



January 24, 2024

Will Seuffert
Executive Secretary
Minnesota Public Utilities Commission
121 7th Place East
Suite 350 St.
Paul, MN 55101

Submitted—Via Electronic Filing— (<https://mn.gov/puc/get-involved/public-comments/>)

**RE: In the Matter of Xcel Energy’s 2023 Transportation Electrification Plan Docket No.
E002/M-23-452**

Dear Mr. Seuffert:

Fermata Energy respectfully submits these comments on Northern States Power Company’s (“Xcel Energy” or “the Company”) 2023 Transportation Electrification Plan (“TEP”), filed in the above-named docket as Appendix H of the Company’s Integrated Distribution Plan. Xcel Energy has a critically important role to play in accelerating transportation electrification (“TE”) in Minnesota and recognizes the importance of bidirectional charging to accelerate electric vehicle (“EV”) adoption.

About Fermata Energy

Founded in 2010, Fermata Energy is a leading Vehicle-to-Everything (“V2X”) bidirectional charging services provider. Fermata Energy designs, supplies, and operates the technologies required to integrate electric vehicles (“EVs”) into homes, buildings, and the electric grid. Fermata Energy’s V2X platform incorporates CHAdeMO and CCS connectors in a bidirectional charger and management software platform that connects the EV and electricity user to the grid. Fermata Energy’s V2X platform extends the value of an EV and allows the vehicle to act as a dispatchable energy storage resource when the vehicle is not in use.

Fermata Energy’s customers today are earning thousands of dollars per EV and EVSE pair through Vehicle-to-Grid (“V2G”) and Vehicle-to-Building (“V2B”) programs nationwide. The company’s bidirectional EV charging system is the first to be certified By UL Solutions in North America to UL 9741, the Standard for Bidirectional EV Charging System Equipment and is the first to earn approval in the U.S. from a major OEM for battery warranty.

In addition to developing the hardware and software required to perform V2X activities, Fermata Energy has spent over 10 years studying how V2X can unlock additional value streams from EVs, including those that are commercially viable today without regulatory intervention and how to best monetize these value streams. Fermata Energy has extensive experience with analyzing use cases, monetization mechanisms, and business models to maximize the benefits of V2X technologies. Vehicle Grid integration (“VGI”) encompasses both V1G (smart and managed charging solutions) and V2X (bidirectional power transfer to the grid, building, home, microgrid, or any other external load source). While V1G enables EVs to participate in off-peak charging programs and provide automated load management, V2X unlocks additional value streams and benefits for ratepayers and the grid by enabling the discharge of power stored onboard an EV. V2X unlocks the value of EVs to provide all of the services that V1G does, in addition to backup power/resilience, demand charge management, demand response, system-wide peak shaving, and ancillary services, among others.

The interest in V2X commercialization is widespread and accelerating. In addition to the launch of the Ford Lightning (EV F150 pickup truck) V2H (vehicle-to-home) offering, 2023 saw several EV manufacturers announce plans to make their EVs bidirectional.¹ Furthermore, several electric vehicle supply equipment (“EVSE”) manufacturers announced plans to bring bidirectional chargers to market, expanding the limited number of bidirectional chargers that are available today.²

The Benefits of Bidirectional Charging and V2X

According to the Smart Electric Power Alliance, a non-profit organization focused on smart grid topics, the 2.1 million EVs currently in circulation in the U.S. have approximately 126 gigawatt-hours of battery storage or five times more than the current grid-connected battery storage.³ Bloomberg New Energy Finance (“BNEF”) projects that 90 percent of all lithium-ion batteries manufactured through 2045 will be in EVs.⁴ The stationary storage segment will remain a small fraction with EVs having a much larger energy storage capability.

¹ See Automotive News, GM to offer bidirectional charging on all EVs by 2026 available at <https://www.autonews.com/mobility-report/gm-evs-have-bidirectional-charging-technology-2026> and CleanTechnica, Tesla Plans To Adopt Bi-Directional Charging By 2025 available at <https://cleantechnica.com/2023/08/19/tesla-plans-to-adopt-bi-directional-charging-by-2025/>.

² See electrek, Wallbox and Kia team up to try and bring bidirectional charging capabilities to EV9 owners available at <https://electrek.co/2023/08/25/wallbox-kia-bidirectional-charging-capabilities-ev9-owners-home/> and

³ See Smart Electric Power Alliance, The State of Bidirectional Charging in 2023 available at <https://sepapower.org/resource/the-state-of-bidirectional-charging-in-2023/>.

⁴ See Bloomberg Law, Electric Vehicles to Drive Massive Battery Demand: BNEF Chart available at <https://news.bloomberglaw.com/environment-and-energy/electric-vehicles-to-drive-massive-battery-demand-bnef-chart>.

Minnesota has an historic opportunity to integrate bidirectional charging as a core component of the transportation electrification and grid modernization efforts. The benefits to state residence would be significant and include the following:

Support Achievement of Climate Goals

Just like stationary storage, V2X bidirectional charging platforms can reduce carbon and criteria pollutant emissions from generators by shifting electricity consumption to the cleanest hours of the day and removing the need for dirty thermal peaker plants to generate electricity. Batteries can absorb excess renewable generation reducing the curtailment of wind and solar and then release that energy back to the homes and businesses when needed. V2X, however, is more cost-effective than stationary storage, as ratepayers don't have to pay for the purchase of the EV battery and can accelerate the transition to renewable energy and can also be deployed quickly at scale.

Provides Valuable Grid Services

With V2X bidirectional charging, utilities gain a large new flexibility resource that can provide the same grid services that stationary energy storage projects provide today. V2X can play an important role in addressing the intermittent production of solar and wind power generation. Furthermore, V2X can be a valuable demand response ("DR") resource providing peak shaving services during periods of grid stress.

EVs in other states have already proven to be valuable resources participating in electric distribution company's ("EDC's") DR programs. For example, in Massachusetts the EDCs' ConnectedSolutions DR programs have enabled V2X projects to generate revenues for EV owners. Highland Electric Fleet's Beverly Public School fleet electrification project demonstrates the viability of electric school buses as bidirectional vehicle-to-grid ("V2G") resources, receiving revenue via National Grid's ConnectedSolutions program and providing a template to scale the service at additional deployment sites.⁵ BlueHub Capital and Fermata Energy recently launched the first V2G pilot program in the nation for multi-family affordable housing. The pilot is designed to increase affordable access to EVs for low-income drivers through an innovative V2G car lease program that is partially financed by earning Eversource ConnectedSolutions revenue.⁶

⁵ See CISION PR Newswire, Highland Electric Fleets Coordinates Electric School Buses' Summer Job - Supporting Local Grid with Vehicle-to-Grid Technology available at <https://www.prnewswire.com/news-releases/highland-electric-fleets-coordinates-electric-school-buses-summer-job--supporting-local-grid-with-vehicle-to-grid-technology-301611928.html>.

⁶ See Enterprise Mobility, First-in-Nation Pilot to Provide Low-Income Driver with Affordable Access to EV Launched in Boston by BlueHub Energy, Fermata Energy, Enterprise Holdings & Codman Square Neighborhood Development Corp. available at <https://www.enterprisemobility.com/news-stories/news-stories-archive/2023/09/pilot-for-affordable-access-to-evs--launched-in-boston.html>.

Lower Vehicle Ownership Costs

EV owners can earn money by selling electricity back to the grid earning revenue, significantly cutting the cost of vehicle ownership. Offsetting the cost of owning and maintaining an EV through the revenue earned from bidirectional charging can accelerate EV adoption. The BlueHub Capital and Fermata Energy pilot referenced above uses the revenue from Eversource's ConnectedSolutions program to reduce the monthly EV lease payment for a low-income household. Bidirectional charging and V2G can provide equitable EV access to low-income households using this innovative approach, a segment that has not seen significant EV adoption given the EV cost barrier.

Increase Community and Household Resiliency

Unidirectional charging is a grid load. V2X bidirectional charging cost-effectively supports grid resilience. During blackouts, EV owners with bidirectional chargers can power their homes, businesses, and critical infrastructure. The energy in an EV can power a typical home for three or more days. Using EVs as a source of backup power for homes or within a larger microgrid also avoids emissions from gasoline- or diesel-based generators.

Ratepayers Savings

EV adoption has already been shown to significantly benefit utility ratepayers as more revenue is generated from the sale of electricity for EV charging.⁷ Several studies have demonstrated that bidirectional charging and V2G offers significant benefits beyond smart charging or V1G.⁸ A 2018 Electric Power Research Institute study projects \$1 billion in annual ratepayer benefits in California if 50 percent of chargers were bidirectional with V2G technology.⁹ While no similar study has been done yet for Minnesota, the potential for significant ratepayer benefits from bidirectional charging exists and should be explored.

⁷ See Synapse Energy Economics, Electric Vehicles Are Driving Electric Rates Down available at https://www.nrdc.org/sites/default/files/media-uploads/evs_are_driving_rates_down_dec_2022_update_0.pdf.

⁸ For example, Tarroja and Hittenger (2021) estimate that the value of smart charging only reaches \$87 per vehicle-year while that for vehicle-to-grid can reach \$2,850 per vehicle-year in California, see Energy, The value of consumer acceptance of controlled electric vehicle charging in a decarbonizing grid: The case of California available at <https://www.sciencedirect.com/science/article/pii/S0360544221009397>.

⁹ See The Electric Power Research Institute, Vehicle-to-Grid: \$1 Billion in Annual Grid Benefits? Available at <https://eprijournal.com/vehicle-to-grid-1-billion-in-annual-grid-benefits/#:~:text=V2G%20technology%20can%20provide%20%241,peak%20shaving%20and%20ramping%20support>.

Comments

Transportation electrification (“TE”) is key to achieving Minnesota’s Climate Action Framework targets to reduce emissions 50 percent by 2030 (from 2005 levels) and achieve net-zero emissions by 2050.¹⁰ Electric utilities have a unique and critical role to play in the TE process. Fermata Energy believes that Xcel Energy’s 2023 TEP represents a well-developed and comprehensive set of proposals to support TE. **Fermata Energy encourages the Commission to approve Xcel Energy’s 2023 TE plan.**

Taken together, the five core program proposals in the Company’s 2023 TEP will accelerate EV adoptions across the state. These five proposals include:

- An expansion plan for the current EV Subscription Service Pilot,
- A Home Wiring Rebate program to help reduce upfront charging infrastructure costs and encourage managed charging,
- Expanded Residential Advisory Services,
- **Support for Electric School Bus projects to support Vehicle-to-Grid (V2G) demonstrations, and**
- Bridge funding for both the Fleet EV Service and Public Charging Pilots to continue supporting important commercial electrification projects.¹¹

Fermata Energy commends Xcel Energy for its interest in and support for bidirectional charging and V2X technology. The Company’s 2023 TEP contains several references to the important role of bidirectional charging and V2G technology in transportation electrification planning, including the following statement:

“V2G has the potential to provide grid services that indirectly benefit all customers by providing additional capacity at times of system peak, relieving distribution constraints at the feeder level, and helping with the integration of high penetrations of renewables.”¹²

Xcel Energy’s 2023 TEP contains a V2G Whitepaper as Appendix H3, which was commissioned by the Company and produced by the consulting firm Guidehouse.¹³ Although the study focused on Colorado, much of the analysis, findings, and recommendations readily apply to V2G market development in Minnesota. In the whitepaper, Guidehouse provided several recommendations to Xcel Energy:

¹⁰ See State of Minnesota, Minnesota’s Climate Action Framework available at <https://climate.state.mn.us/sites/climate-action/files/Climate%20Action%20Framework.pdf>.

¹¹ See Xcel Energy, 2023 Transportation Electrification Plan page 1, Integrated Distribution Plan, Appendix H, Docket No. E002/M-23-452 available at <https://www.edockets.state.mn.us>.

¹² Ibid, page 44.

¹³ Ibid, page 87.



- Incentivize V2X adoption to accelerate market development cycles
- Collaborate with equipment providers on demonstrations at the outset of product deployment
- Invest in tools to make interconnection processing more efficient
- Continue to initiate R&D pilots addressing key unknowns of implementation¹⁴

Xcel Energy's 2023 TEP for Minnesota seeks to implement some of these recommendations to advance bidirectional charging in the state. This includes a proposal for an electric school bus ("ESB") V2G demonstration project. There has been significant interest in ESBs and V2G given the large onboard batteries and predictable route schedules.¹⁵ The proposed program design is reasonable and Fermata Energy encourages the Commission to approve this component of Xcel Energy's 2023 TEP and to support future requests by the Company to expand the pilot to more school districts.

Conclusion

Fermata Energy appreciates the opportunity to provide comments on Xcel Energy's 2023 TEP and once again encourages the Commission to approve the plan.

Respectfully submitted,

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¹⁴ Ibid, page 90.

¹⁵ See World Resources Institute, 3 Design Considerations for Electric School Bus Vehicle-to-Grid Programs available at <https://www.wri.org/insights/electric-school-bus-vehicle-grid-programs>.