October 3, 2023

Comments of the Vehicle-Grid Integration Council
on Xcel Colorado's 2024-2026 Transportation Electrification Plan

Introduction

The Vehicle-Grid Integration Council (VGIC) is a 501(c)(6) nonprofit trade association focused on accelerating the role of smart EV charging and discharging (i.e., vehicle-grid integration or "VGI") through policy development, education, outreach, and research. Scaling VGI is an essential part of transportation electrification and will help accomplish the following key policy goals:

- **Benefit drivers and fleet owners** by reducing the total cost of ownership.
- **Decarbonize the transportation sector** by accelerating EV adoption.
- **Support decarbonization of the power sector** by providing necessary 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 the proper policy and regulatory support and coordination, these goals can be achieved, and EV drivers and EV fleets in Colorado can play a supportive role in the acceleration of both transportation electrification and grid decarbonization. **Our vision for VGI encompasses the following key elements:**

- **Ensure customer mobility needs are satisfied.** Drivers and fleets can participate in a wide variety of VGI services without compromising their mobility needs.
- **Managed charging will benefit EV drivers and fleet operators**: Drivers and fleets will be given the ability 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 EV ownership will accelerate overall EV adoption by drivers and fleet managers, helping meet Colorado's transportation decarbonization goals.
- **EVs provide emissions-free emergency power during blackouts**: During extreme weather blackouts or other power outages, EVs can utilize bidirectional charging capabilities to send energy to a home, building, or microgrid, serving as a generator and providing safe backup power for households and communities.

- **Charging infrastructure dollars go further**: Smarter management of EV charging can help manage the cost of deploying EV charging infrastructure, which encourages wider access to EV charging.
- **VGI enables EVs to provide valuable services to the grid and generate revenue**: V1G (unidirectional charging) and V2G (vehicle-to-grid, or bidirectional charging) will enable electric vehicles to both receive and feed power back to the grid, supporting advanced grid services such as frequency control, demand response, peak shaving, and more. A number of utilities have implemented programs that provide compensation for these valuable grid services.

VGIC appreciates the opportunity to provide the following recommendations on Xcel Energy's 2024-2026 Transportation Electrification Plan ("TEP").

VGIC Supports Xcel's Proposal to Evolve Managed Charging Offerings

Managed charging is a crucial strategy to reduce the impacts of EV charging on the grid and contribute to reductions in greenhouse gas emissions and other harmful pollutants. By reducing peak load and shifting EV charging to off-peak periods, managed charging helps avoid high energy costs and high power plant emissions during peak periods as well as mitigate the need to upgrade distribution and transmission systems to accommodate increasing peak demand. Managed charging offerings can also reduce renewable curtailment by encouraging EV charging to occur during periods with excess renewable energy generation. **Xcel's proposals to evolve its managed charging offerings, including expanding the Charging Perks pilot to a full program,[1] offering an off-peak subscription rate,[2] and developing a managed charging pilot for commercial and fleet customers,[3] are critical to advancing these goals to the benefit of EV customers and all ratepayers.** VGIC looks forward to engaging with Xcel on the specific program details of the commercial and fleet managed charging pilot.

VGIC Supports Xcel's Proposals for Vehicle-to-Everything ("V2X") Pilots with Modifications

As mentioned above and in Xcel's testimony,[4] V2X can offer various benefits to EV customers (such as providing backup power and managing electric bills) and can also support the grid through exports. VGIC appreciates Xcel's work investigating V2X capabilities under the 2021-2023 TEP and supports Xcel's proposal to continue these efforts in the 2024-2026 TEP. Particularly, VGIC supports the inclusion of a variety of V2X applications, including vehicle-to-building ("V2B"), vehicle-to-home ("V2H"), and vehicle-to-grid ("V2G"), for both residential and

[1] Xcel Energy Hearing Exhibit 106, pg. 13.
[2] Xcel Energy Hearing Exhibit 108, pg. 8-9.
[3] Xcel Energy Hearing Exhibit 108, pg. 20.
[4] Xcel Energy Hearing Exhibit 106, pg. 26-27.

commercial customers.[5] Gaining familiarity with different V2X use cases will better equip Xcel to support customer adoption of the full range of potential V2X configurations in the future. These pilots should also include a rate demonstration for V2X use cases, so as not to limit the pilots to a technology proof of concept.

Additionally, VGIC supports Xcel's proposal to integrate the School Bus Electrification project with its V2X efforts, including requiring vehicles and charging infrastructure to be bidirectionally capable and requiring participants to allow Xcel to access the V2G capabilities of buses. Electric school buses are the leading use case for V2G today, with commercially available bidirectional vehicles and EVSE[6] ready to support such projects. As electric school bus deployment scales, V2G offers substantial public benefits, such as supporting grid reliability and community resilience in the face of aging grid infrastructure and increasingly frequent and severe extreme weather events.

However, some of the proposed V2X pilots would benefit from modifications:

1. **Xcel should expand the V2G for Residential EVs pilot to include customers not participating in the Company's bidirectional charger rental offering under the EV Accelerate at Home ("EVAAH") program.** As proposed, potential participants in the V2G for Residential EVs pilot must also participate in the bidirectional charger rental offering,[7] which is focused on the backup power (V2H) use case.[8] However, not every customer interested in V2G will also want to participate in a V2H offering, and thus the requirement to participate in the EVAAH backup power program may inadvertently exclude customers who only wish to pursue V2G opportunities. VGIC suggests that Xcel remove this requirement and allow customers to bring their own bidirectional charger to the V2G for Residential EVs pilot. This change would support customer choice and enable Xcel to gain

[5] Xcel Energy Hearing Exhibit 106, pg. 30.

[6] 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-illinoisschool-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; NuvveCorporation (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-andcost-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-highlandelectric-fleets.pdf?sfvrsn=2efbcc3d_12.

[7] Xcel Energy Hearing Exhibit 103, Attachment HS-1, pg. 71

[8] Xcel Energy Hearing Exhibit 103, Attachment HS-1, pg. 38-39.

experience with more use cases, thereby generating more experience that will help advance the V2G market in the Company's service territory.

2. **Xcel should eliminate the requirement for a dedicated meter and EV supply infrastructure for customers participating in the V2B for Light-Duty Vehicles pilot.** Some major benefits of V2B include demand charge management, DER integration, and backup power, all of which would necessitate the EV charger to be on the same utility meter and service connection as the building load. Requiring a separate meter and service connection would preclude these use cases as well as add unnecessary costs for customers. VGIC recommends that Xcel allow program participants the flexibility to choose whether a separate meter and service connection would make sense for them.
3. **Xcel should partner with several OEMs and hardware manufacturers for the V2X pilots.** There are currently several OEMS selling bidirectional-capable EVs and chargers in the US.[9] Partnering with as many equipment vendors as possible will help Xcel gain valuable experience with diverse set of technical configurations as well as support customer choice.

Given the immense benefits that V2X offers, there should be a clear path for these pilots to become full offerings that unlock V2X to the broader customer base. **Xcel should use lessons learned from the pilots to 1) develop streamlined, customer-friendly interconnection guidance for V2X resources, including both export and non-export configurations, and 2) sustainable compensation mechanisms for grid services, such as through demand response programs or export credits. VGIC recommends that the Commission require Xcel to file proposals for these items in the next iteration of the TEP.**

Furthermore, VGIC recommends that Xcel establish targets for bidirectional charging infrastructure to spur investment and innovation. Targeted incentives for bidirectional charging hardware and software solutions can serve as a "future proofing" strategy to ensure that charging infrastructure installed over the course of the 2024-2026 TEP is able to participate in V2X offerings once they are available in the future. VGIC members are willing to make the necessary investments provided that there is a commitment to support bidirectional charging through incentives paired with compensation for V2X grid services that reflects the benefits of V2X to all ratepayers, as described above.

The Commercial Customer Sited Battery Demonstration Should be Expanded

VGIC supports Xcel's proposal to explore the use of battery storage to support the deployment of Direct Current Fast Chargers ("DCFCs").[10] As discussed by Xcel, co-located

[9] Smart Electric Power Alliance. *The State of Bidirectional Charging in 2023*, pg. 46-48. https://sepapower.org/resource/the-state-of-bidirectional-charging-in-2023/

[10] Xcel Energy Hearing Exhibit 106, pg. 45-46.

energy storage can reduce the peak load of the charging site, thereby helping to avoid or defer the need to upgrade certain distribution infrastructure to accommodate the new charging load. The reduced need for infrastructure upgrades can generate savings for the customer installing DCFCs and ratepayers at large as well as accelerate installation timelines due to the lower overall engineering and construction needs.

However, co-located battery storage is only one approach to achieving these objectives. There are several other solutions – collectively called Automated Load Management ("ALM"), EV Energy Management Systems ("EMS"), or Demand Management Technologies ("DMT") – that can also limit EV charging demand at the service connection to a predetermined level below the aggregated nameplate charging capacity of the EV chargers. These ALM approaches include hardware-based solutions (e.g., co-located energy storage, energy storage integrated into chargers, etc.) and software-based solutions (e.g., power sharing across multiple chargers). Public DCFCs may be more likely to require energy storage solutions, whether co-located or integrated, to ensure high charging speeds for EV drivers looking for on-the-go charging. Software-based approaches may better suit DCFCs and Level 2 EVSE that serve workplace charging, multi-family housing parking, and public or private fleet charging facilities with relatively longer dwell times. **VGIC recommends expanding the proposed Commercial Customer Sited Battery Demonstration to include the full range of possible ALM approaches.** In New York, the Joint Utilities' recently proposed a Load Management Technology Incentive Program, which aims to encourage the installation of ALM technologies, has broad eligibility guidelines that include "all demand management technologies capable of reliably balancing, curtailing, or deferring a customer's net EV charging demand on the electric grid."[11] A similarly broad scope for Xcel's initial pilot/demonstration effort will enable Xcel to better understand the technology's value and encourage customer adoption of the wide range of solutions that can deploy EV charging infrastructure at lower cost and on quicker timelines.

Similar to the V2X pilots discussed above, the lessons learned and experience gained from this pilot should inform future offerings available to a broader, mass-market customer base. Xcel should use the pilot to gather information on the costs and benefits of ALM installations to develop an offering incentivizing customer adoption of these technologies in the next TEP. **VGIC recommends that Xcel and the Commission investigate programs that provide an incentive for installing ALM technologies that is commensurate with the demand reduction and infrastructure cost savings resulting from the customer's installation.** For example, customers could receive a rebate based on a prescribed dollar-per-kW amount for the difference between the cumulative nameplate EVSE capacity and site connection requirement. The per-kW incentive

[11] New York Public Service Commission Case 22-E-0236. *Joint Utilities' Electric Vehicle Load Management Technology Incentive Program*, pg. 3. https://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId={C01E3588-0000-CC11-824F-591C19658923}

amount could be based on overall infrastructure costs avoided by ALM installations – such as the costs associated with installing EVSE across Xcel's service territory, regardless of the specific ALM approach the customer elects. The customer installing ALM would be eligible for a portion of the cost savings enabled by their ALM installation, with the remainder benefiting all ratepayers. For example, suppose the average utility-side cost for EVSE installation is $1,000 per kW, and the customer installs ALM to reduce 100 kW in total nameplate EVSE capacity to 80 kW site connection requirement. In that case, the cost savings enabled by the ALM installation is $20,000. Assuming a cost-share share ratio of 80/20 as an example, the customer would be eligible for a $16,000 incentive, while ratepayers would benefit from $4,000 in savings and/or unspent program budget that can be used for additional charger deployment. VGIC offers itself as a resource to collaborate with Xcel and the Commission on the appropriate mechanism to incentivize customer adoption of ALM.

Conclusion

VGIC appreciates the opportunity to submit these comments on Xcel's 2024-2026 Transportation Electrification Plan. We look forward to further collaboration with the Commission, Xcel, and other stakeholders in Colorado on this important initiative.

Respectfully submitted,

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