Smart Electric Power Alliance

Case Study: Dominion Energy—Electric School Bus Fleet V2G

The State of Bidirectional Charging in 2023

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About SEPA

The Smart Electric Power Alliance (SEPA) is dedicated to helping electric power stakeholders address the most pressing issues they encounter as they pursue the transition to a clean and modern electric future and a carbon-free energy system by 2050. We are a trusted partner providing education, research, standards, and collaboration to help utilities, electric customers, and other industry players across three pathways: Electrification, Grid Integration, Regulatory and Business Innovation. Through educational activities, working groups, peer-to-peer engagements and advisory services, SEPA convenes interested parties to facilitate information exchange and knowledge transfer to offer the highest value for our members and partner organizations. For more information, visit www.sepapower.org.

Disclaimer

Utility Program: Dominion Energy

Electric School Bus Fleet V2G

Description of Project

Since 2019, Dominion Energy has promoted electric school bus adoption through its Electric School Bus Program.[1] Through the program, schools are required to receive funding from the EPA's Clean School Bus Program. Once schools receive funding, Dominion assists with fast-charging solutions that include coordination with the utility, grid upgrades, construction, and charger installation.[2] Dominion also covers the maintenance costs for the chargers for 15 years and 50% of the cost of the battery warranty. As part of the agreement, Dominion requires that the school buses are V2G-capable. Dominion will receive the V2G rights of the buses and after 15 years will receive ownership of the batteries.

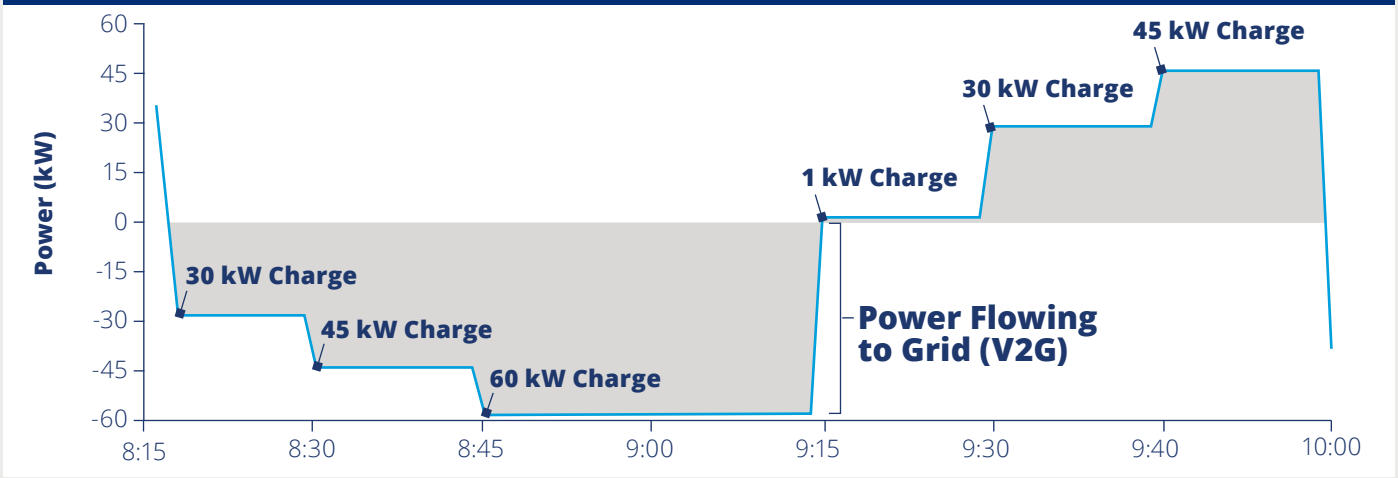
Trial Phase

During the first phase of the program, 50 Thomas Built Saf-T-Liner C2 Jouley school buses were deployed to schools throughout Dominion's service territory.[3] In partnership with Proterra and the Electric Power Research Institute (EPRI), Dominion spent the first 18-months of the project capturing data on the buses in a mixture of urban and rural environments, in a variety of different terrains (such as mountainous vs flat), and in different seasons.[4] This baseline data helped Dominion refine assumptions about grid service capabilities and constraints and provided insights into V2G opportunities.

Early insights indicate that 95% of the time these buses have nearly 3 MWh of available capacity for grid services and that the capacity is higher during the nighttime and early mornings. Additionally, due to the existing controls needed for V1G controlled-charging, developing a fully-fledged V2G program will require marginal incremental effort.

During this phase, Dominion also tested a variety of V2G capabilities on one of the buses, including discharging at different power levels (Figure 1). Dominion is in the process of deploying firmware to the remaining 50 buses and plans to test capabilities across the whole fleet.

Figure 1. Dominion's V2G Demonstration



Source. Distributech International. (2023). Insights from the Nations Largest V2G Electric School Bus Pilot. Recreated by SEPA.

1 Dominion Energy. (2022). Electric School Bus Infrastructure Program.
2 Dominion Energy. (2023). Electric School Buses.
3 Thomas Built Buses. (n.d.). Electric School Buses and Utility Companies: A powerful combination.
4 Distributech International. (February 2023). Insights from the Nation's Largest V2G Electric School Bus Pilot.

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