



September 1, 2023

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Comments of the Vehicle-Grid Integration Council (VGIC) on the Eligibility Guidelines for the Public School Bus Electrification Program

Introduction

The Vehicle-Grid Integration Council (VGIC)¹ is a 501(c)(6) membership-based advocacy group 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 in support of achieving a more reliable, affordable, and efficient electric grid. VGIC appreciates the opportunity to provide comments on NYSERDA’s draft eligibility guidelines for the Public School Bus Electrification Program.

The Public School Bus Electrification Program will directly support deployment of electric school buses which, if enabled, will have untapped potential as crucial, flexible resources to support the evolving electricity grid. Managed charging and vehicle-to-grid (“V2G”) technology provides opportunities for fleets to capture additional benefits, from reduced charging costs and integration with on-site generation and storage, to backup power and payment for exports. By unlocking these key benefits, the Public School Bus Electrification Program can have a much larger impact in accelerating the widespread adoption of electric school buses. Scaling VGI will help accomplish the following public policy goals:

- **Benefit school districts** by reducing the cost of ownership.
- **Decarbonize the transportation sector** by accelerating EV adoption.

¹ VGIC member companies and supporters include American Honda Motor Co., Inc., BorgWarner, bp pulse, Customized Energy Solutions, dcbe, Enel X North America, Inc., EnergyHub, Enphase, Fermata Energy, FlexCharging, FLO EV Charging, Ford Motor Company, FreeWire Technologies, Inc., General Motors, GridWiz, Hoosier Energy, Innovation Core SEI, IoTecha, Kaluza, Kitu Systems, Ninedot Energy, Nissan Group of North America, Nuvve Holding Corporation, Peak Power, Qcells, Sacramento Municipal Utility District, Stellantis N.V., Sunrun, The Mobility House, Toyota Motor North America, Inc., Utilidata, 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/>)



- **Support decarbonization of the power sector** by providing essential grid services as renewable energy and distributed energy resource penetration increases.
- **Increase affordability** by reducing electricity bills for all customers.
- **Improve grid resiliency** and security during extreme weather events.
- **Foster economic activity** through innovation, competition, and market transformation.

With thoughtful program design, we believe this vision could become a reality and that school districts and other entities in New York State can take part in the acceleration of both transportation electrification and grid decarbonization. **Our vision for VGI encompasses the following key elements:**

- **Ensure mobility needs are satisfied.** School bus fleets will be able to participate in a wide variety of VGI services without compromising their mobility function.
- **Managed charging will provide benefits to school bus fleets:** School bus fleets will be given the choice to align charging with the times of day when electricity prices are low, reducing operating costs by as much as 50% compared to unmanaged charging. Lowering the total cost of ownership will help to accelerate overall electric school bus adoption.
- **EVs provide emissions-free emergency power during blackouts:** During extreme weather blackouts or other power outages, electric school buses can utilize two-way charging and discharging capabilities to send energy to a building or microgrid, serving as a generator to support essential services and provide safe backup power for communities.
- **Charging infrastructure dollars go further:** Smarter management of EV charging will help manage the cost of deploying EV charging infrastructure, encouraging wider access to EV charging with equal or lower overall cost burden.
- **Electric school buses provide necessary services to the grid and get paid for it:** V1G (unidirectional charging) and V2G (bidirectional charging) will enable electric school buses to both receive and feed power back to the grid, supporting advanced grid services such as frequency control, demand response, peak shaving, and more. For customers and end-users such as school districts and their fleet managers, V1G and V2G services (load management, demand charge management, and participation in distribution utility demand response programs) also provide significant benefits in the form of operational savings. Providing these services can unlock new revenue streams for electric school buses, lowering the total cost of ownership and accelerating progress towards New York's climate goals.

VGI is a unique opportunity for NYSERDA to establish and advance New York's leadership in affordable, decarbonized, reliable, and resilient transportation and electricity. VGIC



provides the following recommendations for the Public School Bus Electrification Program and would be happy to further discuss any part of these recommendations in a follow-up meeting.

A Higher Level of Funding Should be Made Available for V2G-Capable School Buses and Chargers

Bidirectional charging use cases can leverage EVs' latent battery capacity to provide backup power, manage electric bills, and support the grid through V2G exports. Revenues from V2G exports can offset the relatively higher upfront costs of electric school buses and associated charging infrastructure and improving the financial viability of electrification projects. Electric school buses are the premier use case for V2G today: bidirectional vehicles and EVSE are commercially available for the electric school bus sector,² and V2G exports are eligible for compensation under the VDER tariff in New York.

V2G stands to offer substantial public benefits as electric school bus deployment scales up. However, for these benefits to be fully realized, it is critical that VGI capabilities be considered and built into infrastructure investments as they are deployed, rather than after-the-fact. Bidirectional electric school buses and chargers can support grid reliability and community resiliency in the face of aging grid infrastructure and increasingly frequent extreme weather events. The incremental costs of deploying and enabling bidirectionality can thus create a significant public benefit that should be partially or fully offset under the Public School Bus Electrification Program, similar to how the U.S. Environmental Protection Agency (EPA) included V2G enabled equipment under its Clean School Bus Program.³

² See, for example: Nuvve Corporation. *Blue Bird Delivers North America's First-Ever Commercial Application of Vehicle-to-Grid Technology in Electric School Bus Partnership with Nuvve and Illinois School Districts*. March 23, 2021. <https://nuvve.com/blue-bird-v2g-electric-bus-with-nuvve-and-illinois-school-districts/>; Thomas Built Buses / Daimler Trucks North America LLC (2021). *The Safe-T-Liner C2 Jouley Electric School Bus*. <https://thomasbuiltbuses.com/school-buses/saf-t-liner-c2-jouley>; Lion Electric. *Lion Electric Announces Successful Electric School Bus Vehicle-to-Grid Deployment with Con Edison in New York*. December 14, 2020. https://thelionelectric.com/img/medias/LION_Press_Release_White%20Plains%20EN%20FINAL.pdf; Nuvve Corporation (2020). *Nuvve DC Heavy Duty Charging Station Specifications Sheet*. <https://nuvve.com/wpcontent/uploads/2020/04/nuvve-dc-heavy-duty-spec-sheet-1.0.pdf>; Fermata Energy. *Proven Results and Cost Savings with V2G Technology*. October 14, 2020. <https://www.fermataenergy.com/news-press/proven-results-and-cost-savings-with-v2g-technology>; BorgWarner. *V2G Charging, Control, and Management 60- 500kW: Bidirectional*. <https://www.borgwarner.com/technologies/chargers#bidirectional-v2g-charger>; BorgWarner. *Pioneering Commercial Vehicle-To-Grid in Electric School Buses*. https://cdn.borgwarner.com/docs/default-source/san-diego-documents/bw-00369-case-study-highland-electric-fleets.pdf?sfvrsn=2efbcc3d_12.

³ U.S. Environmental Protection Agency. 2023 Clean School Bus Grant Program Notice of Funding Opportunity, pg. 18. <https://www.epa.gov/system/files/documents/2023-04/2023-csb-grant-nofo-4-20-23.pdf>

NYSERDA Should Incentivize Automated Load Management to Install Charging Infrastructure at a Lower Total Cost

Many communities, especially low-income and disadvantaged communities, are served by outdated utility infrastructure (e.g., substations, transformers) that may require significant and costly upgrades to be able to accommodate school bus charging load. The use of Automated Load Management (“ALM”) approaches can help mitigate these infrastructure upgrade costs by reducing the collective peak load at one site, therefore making charging infrastructure less costly. ALM is a VGI solution that is particularly well-suited for multi-charger sites such as school bus charging depots.

More specifically, ALM is the use of behind-the-meter software (e.g., power sharing) or hardware (e.g., integrated or co-located energy storage) approaches to limit EV charging demand at the service connection to a predetermined level below the aggregated nameplate charging capacity of the EV chargers. For example, a charging site with five 150 kW DCFCs can use ALM to limit its peak demand to 600 kW, compared to a peak demand of 750 kW without ALM. This in turn can mitigate the need to upgrade certain distribution system infrastructure to accommodate the new EV charging load. The reduced need for infrastructure upgrades can generate savings for the customer installing EVSE and ratepayers at large and can accelerate the energization timeline for that site due to the lower overall engineering and construction needs. The potential cost and time savings from ALM can be considerable given the significant infrastructure needs of electric school buses. Additionally, ALM can be used to overcome physical space constraints in locations where it is difficult to upgrade electrical equipment, also helping to accelerate installation and energization timelines. As examples of potential cost savings, Pacific Gas & Electric has worked with EV service providers to implement ALM solutions at 20 workplace and multi-unit dwelling host sites as of Q4 2020 and saved between \$30,000 and \$200,000 per project.⁴ Southern California Edison also implemented ALM to deploy 168 charging stations at \$3,000 per port, significantly less than comparable deployments at \$10,000-\$15,000 per port without ALM.⁵

ALM can stretch the Public School Bus Electrification Program funds and ensure more chargers are installed in more places. We recommend the Public School Bus Electrification Program promote the use of ALM to enable charger and electric school bus deployment at a site where doing so may otherwise be cost-prohibitive or space-prohibitive due to utility distribution system upgrades. Optional ALM solutions should be encouraged and incentivized when they are shown to be comparatively cost efficient versus traditional utility system upgrades. VGIC advises against mandating ALM requirements on charging infrastructure, as this may result in inequities by limiting charging capability for end-users. Instead, ALM should be allowed and incentivized

⁴ Pacific Gas & Electric. 2021. Presentation at CPUC ALM/EV EMS Workshop, Panel 2.

⁵ EPIC Policy + Innovation Coordination Group. 2021. *Transportation Electrification Workstream Report*. https://epicpartnership.org/resources/Transportation_Electrification_Workstream_Report_Final.pdf



so that deploying ALM solutions becomes a viable option for those that wish to do so. The EPA’s Clean School Bus Program recognized the benefits of ALM technologies by including “charge management software” and “battery energy storage systems” as eligible charging infrastructure equipment.⁶ VGIC recommends that charging infrastructure incentives under the Public School Bus Electrification Program similarly cover the costs of ALM technologies.

Fleet Education Activities, Including Fleet Electrification Plans, Should Account for VGI Functionalities

The deployment of electrified transportation across the US represents a paradigm shift, and moving common thinking from “mpg” to “kWh” requires considerable outreach and education. For many school bus fleets, converting to electrified school buses is a significant undertaking that lies outside of their existing expertise. Given the potential complexity of VGI, more policy support is needed to direct funding toward educating school bus fleets not only of the benefits of electrification in general, but the enhanced value proposition that VGI technologies can offer. These value propositions include new potential revenue streams from grid services, reduced charging infrastructure costs, reduced charging energy costs, new bill management options, and enhanced resilience of critical facilities. The Public School Bus Electrification Program should guide applicants to partner with original equipment manufacturers (“OEMs”) and EV service providers to ensure customer education expertise of these stakeholders are adequately leveraged.

VGIC also suggests that fleet electrification plans funded by the Public School Bus Electrification Program account for savings and revenues, such as those generated from VGI, rather than focusing only on capital expenses. This will help to level the playing field for electric buses that have a higher capital cost but lower total cost of ownership. This practice will also more accurately reflect the financial viability of VGI-enabled buses and chargers, helping school districts and fleet operators make more informed decisions for their electrification projects.

Conclusion

VGIC appreciates the opportunity to provide these comments on the Public School Bus Electrification Program. We look forward to further collaboration with NYSERDA and stakeholders on this important initiative.

Respectfully submitted,

Ed Burgess

A handwritten signature in black ink that reads "Edward A. Burgess". The signature is written in a cursive style with a prominent initial "E".

⁶ U.S. Environmental Protection Agency. 2023 Clean School Bus Grant Program Notice of Funding Opportunity, pg. 18. <https://www.epa.gov/system/files/documents/2023-04/2023-csb-grant-nofo-4-20-23.pdf>



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