March 26, 2020

To: Eric Martinot, Gridworks
Matthew Tisdale, Gridworks
Mac Roche, Gridworks

cc: Vehicle-Grid Integration (VGI) Working Group

Subject: CESA's informal comments for the VGI Working Group

Re: CESA's informal comments on the draft VGI Working Group policy recommendations

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Dear Gridworks and VGI Working Group:

The California Energy Storage Alliance (CESA) appreciates the opportunity to participate in the Vehicle-Grid Integration (VGI) Working Group. In particular, CESA is interested in offering our unique perspective and in developing policy recommendations to advance VGI. Our informal comments below are structured to focus on various different categories of policy recommendations.

Introduction

CESA commends Gridworks and participants for making significant progress in identifying and ranking various VGI use cases and compiling an initial list of policy recommendations. In the first stage of the working group, participants answered the Commission's questions on: "What VGI use cases can provide value now, and how can that value be captured?" Now, the working group is delving into the second question: "What policies need to be changed or adopted to allow additional use cases to be deployed in the future?" However, as the over 100 policy recommendations are consolidated and prioritized, CESA recommends that the working group strive to conduct this process within an eye toward the broader policies, programs, and issues in place for all distributed energy resources (DERs) and distill the VGI-specific barriers and issues that must be resolved within these broader DER issues. At times, this working group appears to have operated in a policy "silo" in which the VGI barriers and policies are not in line with expectations or realities of current DER policies, programs, or frameworks.

For example, many of the discussions around VGI participating in the Self-Generation Incentive Program (SGIP), providing resource adequacy (RA) services, and/or participating in the wholesale market have not considered the VGI-specific issues of such resources participating in

these various pathways. VGI has the potential to operate as any other smart grid-facing DER, so this working group should strive to identify how current policies, programs, or frameworks are not sufficiently enabling VGI participation, and if not, whether modifications to existing structures or creation of new structures are needed. In this way, CESA believes that the Commission will be better informed on the specific policy recommendations and direct their development and implementation in the DRIVE proceeding and/or other relevant proceedings or agencies.

At the same time, CESA does not seek to confine VGI policies and recommendations to remain within the framework in place for DERs, which could only serve to stifle innovation and new ideas. There may be VGI-specific frameworks or programs that could be appropriate to advance the state's transportation electrification goals while operationalizing electric vehicles (EVs) and electric vehicle supply equipment (EVSEs) to provide additional value and grid services.

This discussion may come up in answering the third question of the working group: "How does the value of VGI use cases compare to other storage or DER?" However, this question focuses on value and does not fully address CESA's overarching question above. As a result, CESA recommends that Gridworks and working group participants either expand the discussion around the third question to consider how VGI fits into other DER policies, programs, and frameworks, or incorporate our aforementioned question in the process of consolidating and prioritizing policy recommendations as part of answering the second question.

With that in mind, in response to comments and recommendations from other participants, CESA offers the following high-level comments and recommendations for the working group's consideration:

- Crediting for vehicle-to-grid (V2G) exports can be readily addressed if wholesale market participation and interconnection barriers are addressed, or by exploring similar pathways for V2G as mobile "additions or enhancements" to net energy metering (NEM) generation.

- The Commission should work with the investor-owned utilities (IOUs) to develop metering and accounting frameworks, methodologies, and infrastructure to better enable wholesale market participation.

- Before fitting VGI within the Self-Generation Incentive Program (SGIP), the Commission and this working group should consider energy storage definitions and the incrementality and breadth of funding support.

- Immediate pilots should be launched by each IOU for V2X resources for resiliency and public safety power shutoff (PSPS) solutions in the Microgrid proceeding (R.19-09-009) and/or in their Wildfire Mitigation Plans (R.18-10-007); smart remote disconnect approaches should be pursued until interconnection pathways are standardized and established.

- The Commission should refine its incrementality framework to consider EV load assumptions and consider VGI eligibility, as well as in establish a tariff-based mechanism that could provide greater value certainty and enable more gradual subscription to address distribution defer needs.

- Driving VGI market transformation through energy storage targets is not worthwhile because the targets have been met and IOUs have no incentive to procure further within this framework.

- Distinctions must be made between demand response and energy storage resources in considering whether certain VGI resource types fit within storage-specific programs or frameworks.

- The Commission should pursue the policy recommendations included in the Rule 21 working group and subgroup reports.

We look forward to continuously engaging in this working group and welcome any questions you may have regarding any of our points below.

Exports from V2G

- *Policy Recommendation 1.14: Credit for export for V2G/storage*
- *Policy Recommendation 1.16: NEM credit for V2G exports*
- *Policy Recommendation 5.13: Consider technologies beyond rooftop solar in NEM 3.0, such as vehicles and storage*

To fully enable V2G resources, CESA recognizes the need to address barriers related to export and supports the intention of these recommendations. Broadly speaking, the working group should be aware that there are currently technical interconnection and possible legal jurisdictional barriers that must be addressed to enable exports for all DERs. As context, other than NEM facilities or PURPA resources, CESA is not aware of any behind-the-meter (BTM) storage or DER that is deployed for an exporting use case at this time.

As CESA understands it, unless a DER is participating in the wholesale market, credits for exports are subject to PURPA regulations, where NEM is one pathway to qualify. CESA agrees that qualifying V2G for NEM credits could be one means to enable V2G to be credited for exports. To enable this, V2G could pursue a similar pathway to stationary storage systems, which were able to qualify for NEM credits through a revision to the Renewables Portfolio Standard (RPS) Guidebook at the California Energy Commission (CEC) that energy storage devices could meet the definition of an “addition or enhancement” if storage fell into one of two categories:

- Integrated storage are storage devices that are only capable of storing energy from the eligible renewable generator

- Directly connected storage are storage devices that are directly connected to the eligible renewable generator via an internal power line

Since the Commission leveraged the RPS Guidebook definitions in qualifying stationary storage for NEM, a similar path could be explored V2G to see whether definitions for stationary storage as an "addition or enhancement" could apply equally or to a reasonable similar degree for V2G resources. Especially with the mobile nature of the storage resource, it is unclear if such "physical demonstrations" may always be feasible, so this issue should be worked out.

However, given that NEM is intended to allow credits from NEM-eligible generation, thereby requiring assurances against a violation of NEM integrity, stakeholders here should also consider how tying V2G resources could have unintended impacts of limiting V2G operations. For example, D.14-05-033, later modified as well, established physical metering requirements as well as controls-based metering approaches to ensure either "no grid charging" or "no storage export" modes to maintain NEM integrity. For either of these modes, CESA imagines that it could be operationally limiting to leveraging the V2G resource to its full capabilities to serve EV driver needs (*e.g.*, under no grid charging mode) and to only be able to realize the discharge capabilities for vehicle-to-home (V2H) or vehicle-to-building (V2B) as non-exporting storage assets (*e.g.*, under no storage export mode).

An alternative path to V2G export credits could be to establish a new PURPA-compliant program, similar to the Renewable Market Adjusting Tariff (ReMAT) program, where V2G resources would be credited at avoided cost for any exports generated. However, with the ambiguity around generation-plus-storage projects as being eligible as a qualifying facility (QF) and considering V2G is not a generating resource, any PURPA-based path may require non-CPUC action (*e.g.*, FERC, including active Docket No. RM19-15) prior to creating this pathway. Regardless, any NEM or PURPA tariff/program path creates challenges in fitting within the existing framework and with requiring a pairing with a NEM-eligible or PURPA-eligible generator.

Perhaps a clearer or more flexible path for enabling V2G exports, albeit still complicated, would be to work with the California Independent System Operator (CAISO) to address barriers to wholesale market participation to enable V2G resources to participate in the Non-Generator Resource (NGR) model. The NGR market participation pathway would enable exports and more flexibly allow V2G exports to qualify as standalone or paired assets, and if paired, with fewer restrictions on sizing or charging to the qualifying generator asset. Furthermore, the Commission would not need to determine the appropriate "credit" as this is addressed by the wholesale market, which will be priced in energy or ancillary service capacity prices. More is discussed on this below.

Finally, any path to enabling exports will have to address interconnection issues. One advantage of exploring synergies with NEM is that there are streamlined interconnection pathways for NEM facilities, which can bypass the more lengthy wholesale distribution access tariff (WDAT) pathway. WDAT processes present potential barriers for V2G export if seeking to participate in the wholesale market, where CESA has historically been unclear on whether reforms can be pursued in a centralized Commission proceeding given that it is a FERC-

jurisdictional tariff but also touches on distribution cost recovery issues and factors into resource procurements needed for California-specific needs.

Wholesale Market Participation & Access

- *Policy Recommendation 1.4: Apply station power concepts to V2G*
- *Policy Recommendation 3.2: Allow telemetry at aggregation level*
- *Policy Recommendation 3.3: Solve critical issues with DERP-NGR to enable MUAs and the economic integration of aggregated BTM V2G in CAISO markets*
- *Policy Recommendation 3.4: Solve critical issues to enable aggregated BTM V2G to provide RA*
- *Policy Recommendation 3.5: Incorporate V1G opportunities in the DRAM program, once reinstated permanently*
- *Policy Recommendation 3.6: Enable aggregations of EVs on managed charging to participate as resources in real-time energy markets and ancillary services market*
- *Policy Recommendation 3.7: Enable aggregations of EVs on managed charging to meet RA requirements*
- *Policy Recommendation 3.10: CAISO allows for BTM resources to participate in Frequency Regulation without 24/7 wholesale settlement*
- *Policy Recommendation 3.11: Allow 100 kW threshold bid for A/S*

CESA strongly supports exploring pathways to unlock market participation by V1G and V2G resource in wholesale markets. Much of this work has occurred in the CAISO's Energy Storage and Distributed Energy Resources (ESDER) Initiative, which is currently in Phase 4. To our understanding, much of the identified issues above around 24x7 settlement and aggregation revolve around the lack of metering to differentiate and appropriately settle DER activity as wholesale versus retail. Nuvve's station power concept should be explored, but generally CESA understands that metering and accounting issues are within the Commission's domain. A Commission proceeding should be initiated around multiple-use applications, as follow-up to the activity and working group report in the Energy Storage rulemaking (R.15-03-011).

Furthermore, enhancements to the current Proxy Demand Resource (PDR) model to compensate exports and enable ancillary service provision should be explored in future ESDER cycles. This was explored in Phase 2 but was punted in order to focus on the PDR Load Shifting Resource (PDR-LSR) product. While not part of the Commission's domain, close collaboration should be pursued.

Finally, regarding the Demand Response Auction Mechanism (DRAM), CESA is not aware of VGI as being specifically precluded from participation. If able to meet the testing, dispatch, and other administrative and operational requirements, any demand response (DR) resource should be eligible to participate. For the DRAM, this working group should identify the VGI-specific issues hindering their participation.

DER Programs

- *Policy Recommendation 2.2: V2G systems become eligible for some form of SGIP incentives*
- *Policy Recommendation 2.13: Co-installation of batteries with high-power/fast charge installations both for public charging and at private sites*

The Self-Generation Incentive Program (SGIP) has been an instrumental program that has transformed and continues to transform the market for stationary energy storage systems. V2X systems, as a mobile storage resource, has the ability to similarly provide environmental and grid-support benefits as stationary storage resources, but CESA identifies several issues that must be clarified or worked out in the SGIP-related recommendations coming from this working group.

First, the working group should consider whether the SGIP is the most appropriate program to incentivize VGI resources. SGIP is intended to fully fund new capital-intensive storage projects, where no other equivalent program exists for customer-sited stationary storage systems. Even with AB 2514 storage mandates setting a "customer domain" target, most of this domain-specific target was met through SGIP deployments, with just around 118 MW of behind-the-meter (BTM) storage procured through local capacity requirement (LCR) related competitive solicitations.[1] Without SGIP, BTM storage resources would otherwise not have a foundational program needed to support this market segment.

By contrast, the Commission has approved many significant transportation electrification programs and investments, where EV charging infrastructure is supported through make-ready investments and EVSE rebates, and EVs are supported by zero-emission vehicle (ZEV) credits and incentivized through low-carbon fuel standard (LCFS) credits. In light of this, CESA is unclear on what portion of EVSE, V2X, and/or EV costs would need to be supported by the current SGIP program to advance and transform the market for VGI. If certain incremental component costs need to be supported (*e.g.*, such as the cost of the inverter or controller), CESA wonders whether it is simpler for administrative simplicity and for ease in demonstrating incrementality to incentives or funding from other programs (see SGIP Handbook Section 3.2.6) to have VGI resources supported through a single program (*e.g.*, IOU programs and EV-specific programs) that supports the new capital investments in the first place. In general, CESA believes it is vital for the Commission to maintain not unnecessarily "double funding" resources for their capital and deployment costs if already funded through another sourcing mechanism.[2]

[1] See total procurement numbers in a recent filing here: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M330/K052/330052665.PDF

[2] For this reason, CESA presumes the ineligibility of second-life batteries from SGIP was put into place (SGIP Handbook Section 4.2.4) in order to not putting ratepayer funds into resources or technologies that have already been funded. However, it is important to distinguish the difference between technology deployment incentives (*e.g.*, SGIP) and grid-service payments. Whereas second-life batteries may be ineligible for SGIP incentives, they could and should still be eligible to compete for grid-service opportunities.

If the intent is to have the entire EV, EVSE, and VGI-enabling components funded through SGIP, CESA has concerns that this may be limiting the incentive funds that VGI resources could be eligible for given current funding levels in the program and the otherwise limited funding that would thus be eligible for other SGIP technologies, such as energy storage, smart water heaters, and renewable generation.[3] EV applications from the IOUs, by contrast, have larger scales and a dedicated funding source for VGI resources.[4] If SGIP is used as a vehicle to support VGI resources at scale, much more additional funds would likely be needed to achieve the scale of VGI commensurate with the level of EV-related investments.

Notwithstanding those concerns, CESA agrees that V2X resources have similar capabilities to provide environmental benefits and grid support as stationary storage systems. Especially once an interconnection pathway is approved, V2X resources could function just like stationary storage and fit within any of the budget categories for energy storage. Modifications to the program would have to be made, which could be pursued through Program Modification Guidelines (see SGIP Handbook Section 4.2.7), such as the current permanent installation requirements, that could preclude V2G AC resources. How the current GHG signal.

Overall, CESA is supportive of a DER program to support VGI deployments and enhancements but finds that fitting V2X into SGIP may be limiting to stationary and mobile storage alike and create potential inefficiencies in how VGI investments are made. Rather, any consideration of DER programs for VGI could take the form of a VGI-dedicated incentive program, an enhancement or "adder" to EV programs and investments coming out of IOU EV applications, and/or support access to grid service opportunities.

Finally, CESA is strongly supportive of SGIP-incentivized stationary storage projects co-located with high-capacity EV chargers. No rules today appear to preclude the use of SGIP incentives for supporting such stationary storage systems, so it is unclear if there is a specific policy recommendation for the Commission here.

Resiliency & PSPS Solutions

- *Policy Recommendation 5.2, 5.3: Pilot funding for V2H backup power solutions*
- *Policy Recommendation 5.4: Enable BTM V1G/V2G to provide supply, capacity, or other services in FTM sectionalized microgrids*
- *Policy Recommendation 5.12: Create tariffs specific to electric school buses that potentially account for V2G*
- *Policy Recommendation 5.14: Develop standards and requirements for buildings which will support the use of the EV's main power batteries for customer resiliency*

[3] Total SGIP funds available for 2019-2025 amounts to $1.2 billion: http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M327/K726/327726468.PDF

[4] Just to highlight a few, SCE Charge Ready Phase 2 Application requested authority to spend $760.1 million, and close to $1 billion was approved in the IOUs' SB 350 Transportation Electrification Applications.

CESA believes that there are well-scoped initial projects that were submitted as proposals in the Rule 21 Interconnection Discussion Forum and in the Microgrids proceeding that could be considered for immediate consideration by the Commission,[5] with immediate funding for proof-of-concept through the utilities' Wildfire Mitigation Plans and the associated memorandum accounts. Many of the technical issues would need to be worked out but are not insurmountable.[6] Specifically, some policy development may need to involve the development of PSPS operational protocols that include notification and remote disconnects for V2H/V2B and other DERs to deliver islanding capabilities. In addition, broader pilot funding for V2H or V2B resiliency solutions should be pursued – some of which already appears to be in the process of being developed and pursued by the CEC (*e.g.*, Next EPIC Challenge GFO concept). Beyond the aforementioned pilot concept, the CPUC or CEC should consider authorizing and launching open solicitations for broader and innovative concepts on how to deliver resiliency through V2H/V2B systems, possibly in combination with other DERs.

Additionally, a key area of medium-term policy work could take place in the next Title 24 code update cycle at the CEC. CESA is aware of several cities and local governments seeking to go "beyond code" and develop standards for "EV ready" and "resiliency ready" features for stationary storage, bidirectional EVSEs, and possibly for mobile V2X storage. The next code cycle should seek to expand on these features and broadly focus on resiliency, not just net zero energy, needs of new construction.

Distribution Services

- *Policy Recommendation 2.16: Non-wires alternative competitive procurement issued (RFO) targeted to EVs/EVSPs that can limit demand during peak times*

CESA supports the above recommendation. Existing procurement paths exist under the Distribution Investment Deferral Framework (DIDF), but competitive solicitations have been challenging for DERs in general, leading to most of the non-wires alternatives to be for in-front-of-the-meter (IFOM) energy storage projects instead. Customer acquisition timelines and incrementality issues present challenges to short lead time procurements, such that the Commission should refine its incrementality framework to consider EV load assumptions and consider VGI eligibility, as well as in establishing a tariff-based mechanism that could provide greater value certainty and enable more gradual subscription to defer needs. These ideas were explored in the Integrated Distributed Energy Resources (IDER) proceeding (R.14-10-003) and should be revived, while this working group develops VGI-specific issues for consideration in

[5] http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M327/K650/327650076.PDF
[6] http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M326/K172/326172102.PDF

these larger DIDF and IDER discussions. Some of these ideas have already been introduced by CESA[7] as well as by other parties.[8]

Market Transformation

- *Policy Recommendation 4.1: Allow V1G (Smart Charging/Managed Charging) to be counted as storage for Storage Mandate*

Targets can play a foundational role to "force" or incentivize resource buyers to gain experience in procuring, contracting, deploying, and operating new and/or emerging technologies for various applications while supporting economies of scale. Such has been the case for the storage mandate in California, via AB 2514,[9] and its success has informed the establishment of storage mandates in many other states. In similar ways, CESA sees many benefits to support innovation, market transformation, familiarity, and scalability with VGI-related targets.

However, as recently reported in the biennial IOU Energy Storage Applications on March 2, 2020, each of the IOUs do not report any significant residual targets– demonstrating that the storage targets are "done".[10] As a result, this policy recommendation may not be worthwhile or effective to advance VGI going forward. Instead, separate VGI targets could be pursued.

Generally, in setting VGI policy, the working group should be careful not to blur the lines between load-modifying demand response resources and energy storage resources, which have been defined clearly in statute and ruled on multiple times in the Energy Storage proceeding (R.15-03-011). The Commission has already determined that V2X resources can count as storage but that V1G represents end-use load management akin to AC cycling, smart thermostats, etc. CESA would be happy to offer more details if needed.

Interconnection

- *Policy Recommendation 8.2: Waive second interconnection of V2G*

[7] See CESA's discussion of the pros and cons of tariff-based mechanisms, as well as our specific DER tariff proposal here: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M268/K464/268464401.PDF

[8] The working group may also be interested in Sunrun's Bring Your Own Device (BYOD) proposal that could be adapted to a Bring Your Own EV (BYOE) concept: http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M266/K859/266859811.PDF

[9] For the CPUC Energy Division staff's benefit, the AB 2514 targets set a cumulative 1,325 MW target for the three IOUs, which were divided among the IOUs and by domain (transmission, distribution, and customer).

[10] In A.20-03-002, PG&E reported only 20.912 MW of targets left in the customer domain but no more obligations in the transmission and distribution domains. In A.20-03-004, SCE reported that it has zero MW left to procure in any of the domains, having met their overall targets. In A.20-03-003, SDG&E said it was approximately 1.15 MW short in the transmission domain and 4.85 MW short in the distribution domain, which will be met through ongoing IRP procurements.

- *Policy Recommendation 8.4: Adopt interim procedures for validating current limiting functionalities in smart charging*
- *Policy Recommendation 8.5: Interconnection of mobile inverters*
- *Policy Recommendation 8.7: Enable V2G AC interconnection pathway*

Many of the key recommendations were elaborated in the Rule 21 proceeding (R.17-07-007) in a Rule 21 Working Group 3 Report on V2G DC interconnection pathways[11] and in a Subgroup Report on V2G AC interconnection pathways.[12] With this collaborative work completed, standards bodies in the process of updating standards, and the Commission potentially ruling on these proposals in the coming weeks, this working group may have more clarified guidance on policy recommendations that could be further identified and pursued through this working group.

Conclusion

CESA appreciates the opportunity to provide these informal comments and hope these responses are helpful. Please do not hesitate to reach out if you have any follow up questions or would like to discuss further.

Sincerely,

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[11] *Working Group 3 Final Report* at 61-99.
http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M309/K943/309943907.PDF
[12] *Final Report of the Vehicle to Grid Alternating Current Interconnection Subgroup* at 1-8.
http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M325/K636/325636696.PDF