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Comments of Nuvve Holding Corporation on the California Energy Commission Demand Side Grid Support and Distributed Energy Backup

Additional submitted attachment is included below.

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Email to: docket@energy.ca.gov

Docket Number: 22-RENEW-01

Subject: Lead Commissioner Workshop on Demand Side Grid Support Program and Distributed Electricity Backup Assets Program

Comments of Nuvve Holding Corporation on the California Energy Commission Demand Side Grid Support and Distributed Energy Backup Assets Programs Workshops

Docket #: 22-RENEW-01

Reliability Reserve Incentive Programs

Nuvve is a San Diego-based company operating across the U.S. and internationally whose mission is to lower the cost of electric vehicle ("EV") ownership while supporting the integration of renewable energy sources, such as wind and solar. Nuvve's Grid Integrated Vehicle platform ("GIVe"), transforms EVs into grid assets when those vehicles are connected to a bidirectional charger while guaranteeing the expected level of charge at the time the owner or driver needs it for transportation.

The aggregation of thousands of parked EVs plugged into bidirectional chargers turns an EV fleet into a virtual power plant using Nuvve's GIVe platform. This allows Nuvve to provide EV drivers and fleet owners with additional value through earning revenue from participating in electricity markets with a power capacity and capability compared to traditional stationary storage systems. Using our proprietary vehicle-to-grid ("V2G") technology, Nuvve's GIVe platform produces real benefits to society by reducing the cost of electric infrastructure to support transportation electrification while providing reliability services to the electric grid. V2G also helps to reduce harmful emissions beyond those associated with switching from liquid fuels to electricity for transportation by supporting the integration of variable sources of generation including solar and wind. These benefits can be realized across all types of EVs including light-duty vehicles (both battery-only and plug-in

hybrids) and medium- to heavy-duty vehicles, such as school buses and other short-haul fleets.

Nuvve is the only company, working collaboratively with San Diego Gas & Electric ("SDG&E"), to have successfully developed an electric school bus ("ESB") V2G pilot program in California. Six 60 kW bidirectional chargers and six V2G capable Lion Electric school buses were deployed at Cajon Valley Union School District. Using Nuvve's GIVe platform, these buses participated in 10 Emergency Load Reduction Program (ELRP) events from August 17th through September 9th through SDG&E.[1] Nuvve has additional V2G deployments under development with several California school districts.

Nuvve appreciates the opportunity to provide comments on the California Energy Commission ("CEC") Session 1 and Session 2 Workshops on Demand Side Grid Support ("DSGS") and Distributed Electricity Backup Assets ("DEBA") programs held on January 27, 2023.

I. Introduction

It is widely recognized that vehicle grid integration ("VGI"), and more specifically V2G technology, can support many of the State's clean energy goals including increasing EV adoption and providing a vast new flexibility resource to address pressing reliability needs. V2G technology allows electric vehicles to store and discharge electricity to and from the power grid, in addition to being charged from it. The benefits of V2G technology include:

1. *Reducing greenhouse gas emissions*: By enabling electric vehicles to feed surplus energy back to the grid during peak demand periods, V2G technology can help reduce the need for fossil-fueled power plants and decrease greenhouse gas emissions.
2. *Increasing grid stability*: V2G technology can help balance the power grid by providing a reliable source of energy during peak demand periods, which can help prevent blackouts and brownouts.
3. *Lowering energy costs*: By using electric vehicles as a source of energy during peak demand periods, V2G technology can help lower energy costs for both utilities and consumers.

[1] See Nuvve Partners With San Diego Gas & Electric to Allow Electric School Buses to Give Energy Back to the Grid and Prevent Blackouts Through the Emergency Load Reduction Program (ELRP) available at https://nuvve.com/nuvve-partners-with-san-diego-gas-electric-to-allow-electric-school-buses-to-give-energy-back-to-the-grid-and-prevent-blackouts-through-the-emergency-load-reduction-program-elrp/.

4. *Providing a source of income*: Electric vehicle owners can earn money by selling excess energy back to the grid during peak demand periods, which can help offset the cost of vehicle ownership and incentivize more people to adopt EVs.
5. *Supporting renewable energy integration*: V2G technology can help integrate renewable energy sources like solar and wind into the grid by providing a reliable source of energy during periods when these sources may not be available.

California's EV adoption goals are aimed at reducing greenhouse gas emissions and improving air quality by encouraging the widespread use of zero-emission vehicles ("ZEV"). Specifically, California has set a goal for 100 percent of new passenger vehicles sold in the state to be ZEVs by 2035, and for all medium- and heavy-duty ("MHD") vehicles to be ZEVs by 2045. [2] The 2022 Integrated Energy Policy Report forecasts under a scenario of aggressive policy support, California could have more than 7 million EVs on its roads by 2030.[3] If just 5 percent of these EVs were equipped with V2G technology and paired with bidirectional charging stations with an average power rating of just 10 kW, California would have a multi-GW resource to help avoid rotating outages during extreme weather events similar to what happened in August of 2020.[4]

Nuvve believes that the school bus segment is the most promising entry point for a burgeoning V2G market due in part to the large onboard batteries and the predictable drive cycles and dwell times. Furthermore, there are commercially available bidirectional ESBs and high-power bidirectional direct current fast chargers ("DCFC") that are UL certified, which have been approved for interconnection in California under Rule 21. Nuvve is a global leader in V2G standards-based deployments, which includes integrations with two of the leading ESB manufacturers (Blue Bird and Lion Electric) with others currently underway. We have several deployments completed[5] and additional projects under development in several

[2] See Governor Gavin Newsom's Executive Order N-79-20 available at https://www.gov.ca.gov/wp-content/uploads/2020/09/9.23.20-EO-N-79-20-Climate.pdf.
[3] See the California Energy Commission, 2022 Integrated Energy Policy Report Update available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=248735.
[4] See California Energy Commission CAISO, CPUC, CEC Issue Final Report on Causes of August 2020 Rotating Outages available at https://www.energy.ca.gov/news/2021-01/caiso-cpuc-cec-issue-final-report-causes-august-2020-rotating-outages#:~:text=On%20August%2014%20and%2015,leading%20to%20the%20August%20outages.
[5] See Nuvve press releases 1) San Diego County's Ramona Unified School District, Blue Bird and Nuvve Unveil 8 New V2G-Enabled and Qualified Electric School Buses available at https://nuvve.com/ramona-unified-school-district-blue-bird-nuvve-unveil-new-v2g-electric-school-buses/; and 2) SDG&E and Cajon Valley Union School District Flip the Switch on Region's First Vehicle-to-Grid Project Featuring Local Electric School Buses
Capable of Sending Power to the Grid available at https://nuvve.com/sdge-and-cajon-valley-union-school-district-flip-the-switch-on-regions-first-vehicle-to-grid-project-featuring-local-electric-school-busescapable-of-sending-power-to-the-grid/.

states. Nuvve will have over 3 MW of V2G deployments by the end of 2023 in California alone.

In creating DEBA the legislature specified its purpose 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."[6]

The DSGS program provides compensation for load reductions during extreme grid events expanding opportunities for behind-the-meter resources to serve as part of the Strategic Reliability Reserve. Together, these programs are complementarily addressing both the capital investment in new clean distributed energy assets (DEBA) while providing recurring revenues (DSGS) to support ongoing operations and maintenance ("O&M") costs and measurement and verification ("M&V") expenses.

Despite the progress that Nuvve and other V2G companies have made in recent years, V2G deployments in California are extremely limited. Without incentives for bidirectional infrastructure investments and adequate compensation for V2G exports, the GW-scale V2G potential will not be realized. The creation of the DSGS and DEBA programs authorized through AB 205 offers an important opportunity to accelerate V2G deployments as part of the Strategic Reliability Reserve portfolio of resources serving as on-call emergency supply assets. Nuvve believes that V2G represents the most promising asset class contributing to California's Strategic Reliability Reserve given the potential for rapid deployment, scale, and cost-effectiveness.

During this early phase of V2G market development, incentives will play a critical role. Careful design of the incentives offered through DEBA and DSGS could play an instrumental role in the creation of a robust V2G industry bringing a vast new flexibility resource to the California energy market. The incentives should be based on an understanding of what is required to attract investment for V2G deployments. This requires an understanding of the current capital cost for equipment, construction, permitting, etc., and a realistic assessment of the ongoing O&M and M&V costs. Investments will not flow to V2G projects unless investors are confident that the incentives and revenues anticipated from a project will provide an acceptable rate of return.

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[6] See California Legislative Information Assembly Bill No. 205 available at https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202120220AB205.

Nuvve believes that the DSGS and DEBA programs should be designed to be complementary, providing a coordinated set of incentives that when combined create an attractive investment environment to accelerate V2G deployments serving as on-call emergency resources. Nuvve responds below to a subset of the questions posed by the CEC staff for both the DSGS and DEBA programs.

In summary, Nuvve offers the following recommendations:

- explicitly include V2G as an eligible technology for DSGS and DEBA and provide a minimum number of dispatch hours for the DSGS Options 1 and 2;
- allow aggregators to serve as DSGS providers;
- modify DSGS Option 3 to be market-informed and eliminate the baseline requirement;
- create a DEBA funding program for V2G that specifies eligible bidirectional chargers and EVs that have demonstrated V2G functionality;
- develop a V2G roadmap with specific targets for bidirectional charging infrastructure deployments; and
- establish DEBA funding/incentives for V2G projects that fills the current funding gap.

II. Demand Side Grid Support Program

The DSGS program expands the opportunity for numerous behind-the-meter assets to contribute to California's reliability needs complementing the existing ELRP program available to customers located within the three major investor-owned utilities ("IOU"). The lessons learned from the two ELRP seasons and the abbreviated DSGS season during late summer 2022 provide important learnings to inform program guideline revisions in advance of the summer 2023 reliability season.

Nuvve encourages the CEC to explicitly reference V2G as an eligible technology for participation in the DSGS program. Similar to the ELRP, the V2G asset class should be guaranteed a minimum number of hourly dispatches for the Option 1 and Option 2 incentives. Some degree of revenue certainty is necessary to attract investment in bidirectional infrastructure.

What other program modifications should be considered?

Nuvve supports the CEC staff's proposed modification to make aggregators eligible to serve as DSGS providers. The CEC's September 3, 2022, *Guideline Advisory* expanded the DSGS provider eligibility to aggregators of customers during the August–September extreme heat event and the state of emergency proclaimed by Governor Newsom.[7] Nuvve recommends expanding eligibility to aggregators for future program years, which will allow more customers to participate. Aggregators can aggregate resources across different retail suppliers' territories, which provides benefits in the form of economies of scale and again the potential to increase the capacity that can be offered as emergency grid resources.

Nuvve supports the proposal made by the California Solar and Storage Association ("CALSSA") to change the Option 3 compensation requirement for wholesale market participation and eliminate the baseline calculation.[8] CALSSA proposals would eliminate the current Option 3 requirement for DSGS participants selecting Option 3 to participate in California Independent System Operator ("CAISO") wholesale market. This requirement would be replaced with a market-informed dispatch requirement. Wholesale market participation creates unique barriers for V2G resources and is noted by CALSSA, most notably the lack of ability to account for grid exports in calculating asset performance. CALSSA offers numerous arguments in support of eliminating a baseline. Nuvve agrees that baseline elimination will greatly simplify the program, streamlining both program development and program participation. Nuvve expects that a segment of our fleet customers investing in bidirectional charging infrastructure will find Option 3 more attractive if these modifications are adopted.

III. Distributed Electricity Backup Asset Program

Nuvve recommends that the CEC develop a specific funding opportunity for bidirectional charging infrastructure and V2G. While progress is being made, the V2G industry today lacks a fully interoperable ecosystem of bidirectional chargers and V2G-capable EVs. Thus, it is important that the funding/incentives allocated to V2G projects include a requirement that the award recipient demonstrates the bidirectional chargers

[7] See CEC Guideline Advisory, Demand Side Grid Support Program Provisions During the State of Emergency, September 3, 2022 available at https://www.energy.ca.gov/sites/default/files/2022-09/Demand_Side_Grid_Support_Program_Guideline_Advisory.pdf.

[8] See California Solar & Storage Association Comments – CALSSA DEBA DSGS program design proposal available at https://efiling.energy.ca.gov/GetDocument.aspx?tn=248480&DocumentContentId=82924.

being funded will be paired with V2G-capable EVs. This could include the CEC developing a list of eligible pairings of bidirectional chargers and EVs that have demonstrated V2G operations. This list would become obsolete once V2G interoperability matures in the coming years. V2G project funding eligibility guidelines could also specify standards-ready capabilities as the industry moves toward the adoption of interoperability standards.

Nuvve encourages the CEC to develop a V2G roadmap with specific targets over time for the deployment of bidirectional charging infrastructure. Progress can be measured against the targets to calibrate the incentive levels. If there is less bidirectional infrastructure being deployed relative to the target, this would indicate a need to perhaps increase incentives or address other barriers facing V2G deployments.

What level of funding is needed to spur the development of a project?

Nuvve's experience working with numerous school districts in California and in other states finds significant barriers to fleet electrification and V2G adoption. The number one barrier school districts face is the cost to install charging infrastructure. Additional incremental costs are incurred for bidirectional charging stations for V2G. These incremental costs include the price premium for a bidirectional DCFC and the interconnection-related expense including utility system and facility upgrade costs. Given that V2G today is based on a DC architecture, it is difficult for a school district to justify investing in a bidirectional DCFC when a Level 2 alternating current ("AC") charger is often capable of providing a charge rate that would accommodate bus route requirements. In the case where a DCFC is needed to support bus route requirements, the incremental cost for bidirectionality and interconnection may also prove to be cost-prohibitive.

The incremental cost for V2G can be partially offset by the revenues made possible through utility programs that provide compensation for grid exports including the ELRP and DSGS. These recurring revenues must also cover the ongoing O&M and M&V costs associated with program participation. It is Nuvve's experience that currently available utility program revenues are not sufficient to cover both the incremental capital costs for V2G and the recurring O&M and M&V costs. Thus, there is currently a funding gap that DEBA can fill to accelerate investments in bidirectional infrastructure. We do anticipate, however, that the costs of V2G deployments will decline over time due to economies of scale and experience. In the short- and medium-term, DEBA can play a critical role in supporting the nascent V2G segment.

IV. Conclusion

Nuvve is poised to scale its commercially available V2G offerings to school districts across the state. During the summer 2022 ELRP season, Nuvve successfully demonstrated the potential of V2G to contribute to relieving emergency grid conditions.[9] Our experience finds a funding gap whereby school districts will default to unidirectional infrastructure due to cost concerns. The DSGS and DEBA programs represent an historic opportunity to jump-start the V2G segment leading to hundreds of MW of reliability resources in the short-term and GW-scale assets in the longer-term. Nuvve appreciates the opportunity to provide comments on the formation of the DEBA program and revisions to the DSGS guidelines from 2022. Finally, Nuvve looks forward to working with the CEC as a direct participant in the DSGS and DEBA programs.

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[9] See Nuvve Partners With San Diego Gas & Electric to Allow Electric School Buses to Give Energy Back to the Grid and Prevent Blackouts Through the Emergency Load Reduction Program (ELRP) available at https://nuvve.com/nuvve-partners-with-san-diego-gas-electric-to-allow-electric-school-buses-to-give-energy-back-to-the-grid-and-prevent-blackouts-through-the-emergency-load-reduction-program-elrp/.