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Comments of Nuvve Corp on CEC Docket #20-IEPR-02 VGI Workshop

Additional submitted attachment is included below.

Comments of Nuvve Corporation

California Energy Commission Docket #20-IEPR-02
2020 Integrated Energy Policy Report Update
07-15-2020

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Use case: Current EV rate design and impacts on VGI value streams

Nuvve is a San Diego-based technology and services company operating in the U.S. and internationally whose bi-directional vehicle-to-grid (V2G) technology transforms electric vehicles (EVs) into grid resources when those vehicles are plugged in, while guaranteeing the expected level of charge at the time the driver needs it for transportation. 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 while integrating stationary batteries and demand response resources. While Nuvve is an industry leader in bi-directional technologies, we work in a variety of areas relevant to the broader Vehicle- Grid Integration (VGI) effort in California and around the world. As is the case anywhere else, California's regulatory structure determines what business models are viable and how services may be monetized.

California's energy decarbonization and transportation electrification goals are clearly and inextricably linked as elements of the state's wider climate change strategy. The nature of the relationship, however, must be clear in order to effectively design rates, allow customer access to related value streams, and ensure that utility roles and incentives are aligned and synergistic with state goals. Specifically, it is a mistake to conclude that transportation electrification is part of an "electrify everything" strategy, and an emissions reduction box to be checked as part of a wider effort to meet climate goals. Similarly, transportation electrification does not simply become "cleaner" as a result of energy decarbonization. Rather, the two elements can and should form a positive feedback loop in which VGI services allow further integration of renewables and more efficient use of infrastructure, in return for value streams that encourage further competition and private investment in EV infrastructure, and an improved economic case for EV adoption. This comment illustrates the impact of this dynamic being broken by misalignment of rates, interconnection decisions, and distribution buildout rules, and suggests steps to avoid replicating this situation as EV rate design and EV infrastructure become increasingly prevalent issues.

Use Case: School district purchases bi-directional electric school bus, with support from MD/HD EV funding program

When California schools take advantage of the MD/HD funding program to purchase electric school buses, there come a couple of conditions.

1) The bus must be on the new commercial EV rate
2) The bus must have its own electrical service, meaning there is a metered account separate from any other loads or resources the school might have. This is logical, as this and other EV rates are designed for application only to the expected usage patterns of EVs.

This configuration makes sense on the surface. The commercial EV rate is designed to mitigate demand charges for high-powered, low utilization charging stations such as "DC fast charging" destination charging facilities. Such sites have very little flexibility in the rate and time at which they charge customers' cars, leaving little opportunity to avoid demand peaks. People at a destination charger want a charge immediately and fast. School buses could certainly produce sizable increases in a school's demand if they use high-powered chargers and all arrive simultaneously to charge at full power all at once, so it may seem that this is an appropriate application of the rate. However, the school bus use case is different from the destination charging case: They have all evening and all night to charge, and hence more flexibility of both timing and charge rate. So, we are applying a rate that assumes little to no flexibility in charging and usage to a use case that, as is the case with many EV use cases, is in fact inherently flexible and if correctly configured could provide significant value to the customer and the grid. The effect of this well-intentioned funding decision is to eliminate vehicle-grid integration (VGI) opportunities, discourage private investment, and instead to simply add the vehicle to the grid as new time-of-use load instead of integrating it as a resource.

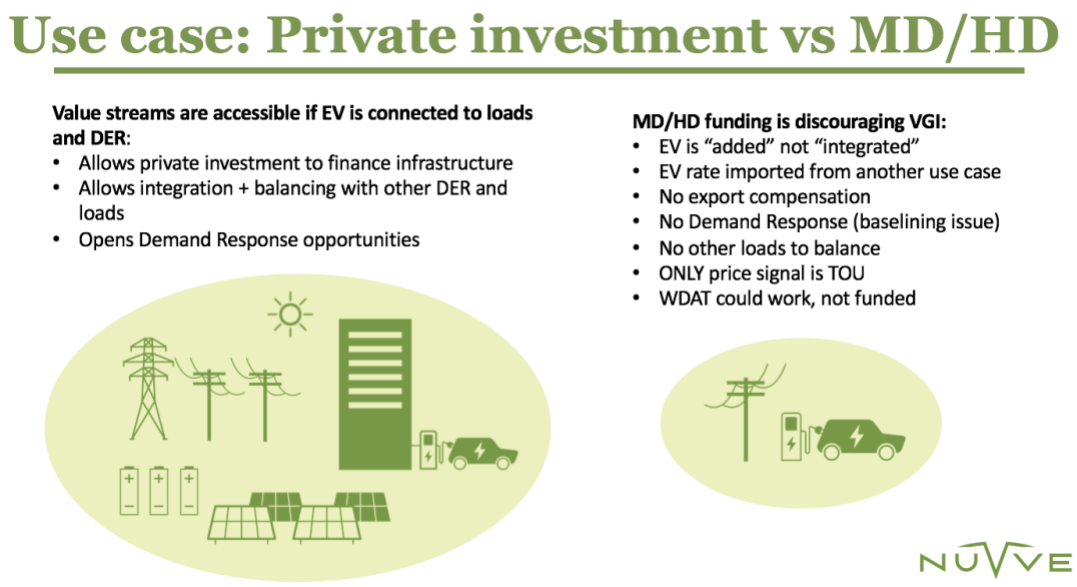
How does school bus funding end up discouraging VGI? Remember that the bus is behind its own meter with a specific time-of use rate. This restricts the value streams the bus may access while parked for the following reasons:

1) With no other loads to create a baseline of energy usage, buses cannot participate in demand response programs at the distribution or transmission level
2) Even if other buses could be used to create baseline energy usage, bi-directional "V2G" buses cannot discharge their batteries effectively because demand response

programs do not compensate for energy sent back to the grid: Once the load reaches 0 kW, compensation stops. There is no reason to have bi-directional buses on this program.

3) With no other loads or resources, a bi-directional bus cannot optimize on-site solar, and it cannot balance out peaks in facility load.
4) There is no retail "Net metering" type of rate that compensates a bi-directional EV for exporting, so again there is no real incentive for bi-directional buses here.
5) An "in front of the meter" Wholesale Direct Access Tariff (WDAT) interconnection would allow compensation for export, but as far as we know that type of connection is not funded by this program.
6) There is currently no path to participate in ancillary services from behind retail meters in California.
7) The time-of-use rate is the only price signal the bus can respond to, so the school district can set a timer.

Why does this discourage private investment? Though there are a variety of investors and infrastructure companies interested in financing the school bus use case, there needs to be some value stream to associated with it. A school that has already accepted this funding and this rate will not be a candidate for VGI applications, and investors need to search for unfunded projects, limiting the market they see.



Recommendations:

Nuvve recommends that utilities and regulators refrain from trying to design the perfect rate for EV use cases. There are simply too many use cases (thousands in fact, as highlighted by the VGI Working Group), and as the example in this comment shows, a rate may not translate well even across seemingly related cases. Further citing the example, we saw a rate designed for an inflexible use case applied to a far more flexible case and in doing so actually diminishing the potential value of that flexibility to the grid. We therefore recommend the following when considering rates related to EV use cases:

- Reframe EVs as a type of DER that can be placed behind a retail meter along with solar pv and stationary storage, rather than as a specific technology-based class.
- Account for and encourage the inherent flexibility of most EV use cases.
- Assume EVs will respond to a variety of price signals not included in the rate, such as generation on-site, demand response requests, and energy arbitrage opportunities that may even incentivise the EV discharge energy, and remove disincentives to responding to external signals.
- Remove disincentives to discharging energy such as potential for double-taxation, and lack of compensation for exporting
- Stop planning distribution for the worst hour of the worst day with no control of resources, and stop using Time-of-Use rates as the primary price signal for load shifting. Instead design incentives for customers to keep usage within consistent limits by coordinating all DERs and loads behind customer meters
    - Examine behind the meter EV energy management as a non-wire alternative to distribution upgrades
    - Decrease complexity of distribution planning and rate design
- IOU involvement should end at the Point of Common Coupling

Staff "TERPA" proposal

Nuvve supports the CEC staff proposal "TERPA" concept, and believes it warrants further consideration and development. Lack of EVSE infrastructure is the result of a problem, not the problem itself. The problem is the environment is not right for innovation and investment

by industry. California cannot meet the challenge of climate change with mandates and funded programs, those only provide the starting place. The state must create mechanisms for real, accelerating momentum in private industry, and all the innovation, marketing, and customer focus that comes with a viable and attractive market. The TERPA concept aims to spur competition while linking EVSE installation to GHG avoidance in a way that generates the type of positive feedback loop sketched out at the beginning of this comment for EV infrastructure. The "Avoided Cost of Charging" concept seems like a viable way to address the ongoing concern that ratepayers must not overpay for the socialized cost elements of EV infrastructure, while still making room for a variety of business models from private developers and third-party providers. PURPA, from which TERPA it takes inspiration, is proof that the right policy can create a thriving and competitive industry. Finding a way to replicate that dynamic would be a bold step to accelerate transportation electrification and surpass California's already ambitious goals.

Respectfully submitted,

Jacqueline Piero