November 30, 2022

Email to: docket@energy.ca.gov
Docket Number: 21-ESR-01
Subject: Request for Information on Clean Energy Resources for Reliability

Re: Comments of the Vehicle Grid Integration Council on Request for Information on Clean Energy Resources for Reliability

Dear Sir or Madam:

The Vehicle Grid Integration Council ("VGIC") [1] appreciates the opportunity to comment on the Request for Information on Clean Energy Resources for Reliability ("RFI") released on November 3, 2022. VGIC commends the California Energy Commission ("CEC") for its efforts to bolster grid reliability in the face of increased risk of extreme weather events.

I. INTRODUCTION AND SUMMARY.

The Vehicle Grid Integration Council is a 501(c)(6) membership-based trade association focused on accelerating the role of smart electric vehicle ("EV") charging and discharging through policy development, education, outreach, and research. VGIC supports the transition to a decarbonized transportation and electric sector by ensuring the value from EV deployments and flexible EV charging and discharging is recognized and compensated in support of a more reliable, affordable, and efficient electric grid.

Senate Bill ("SB") 846 has tasked the CEC to develop a Clean Energy Reliability Investment Plan ("CERIP") and a goal for load shifting. Meanwhile, Assembly Bill ("AB") 205 has tasked the CEC with developing the Distributed Electric Backup Asset ("DEBA") program to "incentivize the construction of cleaner and more efficient distributed energy assets that would serve as on-call emergency supply or load reduction for the state's electrical grid during extreme events."[2] VGIC strongly believes the DEBA program guidelines be simple, universally accessible, and prioritize clean resources, as recommended in stakeholder comments submitted on November 10, 2022 in response to the October 28, 2022 workshop on Clean Energy Alternatives for Reliability. It is critical that the DEBA program yield real-world load reductions and exports that will meaningfully support grid reliability, and to do so the DEBA must fill existing gaps in policy and funding support. With

[1] VGIC member companies and supporters include American Honda Motor Co., Inc., Customized Energy Solutions, dcbel, Enel X North America, Inc., ENGIE NA, Fermata Energy, FlexCharging, FLO EV Charging, Ford Motor Company, FreeWire Technologies, Inc., General Motors, IoTecha, Kaluza, Kitu Systems, 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/).

[2] AB 205 Energy. Article 2, Section 25791(a).

this in mind, VGIC offers the below overarching recommendations to the CEC in Sections II-IV, in addition to detailed responses to the RFI questions in Sections V-VII:

- DEBA program design should include a $/kW incentive program to offset the incremental upfront costs of installing bidirectional EV chargers and storage-backed managed charging that act as on-call resources during grid emergencies.
- CEC should coordinate with the CPUC to establish a pathway to participating in ELRP and other DR programs using onboard vehicle telematics.
- Storage-backed managed charging should be assessed as part of CERIP and be eligible for DEBA incentives.

II. DEBA PROGRAM DESIGN SHOULD INCLUDE A $/KW INCENTIVE PROGRAM TO OFFSET THE INCREMENTAL UPFRONT COSTS OF INSTALLING BIDIRECTIONAL EV CHARGERS AND STORAGE-BACKED MANAGED CHARGING THAT ACT AS ON-CALL RESOURCES DURING GRID EMERGENCIES.

The potential of California's EVs to provide vehicle-to-building ("V2B") discharge (i.e., to meet site load) and vehicle-to-grid ("V2G") export through bidirectional chargers is immense. Today's commercially-available bidirectional chargers range from 10 kW to 125 kW of export capacity. Even with a conservative 5% of California's approximately 1 million EVs discharging at an average of 10 kW, 500 MW of distributed export capability would be unlocked for the grid. With an aggregation of just 500 customers operating in V2G mode, the grid could benefit from 10 MW of total instantaneous response (i.e., 5 MW of load reduction and 5 MW of export).

While not all EVs and chargers are capable of bidirectional charging, the list of bidirectional-capable products currently available to customers has rapidly expanded in just the past year, with around 30,000 Nissan LEAFs in California that can pair with Fermata chargers and likely close to 10,000 Ford F-150 Lightning Electric in California by summer 2023 that can pair with the bidirectional Ford Charge Station Pro.[3] VGIC estimates this equates to over 500 MW in total technical potential, and 25 MW of potential net peak contribution from V2G exports with a 5% participation rate.

In the medium and heavy-duty segment, electric school buses from BlueBird, Thomas Built, Proterra, and BYD, and bidirectional chargers from Nuvve and Rhombus are already planned to

[3] CEC's EV sales dashboard indicates 30,000 post-2012 Nissan LEAFs. Fermata FE-20 chargers offer 20 kW of export capability. For Ford F-150 Lightning estimates, recent sales reports show Ford approaching 10,000 nationwide sales in the first three months of customer deliveries. VGIC believes it is conservative to estimate nationwide sales would approach 20,000 by the end of summer 2023. Assuming California holds 50% of all EVs sold nationwide, VGIC estimates it is reasonable to assume 10,000 Ford F-150 Lightnings will be in California by end of summer 2023. Ford Charge Station Pro offers 10 kW of export capability. https://thedriven.io/2022/10/06/ford-triples-ev-sales-in-the-us-led-by-f-150-lightning/

reach MW-scale export capability by summer 2023.[4] Additionally, the upcoming Chevrolet Silverado EV and GMC Sierra EV will have bidirectional charging capabilities, and recent announcements from Hyundai, Kia, Volkswagen, Lucid, Rivian, Audi, and Volvo indicate upcoming bidirectional capability. Meanwhile, new bidirectional charging products, such as those from dcbel and Wallbox, are expected to be available soon.

Despite the rapid expansion of available products and the significant potential grid capacity that could be unlocked, the deployment of bidirectional charging equipment is nascent in large part due to the higher upfront costs of installing the chargers and associated equipment relative to unidirectional charging equipment. Moreover, bidirectional charging equipment, though confirmed in California Public Utilities Commission's ("CPUC") Decision 20-09-035 to be energy storage, is not eligible for California's popular Self Generation Incentive Program ("SGIP") and is not offered any incremental incentives under existing CEC or utility transportation electrification ("TE") programs. This presents a clear policy gap and bottleneck for the bidirectional charging market.

With this in mind, VGIC strongly recommends the CEC offer a transparent $/kW incentive to support the construction of these critical grid resources. Additionally, compelling and simple vehicle-to-everything ("V2X") technology incentives send a clear market signal to vehicle and charger manufacturers that have not yet begun offering bidirectional charging products to do so, thereby expanding customer choice and placing downward pressure on the future costs of installing bidirectional charging equipment. While cost data for the purchase and installation of today's bidirectional charging equipment is limited, VGIC believes a flat $1,000/kW bidirectional charging equipment incentive is critically needed to unlock the gigawatt-scale distributed energy storage capacity already embedded in California's on-road EVs.

To reduce administrative burden, VGIC recommends the flat $/kW incentive be made available on a rolling basis to aggregators for aggregations greater than 25 kW, rather than to individual projects.[5] Additionally, the incentive should accommodate the addition of individual customers that enter the aggregation at a later date. Furthermore, the minimum aggregation size should be 25 kW, to align with the Emergency Load Reduction Program's ("ELRP") Vehicle Grid Integration ("VGI") Aggregation Pilot.

VGIC also notes that V2B chargers and associated equipment, like automated transfer switches and meter-socket-based devices, can safely island a customer's load from the grid, therefore supporting the grid during extreme heat events or other tight reliability conditions. In addition to V2G export solutions, these configurations should also be eligible to receive the simple $/kW incentive.

Lastly, VGIC recommends that storage-backed managed charging should also be deemed eligible for the $1,000/kW incentive, as detailed further in Section IV below.

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[4] See VGIC's Comments on IRP Modeling Advisory Group Inputs and Assumptions. https://www.vgicouncil.org/s/2022-10-06-VGICs-Informal-Comments-on-IA-MAG-Meeting.pdf

[5] The 25 kW minimum aggregation size aligns with the Emergency Load Reduction Program's VGI Pilot.

III. CEC SHOULD COORDINATE WITH CPUC TO ESTABLISH A PATHWAY TO PARTICIPATING IN ELRP AND OTHER DR PROGRAMS USING ONBOARD VEHICLE TELEMATICS.

While bidirectional charging holds great promise as a grid resource, VGIC urges the CEC to consider the "low-hanging fruit" of unlocking greater load shift participation from EVs. VGIC estimates another 250,000 EVs will be sold in the state by summer 2023, on top of the 1 million already on California's roads.[6] Assuming an average charging load of only 5 kW per vehicle, this represents a total technical potential of 6,250 MW in instantaneous load that could theoretically be reduced via managed charging ("V1G"). Obviously, the practical potential is only a small fraction of that since not all of those devices will be charging during the critical net peak load hours of 6-9pm, and not all EV owners will choose to participate in V1G activities. However, VGIC estimates that even under a more reasonable participation rate of 5%, approximately 312 MW of net peak load reduction from V1G might be achievable by the end of summer 2023.

Historically, customers with certain smart chargers have been able to participate in California's limited portfolio of smart charging pilots and programs. Meanwhile, the underlying tech needed to facilitate greater participation in load shift programs and rates is embedded in most EVs themselves via the onboard vehicle telematics capabilities. Telematics-based pilots are increasing in number, for example, Sacramento Municipal Utility District's ("SMUD") recently announced BMW/Ford/GM pilot, PG&E's evPulse program, and PG&E's BMW ChargeForward pilot. However, the largest VGI pilot, ELRP, remains closed to telematics-based load management, and no mass-market (i.e., non-pilot) VGI program utilizing vehicle telematics has been proposed or established in California. By unlocking both smart chargers and vehicle telematics participation pathways for ELRP, DSGS, and any other upcoming load reduction programs and rates, California can solve for a critical "missing link" in its load reduction capabilities.

VGIC strongly recommends the CEC work with the CPUC to enable telematics participation in ELRP, the CEC's Demand Side Grid Support ("DSGS") program, and other demand response or VGI program offerings. Recently, the CPUC directed that a workshop dedicated to this subject must be hosted by August 2023, and party proposals may be considered following this workshop. However, this workshop will be dedicated to a telematics submetering protocol for the purposes of rate participation and customer billing, but would not address expanding programs, such as ELRP, to allow for telematics-based participation.

IV. STORAGE-BACKED MANAGED CHARGING SHOULD BE ASSESSED AS PART OF CERIP AND DEEMED ELIGIBLE FOR DEBA INCENTIVES.

VGIC appreciates the CEC's inclusion of V1G and V2B as demand resources and V2G as a supply/demand resource in its preliminary approach. However, VGIC encourages the CEC to also consider the attributes of storage-backed managed charging. Storage-backed managed charging utilizes stationary energy storage co-located or integrated with an EV charger to buffer charging

[6] CEC ZEV Sales Dashboard.

sessions and flatten a site's peak load. This approach is currently in use at public Direct Current Fast Charger ("DCFC") sites as well as fleet depots which otherwise may have had limited ability to reduce peak demand given the expectations of those drivers and fleets. While public DCFC is not typically considered a candidate use case for managed charging, utilizing a co-located or integrated stationary energy storage system can transform these sites into more flexible load management assets. Moreover, this storage-backed configuration can also support charger reliability and uptime by providing backup power during grid outages. Lastly, these sites can significantly reduce costs for grid upgrades in some cases, for example by deferring or avoiding transformer and other secondary distribution system upgrades, which in turn helps protect utility ratepayers from the rising costs of transportation electrification related utility infrastructure. Example commercial implementations of this configuration include recent installations from Electrify America[7] and FreeWire Technologies[8].

Despite these many benefits, this type of configuration is not currently promoted or incentivized through CEC or utility programs, and is overall under deployed in California. VGIC believes adoption has been hampered due to the lack of promotion or incentive to elect these options, despite their obvious benefits. Namely, utility-side infrastructure upgrade costs are typically socialized to all ratepayers, leaving no reason for customers to choose these systems that can reduce system cost, help manage load, provide benefits such as site backup power, and alleviate congestion in backlogged utility service connection queues. VGIC believes an appropriate technology incentive, e.g., DEBA, can correct this market failure, although none has been proposed by the CEC or utilities to date.

While energy storage appears in Tables 1 and 3, and managed charging appears in Table 2, VGIC strongly recommends the CEC consider the hybrid "Storage-backed electric vehicle managed charging" as a supply/demand resource type in Table 3 for the purposes of the resource evaluation effort as well as the DEBA incentive, as it is a unique resource configuration that holds significant potential benefits for the grid, drivers and fleets, and utility ratepayers. Moreover, VGIC strongly recommends that storage-backed V1G be eligible to receive the same DEBA incentive open to V2B and V2G charging equipment, given its similar costs, use cases, and customers.

V. RESPONSES TO RFI QUESTIONS ON RESOURCE TYPES AND EVALUATION ATTRIBUTES.

Question 2. Are there resources that should be added to or removed from the preliminary list under each of the categories (shown in Tables 1, 2, and 3)?

VGIC recommends adding storage-backed managed charging to Table 3, as detailed above in Section IV.

[7] https://media.electrifyamerica.com/en-us/releases/199
[8] https://insideevs.com/news/613621/chevron-texaco-stations-freewire-chargers/

Question 4. How should the attributes be weighted relative to each other? Should some attributes be weighted more than others?

California has a myriad of overlapping decarbonization goals, yet two of the largest culprits of greenhouse gas emissions and local air pollutants remain the transportation and electric sectors. With this in mind, VGIC recommends the CEC apply the strongest weighting to the "policy alignment" attribute, as it promotes much-needed efficiency in implementing intersecting state policy goals, such as electric and transportation sector decarbonization.

Question 5. What data/information sources can help inform characterization and evaluation (both qualitative and quantitative) of the different resources?

Regarding the permitting and interconnection attributes, VGIC notes that the CPUC's Decision 20-09-035 determined that bidirectional charging systems are energy storage for the purposes of interconnection, therefore the CEC should equate the V2G, V2B, and stationary energy storage permitting and interconnection attributes in their assessment.

Regarding the equity attributes of all four VGI resource types (V1G, storage-backed V1G, V2B, and V2G), VGIC notes that these solutions either reduce charging costs or offer grid services revenues, which ultimately lowers the total cost of ownership and, in turn, make EVs more accessible for low-income, DAC, and tribal communities. Additionally, these VGI approaches promote efficient use of existing grid infrastructure, thereby lowering the ratepayer impact of supporting transportation electrification and the electricity bills for all utility customers. Lastly, the lower total cost of ownership resulting from VGI is particularly supportive of medium- and heavy-duty vehicle electrification and thus lowers emissions, including pollution from diesel fuel, along trucking corridors, ports, and other industrial areas most often located in or near low-income, disadvantaged communities ("DACs"), and tribal communities.

VI. RESPONSES TO RFI QUESTIONS ON RESOURCE CHARACTERIZATION.

Question 1. Please provide a general overview of the resource, including the following: Resource category (e.g., supply, demand) and type (e.g., solar) and scale (e.g., utility, distributed)?

VGIC supports the proposed resource categories and types in Tables 1-3 of the RFI, and references its above comment on adding storage-backed managed charging as a resource.

Question 2. How does the resource compare to conventional generation in terms of greenhouse gas and priority pollutant emissions?

All four VGI resources (V1G, storage-backed V1G, V2B, and V2G) not only represent clean grid resources, but also support reductions in greenhouse gas and priority pollutants in the transportation sector, California's most polluting sector.

Question 3. How does the resource support reliability (e.g., supply, permanent load reduction, net peak reduction, or emergency asset?) (List all that apply.)

- Managed charging (V1G) and vehicle-to-building (V2B)**:** Demand resource, net peak reduction, emergency asset

- Vehicle-to-grid (V2G) and storage-backed V1G: Supply/demand resource, net peak reduction, emergency asset

Question 3a. How can the resource be used as an incremental on-call resource during emergencies?

All four VGI resource types can participate in ELRP, DSGS, another utility pilot or program (e.g., PG&E's VGI Pilots), or dynamic rate option as incremental on-call resources during emergencies. By unlocking participation pathways for onboard vehicle telematics, incremental managed charging (V1G) resources can be used during emergencies. V2B and storage-backed V1G could be configured to island from the grid during emergencies, thereby providing instantaneous load reduction.

Question 4. How many new MWs and MWhs can the resource provide per year, taking into account resource characteristics and known barriers between now and 2035?

- Managed charging (V1G): As noted in Section III above, VGIC estimates a conservative 5% participation rate would yield approximately 312 MW of net peak load reduction from V1G by the end of summer 2023.

- Storage-backed managed charging (V1G): VGIC has no estimate at this time, but offers that it is likely greater than the V1G capability since the average charger using storage-backed managed charging is much larger (e.g., 150 kW DCFC vs 7 kW Level 2). Conservatively, VGIC estimates this resource could yield at least 312 MW of net peak load reduction in the near-term, but acknowledges it may be much higher if construction is properly incentivized as discussed above in Section IV.

- Vehicle-to-building (V2B): VGIC estimates around 30,000 Nissan LEAFs in California that can pair with 20 kW Fermata chargers and likely close to 10,000 Ford F-150 Lightning Electric in California that can pair with 10 kW Ford chargers by summer 2023 to offer over 500 MW in total technical potential, and 25 MW of potential net peak contribution from V2G exports with a 5% participation rate. However, this capability, since non-exporting, is limited by the amount of co-mingled site load at the charging site that could be served through V2B discharging.

- Vehicle-to-grid (V2G): With the proper export programs and rate designs in place, for example a full-scale ELRP, VGIC estimates the near-term capability from the light-duty segment to equal the 500 MW total technical capability and 25 MW using 5% participation rate noted above in the V2B case. Notably, V2G exports would not be limited by site load. The medium- and heavy-duty segment could also add significant capacity in the near-term,

considering that all new Blue Bird electric school buses arrive V2G-capable, and that Thomas Built, Proterra, and BYD, comprising the overwhelming majority of the electric school bus market, all offer bidirectional school buses.

Question 9. What are the key non-financial barriers to the development and implementation of this resource (including, but not limited to, permitting, interconnection, supply chain, customer acceptance, and alignment with policy goals)?

As discussed above in Section III, the key non-financial barrier to more significant implementation of managed charging (V1G) is the lack of a pathway for customers to participate in programs and rates via vehicle telematics.

Question 10. What are the key financial barriers to the development and implementation of this resource?

As discussed in Section II above, VGIC believes the key financial barriers to greater deployment of bidirectional charging equipment is the high upfront cost of the equipment as well as construction and installation costs. Storage-backed managed charging faces the same financial barrier, and VGIC reiterates its recommendation that an incentive is provided to offset the costs of storage-backed managed charging solutions.

Question 11. What types of benefits or impacts is the resource anticipated to have on low income and
disadvantaged communities, and tribes, if any in terms of development and deployment?

As discussed above in Section V, VGIC believes each of the four VGI resources bring considerable benefits to low-income and DACs, as well as tribes, through reduced costs of ownership, reduced utility ratepayer impact, and reduced transportation sector emissions within those communities.

VII. INPUT ON DISTRIBUTED ELECTRICTY BACKUP ASSETS PROGRAM DESIGN.

VGIC believes that VGI solutions should be prioritized in the DEBA program as a solution set that:

- Offers dispatchable assets to meet grid needs
- Generates no onsite greenhouse gas ("GHG") emissions or air pollution, and offsets emissions and air pollution from the transportation sector, California's most polluting sector
- Incurs relatively minimal incremental costs, since the underlying technology is purchased and, to some extent, already deployed for the transportation sector use case
- Remains unsupported through existing mass-market CEC or utility programs

VGI technology is therefore a critical resource type for the new DEBA program, as it will both add capacity to California's Strategic Reliability Reserve and offset the use of normally prohibited resources. Additionally, bidirectional charging resources specifically can support community resiliency during local grid outages by providing backup power directly to a site or islanded microgrid.

VGIC, therefore, commends the CEC for considering VGI resources in their initial resource classification and recommends the below modifications and enhancements to the CEC's proposed approach:

Question 1) What size of resource and what types of customers should the program target?

VGIC believes the program should target small distributed resources, including VGI aggregations, that are historically under procured relative to large, in-front-of-the-meter, utility-scale resources.

Question 2) What types of incentive structures and amounts are needed to accelerate the development and deployment of this resource?

See VGIC's response in Section II above, detailing a flat $1,000/kW for bidirectional charging equipment and storage-backed V1G configurations.

Question 3) What types of conditionalities and measurement and verification requirements should the program include to ensure funded resources participate and deliver during emergency events?

VGIC recommends that resources receiving DEBA incentives be required to participate in one of the following programs or rates:

- ELRP
- DSGS or other Load-Serving Entity ("LSE") program
- Dynamic rates, including PG&E's Day-Ahead Hourly Real-Time Pricing ("DAHRTP") Commercial EV Rate
- PG&E's VGI Pilots, SDG&E's proposed EV DR Pilot, SCE's proposed V1G pilot, or any similar pilots or programs available to EVs that include a price signal or alert during emergency events
- Islanding in response to grid emergency signal, i.e. for V2B and storage-backed V1G
- Direct wholesale market participation

Critically, customers must be given a choice as to which pathway they would like to participate in.

VIII. CONCLUSION.

VGIC appreciates the opportunity to provide this response to the RFI and looks forward to collaborating with the CEC and other stakeholders in this docket.

Respectfully submitted,

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