC's proposed Bidirectional Charging Equipment Rebate will provide much-needed support to reduce the costs of purchasing and installing bidirectional chargers and associated electrical equipment, including traditional make-ready infrastructure and automatic transfer switches for backup power use cases. Notably, bidirectional charging equipment is not currently given incrementally higher funding under CEC rebates or make-ready programs. Although a type of energy storage, bidirectional charging equipment is not deemed eligible for California's Self-Generation Incentive Program. There exists an uneven level of access to funding for bidirectional charging equipment compared to other charging equipment and other energy storage systems.

As proposed, the Bidirectional Charger Rebate could be open to recipients of CALeVIP, EnergiIZE, and, potentially, utility make-ready programs. VGIC urges the CEC to think expansively about and take bold action regarding (1) the level of funding offered and (2) charger eligibility for a bidirectional adder under these programs. Today's commercially available bidirectional charger equipment are V2X Direct Current ("DC") configurations, and many V2X DC sites, including school bus V2X sites that provide immense value to the grid and customers, need to upgrade to 3-phase, higher voltage DC service. These upgrades result in higher costs than what is typically covered by utility make-ready programs, which are intended to support Level 2 Alternating Current ("AC") charging. Without sufficient funding support for these projects,

---

<sup>5</sup> *Administrative Law Judge's Ruling Regarding Staff Recommendations and Workshop and Attachment A: Staff Recommendations*. June 15, 2022.

<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M485/K625/485625918.PDF> and  
<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M485/K564/485564404.PDF>

<sup>6</sup> *Advanced Strategies for Demand Flexibility Management and Customer DER Compensation*. June 22, 2022.

<https://www.cpuc.ca.gov/-/media/cpuc-website/divisions/energy-division/documents/demand-response/demand-response-workshops/advanced-der---demand-flexibility-management/ed-white-paper---advanced-strategies-for-demand-flexibility-management.pdf>

customers will be unable to offset high upfront installation costs and may terminate otherwise beneficial projects.

Additionally, not all available bidirectional chargers – of which there is only a handful on the market – currently qualify for CEC rebate and utility make-ready programs. The Nissan LEAF is the most common bidirectional charging vehicle, with approximately 25,000 currently on California’s roads, and uses the CHAdeMO standard for bidirectional charging.<sup>7</sup> Meanwhile, CALeVIP,<sup>8</sup> EnergiIZE,<sup>9</sup> utility make-ready programs,<sup>10</sup> and National Electric Vehicle Infrastructure (“NEVI”) program administrators have decided to end support for CHAdeMO connectors.<sup>11</sup> VGIC expects all chargers, including bidirectional chargers, will converge on common connector types and communication standards in the long term. However, we believe that interim or temporary support for CHAdeMO standards is appropriate in recognition of the ability for bidirectional charging to meet the unique reliability challenges California faces over the next several years due to potential capacity shortfalls and extreme weather events. VGIC estimates that California’s 25,000 Nissan LEAFs equate to 469 MW in total technical potential for incremental contributions to net peak load. Not all vehicles will be able to participate at once, however, VGIC estimates that a 5% participation rate would equate to approximately a 23 MW of potential net peak contribution from today’s Nissan LEAFs.<sup>12</sup>

Meanwhile, V2X AC configurations can be piloted in California but do not need to comply with certain Rule 21 interconnection requirements for smart inverter standards. Instead, the major

<sup>7</sup> See VGIC’s estimates for bidirectional vehicle deployment in September 1, 2021 Opening Testimony in R.20-11-003. Pg 4-10.

<https://static1.squarespace.com/static/5dcde7af8ed96b403d8aeb70/t/6137a2f643f8bc74a42af9ae/1631036151186/2021-09-01+VGIC%27s+Opening+Testimony+on+Phase+2+Emergency+Reliability+Proposals+-+FINAL.pdf>

<sup>8</sup> *Recommendation for Deployment of ISO 15118-Ready Chargers*. California Energy Commission. February 24, 2022.

<sup>9</sup> *Implementation Manual for Energy Infrastructure Incentives for Zero-Emission Commercial Vehicles Projects (EnergiIZE)*. August 2, 2022. Pg 21.

[https://energiize.org/implementationmanual/EnergiIZE\\_Implementation+Manual\\_+Q3+2022+vFinal.pdf](https://energiize.org/implementationmanual/EnergiIZE_Implementation+Manual_+Q3+2022+vFinal.pdf)

<sup>10</sup> *Decision Adopting Plug-In Electric Vehicle Submetering Protocol and Electric Vehicle Supply Equipment Communication Protocols*. August 4, 2022. Pg 44.

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M496/K419/496419890.PDF>

<sup>11</sup> *Notice of Proposed Rulemaking, National Electric Vehicle Infrastructure Formula Program*. Federal Highway Administration. Pg 37263. <https://www.govinfo.gov/content/pkg/FR-2022-06-22/pdf/2022-12704.pdf>

<sup>12</sup> See VGIC’s estimates for bidirectional vehicle capabilities to support peak contributions September 1, 2021 Opening Testimony in R.20-11-003. Pg 6.

<https://static1.squarespace.com/static/5dcde7af8ed96b403d8aeb70/t/6137a2f643f8bc74a42af9ae/1631036151186/2021-09-01+VGIC%27s+Opening+Testimony+on+Phase+2+Emergency+Reliability+Proposals+-+FINAL.pdf>

investor-owned utilities have adopted a requirement that costly relay equipment be installed to ensure safety and reliability.<sup>13</sup> The necessary relay equipment to run a V2X AC pilot is prohibitively expensive and not a long-term solution. Standards development work is underway at the relevant standards development organization, including UL, and is supported by utilities and automotive stakeholders alike. The completion and implementation of these standards will unlock lower-cost approaches to V2X AC. However, VGIC recognizes that this standards development work is not yet completed and anticipates some delay between the publication of relevant standards and final incorporation into Rule 21 processes. With this in mind, VGIC recommends the CEC's proposed bidirectional charging equipment adder be open to V2X AC pilot projects and provide sufficient funding levels to offset costs installation costs, including safety relay equipment and trip schemes.

Therefore, the CEC's proposed bidirectional charger rebate could best support the nascent bidirectional charging market by ensuring a sufficiently high level of funding support is offered to *all* bidirectional chargers, regardless of what level of funding, if any, they are eligible to receive from CEC rebate and make-ready programs. VGIC offers that the defining eligibility requirement for the bidirectional charger rebate could be based on whether a bidirectional EVSE can seek interconnection with a utility. In the case of V2X DC sites interconnecting to participate in the investor-owned utility's Emergency Load Reduction Programs, EVSE would need to be certified to UL 1741, but not UL 1741 SA, SB, or any updated smart inverter standards established by the Smart Inverter Working Group. V2X DC sites interconnecting with investor-owned utilities for purposes other than ELRP would need to have EVSE certified to UL 1741 SA, but not SB, due to the 5-year grace period extended to V2X DC EVSE to meet applicable standards. Lastly, V2X AC sites do not need to meet certain Rule 21 interconnection requirements if seeking interconnection as a pilot project, as detailed in CPUC Resolution E-5165. VGIC recommends the CEC revisit these eligibility requirements once the V2X market is sufficiently developed and it is appropriate to impose similar connector and communication standard requirements to what is required under CEC rebate and utility make-ready programs.

---

<sup>13</sup> *Resolution E-5165. Approval, with Modifications, of Vehicle-to-Grid Implementation Plans and Technical Requirements in Compliance with Decision 20-09-035.*

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M420/K860/420860657.PDF>



*B. Automated Load Management (“ALM”) Incentives*

As noted above in Section II, ALM solutions were deemed a near-term policy action in recognition that ALM is an important tool for meeting California’s TE goals. Encouraging customers to voluntarily choose ALM solutions can be a powerful tool for both streamlining and minimizing the total costs of TE. However, to date, ALM has not been promoted or implemented by California’s utilities in their TE programs or any other pathway, apart from PG&E’s EV Charge Network and the proposed PG&E EV Charge 2. ALM strategies can reduce energization timelines and associated costs by deferring or even completely avoiding the need for certain distribution utility infrastructure upgrades and other make-ready work. ALM solutions include:

- Software-based approaches that share available electrical capacity among EVSE: Sites with multiple EVSE and long dwell times, including workplace charging sites and multi-unit dwellings, are particularly well suited for software-based ALM. Software-based ALM is used to draw less total power than the aggregate nameplate charging rate at a site. For example, a site with a combined 76 kW maximum charger demand could use software to ensure the actual demand does not exceed 62 kW.
- Battery-integrated EVSE or co-located energy storage systems sized to avoid or defer the need for additional electrical capacity and infrastructure on both the utility and customer side of the meter: Sites with short dwell times, including public DCFC stations and certain fleet charging depots, are particularly well suited to implement integrated or co-located energy storage as an ALM solution. Batteries can be integrated into a charging station or external to a charging station but co-located behind the same meter. These batteries charge from the grid when EVSE utilization and energy costs are low and discharge to meet EVSE load when utilization and energy costs are high. For example, using existing battery-integrated EVSE or co-located energy storage technologies, a site with less than 30 kW of available power could deliver a 200 kW charge to a single vehicle. Said another way, a site with a 200 kW EV charging demand can inherently ensure demand will not exceed 30 kW.

For some EVSE site hosts, ALM solutions can facilitate the interim use of EVSE at a lower power until any needed distribution utility and on-site infrastructure upgrades are completed, at which



point they can operate at full power. For others, ALM solutions can defer or avoid the need for distribution utility or on-site infrastructure upgrades altogether. In these cases, site hosts experience reduced time to connect/energize their EVSE and contribute to infrastructure cost savings which accrue to site hosts, drivers, and utility ratepayers at large. Additionally, ALM solutions can support other desirable use cases, including managing charging load during peak electricity demand, lowering demand charges for the site host, enabling EV charging when the grid goes down, providing backup power to the site host to enhance resilience, or providing power to the site and ancillary services to the grid. The set of these co-benefits available to a given site will depend on whether software-based ALM or integrated/co-located energy storage – or both – strategies are implemented.

Utility make-ready programs do not send the proper price signals to the market and, to VGIC’s knowledge, the CEC-funded rebate programs like CALeVIP and EnergiIZE do not actively promote ALM solutions. Collectively, these programs inadvertently undermine any justification for customers to elect ALM solutions that right-size infrastructure and accelerate deployment. As such, VGIC recommends the CEC consider a funding concept to promote ALM. VGIC believes the following design elements are key to successful ALM implementation:

- Ensuring ALM is an option for customers to choose from and not a requirement.
- Conducting marketing, education, and outreach to inform utilities and customers of available ALM solutions and the benefits associated with each.
- **Offering incentives to site hosts that elect ALM, including:**
  - 1) A \$/kW rebate for reducing distribution utility infrastructure upgrades, applied to each kW reduced below aggregate nameplate charger capacity at a site. Notably, total to-the-meter make-ready cost data for non-TE program installations are published in the EV Load Research Report, and total kW deployed in non-TE program installations is tracked in the same report.<sup>14</sup> This data can be used to find the average \$/kW value of ALM and, in turn, can provide the basis for a \$/kW

---

<sup>14</sup> Joint IOU Electric Vehicle Load Research and Charging Infrastructure Cost Report: 10<sup>th</sup> Report Filed on March 21, 2022. Pg 120, Attachment 1 Table 2; Attachment 2 Table 2; Attachment 3 Table 2.

<https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M464/K783/464783120.PDF>

incentive applied to each kW an ALM approach reduces below aggregate nameplate capacity at a site.

- 2) A fixed incentive for installing EVSE behind existing utility meters. The value of this incentive should also be commensurate with the average cost of installing a new meter.

VGIC recognizes that technical standards are being developed that may streamline the deployment of ALM software.<sup>15</sup> Additionally, VGIC has recommended to the CPUC that the above ALM incentive approaches be included in Funding Cycle 1 (2025-2030) of the proposed Statewide Behind-the-Meter Rebate Program.<sup>16</sup> However, these developments may not be realized for several years. In the interim, VGIC recommends the CEC consider a new, separate “ALM Incentives” funding concept based on the two types of incentives highlighted above.

### *C. Support for Meter Socket Based Solutions and Electrical Isolation Methods*

In January 2021, the CPUC issued a Decision directing utilities to develop pathways to evaluate and approve low-cost, reliable electrical isolation methods.<sup>17</sup> These isolation methods can support vehicle-to-home (“V2H”) and vehicle-to-building (“V2B”) backup power solutions for customers where an automatic transfer switch is too costly, not possible given physical constraints, or simply not the preferred configuration. Although the CPUC has directed the utilities to develop pathways to approve such low-cost isolation methods, solutions that rely on a meter socket form factor do not qualify for CEC rebates or utility make-ready programs intended to support EVSE. For example, the IslandDER<sup>18</sup> and Tesla Backup Switch<sup>19</sup> are both low-cost isolation solutions

<sup>15</sup> See, for example, IEEE 2030.13 committee.

<sup>16</sup> See *Comments of VGIC on Revised TEF* at pg 10 and *Reply Comments of VGIC on Revised TEF* at pg 6 and pg 8 footnote 17 for recommendations to implement ALM in CA under the proposed BTM Rebate Program: <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M471/K485/471485566.PDF> and <https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M477/K591/477591920.PDF>

<sup>17</sup> *Decision Adopting Rates, Tariffs, and Rules Facilitating the Commercialization of Microgrids Pursuant to Senate Bill 1339 and Resiliency Strategies*. January 14, 2021. Pg 70.

<https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M361/K442/361442167.PDF>

<sup>18</sup> <https://connca.com/products/islandder/>

<sup>19</sup> <https://www.tesla.com/support/energy/powerwall/learn/tesla-backup-switch>

August 12, 2022



that utilize meter socket devices and could enable low-cost V2H and V2B but do not qualify for incentives.

With this in mind, VGIC urges the CEC to ensure meter socket-based solutions are deemed eligible in current and planned CEC funding concepts to ensure a level playing field for customers to access rebates for these solutions. Notably, Siemens and ConnectDER recently announced a meter socket product that could facilitate VGI for customers that do not want to upgrade their electrical panel. Including meter socket-based VGI technologies in existing and new rebate programs would directly reduce customer costs and increase access to low-cost V2H/V2B backup power solutions.

#### **IV. Conclusion**

VGIC appreciates the leadership of the CEC in hosting the VGI market status update workshop and developing VGI funding concepts. We look forward to further collaboration with the CEC and other stakeholders on this important initiative.

Respectfully submitted,  
ED BURGESS