

ELECTRIC SCHOOL BUS VEHICLE-TO-GRID (V2G) DEMONSTRATION PROJECT

WHITE PLAINS, NY



Key Findings for Nova Scotia


- Older vehicle-to-grid (V2G) demonstrations faced difficulties with technology integration, leading to lower than desired ability to respond to called events.
- Results from these early pilots should inform future pilot design and modelling.

PROJECT AT-A-GLANCE

 White Plains, NY

 2018-2021

 5 Lion Electric School Buses

 Grid services tested: discharging during scheduled events outside of operational hours during the school year and summer holidays

PARTNERS

White Plains School District [ESB host](#)

Con Edison [Utility company, co-funder](#)

NYSERDA [Co-funder](#)

National Express [Bus operator, co-funder](#)

Nuve Corporation [V2G technology provider](#)

CurrentWays Technologies [On-board charger OEM](#)

FPG Electrified [Project developer/manager](#)

PROJECT MOTIVATION

GOAL

Determine the technical and economic viability of using V2G-equipped school buses to support the grid at times when power demand is high.

HYPOTHESIS

ESBs are ideal for V2G integration due to daily use patterns and opportunities for overnight storage.

V2G will provide cost-saving opportunities for operators by enabling them to sell power back to the grid during periods of high demand, and it will improve grid reliability by reducing system peaks.

CONTEXT

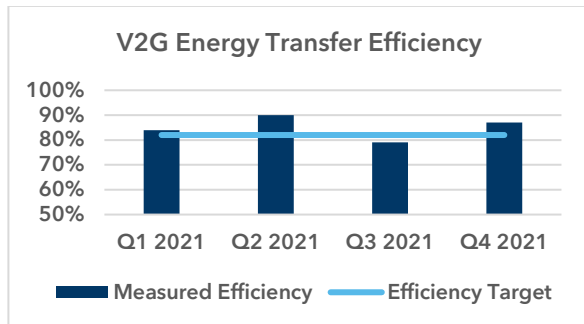
The City of White Plains passed a law requiring all school buses to be electric by 2035. In addition, the State's 2023 budget requires all new school bus purchases to be zero-emissions by 2027 and all school buses on the road to be zero-emissions by 2035.

The V2G concept aligns with Con Edison's Clean Energy Commitment goal to make it easier and more convenient for drivers to adopt EVs.

VEHICLE TO GRID (V2G) FINDINGS

SELECT TECHNICAL RESULTS

- **Higher than target round-trip efficiency.** The ratio of energy discharged at the EVSE to that measured at the battery was 85%, higher than the project's target of 82%.



Source: ConEd, 2022

- **Lower than desirable reliability.** The bus's availability for exporting to the grid when scheduled was 55% of days available. Technology integration was the most common source of reliability issues, since many of the applied technologies were still pre-market and did not seamlessly integrate with each other.
- **Some battery capacity decline, but longer-term monitoring is needed.** The batteries' capacity declined over the one-year demonstration period. The ESBs used in the V2G

demo consumed approximately twice the energy and degraded approximately twice as much, compared to the control ESBs. However, studies have shown that battery degradation is not linear ([Geotab, 2025](#)) and that the impact of V2G on battery degradation varies by use case; some researchers suggest that V2G may even support battery health ([NREL, 2023](#)).

CONCLUSIONS

- **V2G adds complexity and needs high engagement from technology providers.** Bus operators and maintenance staff had to troubleshoot with technical experts and needed support from technology providers to assess transportation use, electrical infrastructure, and V2G integration.
- **Further standardization of communications protocols is needed.** The project team anticipated that equipment issues should improve as the industry matures but noted that standardization will be critical.
- **Technical results should inform financial modelling for future V2G projects.** Planning for future projects should account for the financial impact of energy transfer losses and additional battery degradation.

OTHER LESSONS LEARNED

- **Increasing public support for EVs.** The demonstration attracted positive attention in the White Plains community.
- **Improved driver and passenger experience.** Operators reported positive feedback on vehicle performance and driving experience due to a

healthier bus environment, quieter cabin, and wider driver window/viewing periphery.

- **Future opportunities for electric heating.** Diesel-powered on-board heaters were required. Advancements in battery technology could fully eliminate the need for fossil fuels to operate buses in colder climates.

ABOUT THIS PROJECT

This case study is part of a series commissioned by the Ecology Action Centre exploring the potential for electric school buses (ESBs) to provide grid services by supplying electricity back to the local building or grid when they are not in use, otherwise known as "vehicle-grid integration (VGI)." VGI can help make ESBs more financially viable and boost community resilience, but grid services are just one of many important benefits offered by ESBs, alongside cleaner air for children and drivers, quieter operation, and fuel cost savings.

The Council of Atlantic Ministers of Education and Training commissioned a study for ESBs that showed a feasible pathway to electrifying Nova Scotia's school bus fleet by 2036. These case studies explore how learnings elsewhere could inform future programs in Nova Scotia.

References: ConEdison, 2022. REV Demonstration Project: Electric School Bus V2G Q1 2022 Quarterly Progress Report; ConEdison, 2020. REV Demonstration Project: Electric School Bus V2G Q2 2020 Quarterly Progress Report; ConEdison, 2022. [Con Edison And Partners Go To School With Findings From E-School Bus Project.](#)