May 9, 2022

Northeast States for Coordinated Air Use Management (NESCAUM)
89 South Street, Suite 602
Boston, MA 02111

Re: Comments of Nuvve Holding Corporation on NESCAUM Draft Multi-State Medium- and Heavy-Duty Zero-Emission Vehicle Action Plan

Nuvve Holding Corp ("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 bi-directional 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 comparable 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. In addition, V2G helps to reduce CO_2 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 appreciates the opportunity to comment on the draft Multi-State Medium- and Heavy-Duty "MHD" Zero-Emission Vehicle ("ZEV") Action Plan.

Nuvve Supports NESCAUM's Efforts to Develop a Multi-State MHD ZEV Action Plan

Nuvve appreciates the significant effort by the Multi-State ZEV Task Force to develop a comprehensive Multi-State MHD ZEV Action Plan ("Plan"). The draft Plan acknowledges the critical importance of addressing tailpipe emissions from the MHD vehicle segment as part of a comprehensive strategy to address climate change and reduce hazardous air pollutants that harm human health, particularly in the frontline and overburdened communities of the northeast states represented by NESCAUM. These communities are disproportionately impacted by pollution from diesel trucks and buses given that they are often located near freight hubs, bus depots, trucking corridors, and other emissions sources.

The draft Plan recognizes that the most viable and cost-effective strategy to address medium- and heavy-duty vehicle (MHDV) emissions is through widespread electrification of the MHDV fleet. Nuvve agrees that the widespread electrification of the MHDV fleet represents the most feasible pathway to addressing the tailpipe emissions from the Class 2b through Class 8 vehicle segments. The transition from diesel fuel and gasoline use in the MHDV segment to electricity offers the potential to create significant economic and health benefits for the northeast region. Displacing fuels imported from outside the region and country with locally produced, clean electricity will create significant economic development and employment opportunities in the northeast. With advanced planning and thoughtful policy development, these benefits can be shared broadly helping to create robust and inclusive opportunities for all segments of society.

Nuvve supports the overall draft Plan and was pleased to see V2G referenced in several locations. The Plan could be even stronger with more emphasis on the need for advanced planning and policy support for the development of a bi-directional infrastructure and V2G capable MHD EVs to take full advantage of the transformative opportunities that V2G creates as the electric and transportation industries become tightly coupled.

Electrification of the MHDV fleet with V2G in the northeast creates unprecedented opportunities in the following areas:

- **reduce the overall cost of ownership by unlocking the value that EV fleets provide as grid resources;**
- **extend the emissions benefits of transportation electrification to the electric sector by supporting the integration of variable sources of generation including wind and solar;**[1]
- **displace the need for stationary storage resources and the associated raw materials needed for their manufacture;**
- **enhance grid flexibility by leveraging V2G as a grid resource during periods of extreme grid strain avoiding regional power outages; and**
- **providing resilience using MHD EV with V2G during grid outages meeting essential loads at critical facilities (e.g., first responders, hospitals, emergency shelters, etc.).**

Sales and Fleet Purchase Requirements

The Multi-State MHD ZEV Memorandum of Understanding ("MOU") provides a solid foundation upon which to build. The 18 jurisdictions in the U.S. and Canada that have signed the MOU agreed to strive to make at least 30 percent of sales of new MHDV be ZEVs by 2030, and 100 percent of sales of ZEVs by no later than 2050. We strongly support the recommendation that states consider adopting California's Advanced Clean Trucks (ACT) regulation. ACT moves beyond the MHD ZEV MOU, codifying the transition to electrification of the MHDV segment to ZEV into enforceable policy.

Nuvve also supports the recommendation that states should establish zero-emission purchase and reporting requirements for publicly owned and contracted school bus fleets to achieve 100 percent

[1] Many eastern states have made significant commitments to offshore wind development. Eight eastern states have collectively committed to over 37 GW of offshore wind in the next decade. This will have a transformative impact on regional electric grids requiring a significant increase in resources providing grid flexibility.

zero-emission purchases and contracts by no later than 2040. As noted in the Plan, school districts across the country are increasingly exploring the potential for electric school buses (ESB) to provide V2G services. The U.S. Environmental Protection Agency is promoting V2G as part of its school bus electrification program given the routine duty cycles and long dwell times of school buses.[2]

Nuvve is focused on the electric school bus market and today offers a fully certified ESB V2G solution in partnership with several school bus original equipment manufacturers (OEM). Nuvve offers a direct current fast charger ("DCFC") that meets the UL 1741 SA smart inverter standard and thus is eligible to interconnect under IEEE 1547. Nuvve has several ESB V2G deployments today that are currently operational. We have successfully interconnected our bi-directional DCFC in several utility jurisdictions. The ESB V2G opportunity is here today and is ready for broad commercialization.

Given the multiple benefits of V2G referenced above, Nuvve suggests that the draft Plan include V2G in the recommendations under the "Sales and Fleet Purchase Requirements." For example, this could include a carve-out that requires a certain percentage of EVs sold to meet MHD ZEV purchase requirements to be V2G capable. At a minimum, the Plan should encourage states to avoid any unintended procurement restrictions or requirements that act as a barrier to the purchase of V2G capable ESB or other MHD EVs. For example, least-cost procurement requirements would preclude the purchase of V2G capable MHD EVs due to the small incremental cost of building a V2G capable EV.

Vehicle and Infrastructure Purchase Incentives

Nuvve agrees with the draft Plan regarding the need to provide incentives for MDH EV and the associated infrastructure in the short- and medium-term to address the incremental costs over comparable internal combustion engine vehicles. We agree that EV incentives work best when they are offered at the point of sale and that a scrappage requirement is carefully considered to avoid barriers for certain fleet and ownership types. Purchase incentives must be carefully designed to ensure robust competition between MHD EV OEMs to drive down the costs that are expected through economies of scale in manufacturing. The administration of rebates through dealer networks does not properly allow for competitive bidding and therefore may not maximize the use of limited incentive funds.

The societal value of bi-directional infrastructure and V2G should be included in the funding formulas for EVs and chargers. From a cost-benefit framework, enhanced funding for V2G capable EVs and bi-directional chargers is justified given the additional benefits created. It is also important that purchase incentives support a variety of ownership models including third-party owned and leasing arrangements.

Electric Utility and Utility Regulatory Actions

Transportation electrification entails a coupling of the electric and transportation industries. Thus, the electric utilities and state public utility commissions ("commissions") will play an important role in the success of MHDV electrification efforts. Some segments of the MHDV segment will require high-power

[2] U.S. Environmental Protection Agency, What If Electric School Buses Could be Used to Supply Power When Off Duty?, available at https://www.epa.gov/greenvehicles/what-if-electric-school-buses-could-be-used-supply-power-when-duty.

chargers that are more likely to require significant new electric system infrastructure enhancements. In addition, V2G represents a new grid asset for which utilities and commissions have limited experience. Thus, early and thoughtful planning is necessary to align the build-out of the charging infrastructure with MHD EV market growth to maximize the value of V2G.

Nuvve has experience working with numerous utility make-ready programs. Based on our experience, we recommend that make-ready programs not require a separate service meter for EV chargers. V2G creates significant benefits when co-located with other loads, storage, and distributed solar. Based on evolving grids with high penetration of solar and wind, the ability to shape load to meet the variable production of renewable sources of generation is becoming increasingly important. V2G allows EVs to play a central role in balancing customer side loads and generation. This value must be fully reflected in the design and incentives provided through utility make-ready programs.

Nuvve offers additional comments on the following recommendations:

- *Recommendation 3 f.*—utility compensation for V2G services should reflect the full value-stack based on the location and timing of grid services provided. These programs should support customer-side demand response options while also accommodating V2G exports onto the grid.
- *Recommendation 5.*—the National Standard Practice Manual for Distributed Energy Resources[3] (NSPM DER) should be adopted for transportation electrification (TE) program cost/benefit analysis. TE programs are often viewed as increasing electric system costs. However, TE with V2G creates electric system benefits from the provision of valuable grid services.
- *Recommendation 6 b.*—utility regulators should encourage utilities to provide enhanced funding for bi-directional charging infrastructure as part of "future-proofing" the charging infrastructure based on the incremental value that V2G provides to the electric system.
- *Recommendation 8.*—commercial EV rates should not require chargers to be on a separate service and should accommodate submetering. As noted above, V2G provides customer-side value when co-located with building load and onsite generation.

Electrification of the MHDV segment is essential for the NESCAUM member states to meet their decarbonization goals. Displacing fuels purchased at the pump with electricity purchased from the grid opens up new opportunities for regional economic growth and expanded employment opportunities. The multi-state ZEV task force's draft Multi-State MHD ZEV Action Plan provides a wealth of valuable recommendations to support the electrification of the MHDV segment. The Plan could be enhanced with additional recommendations as discussed above to support the build-out of bi-directional charging infrastructure and adoption of V2G capable MHD EVs. Nuvve appreciates the opportunity to share comments on the draft Plan.
Respectfully submitted,

[3] The National Standard Practice Manual for Distributed Energy Resources offers a set of policy-neutral, non-biased, and economically-sound principles, concepts, and methodologies to support single- and multi-DER benefit-cost, available at https://www.nationalenergyscreeningproject.org/national-standard-practice-manual/.

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