FLEXIBLE LOAD MANAGEMENT PILOT

SOUTH BURLINGTON, VT

Key Findings for Nova Scotia

- Automated signalling and successful interoperability are possible with the right suppliers and support.
- Compensation needs to be structured differently for electric school bus (ESB) vehicle-to-grid (V2G) programs than for stationary assets, in order to compensate participants fairly.
- As grid-wide load management capabilities expand, utilities need to move from a goal of peak shifting to load managing, which brings greater opportunity (e.g. matching with renewables) and complexity.

PROJECT AT-A-GLANCE

South Burlington, Vermont

2021-today

4 Thomas Built buses
(grew to 6 buses in later years)

Grid services provided: reducing load during peak events
(Currently, Vermont peaks in summer or winter; New England peaks in summer.)

PARTNERS

Green Mountain Power (GMP) Pilot implementer
Efficiency Vermont Pilot recruitment, baselining
Thomas Built ESB manufacturer
South Burlington School District ESB host
Synop Charging and energy management software provider
Dynamic Organics Automated signal orchestration
Highland Electric Fleets Electrification-as-a-service provider

PROJECT MOTIVATION

GOAL

GMP's Flexible Load Management (FLM) Pilot: expand the number, capacity and flexibility of assets under management that can be remotely dispatched via communication signal; target demand reduction during monthly and annual peak events; generate customer savings; and gather information needed to eventually offer the compensation as a tariff available to all customers.

CONTEXT

Most pilot participants use stationary assets; only a few use vehicles. The school's V2G ESB participation was funded with $965,000 from a Vermont state grant (from Volkswagen Environmental Mitigation Trust Funds) and an incentive from GMP that helps lower overall costs for all GMP customers through strategic electrification and lowering peaks.

PILOT QUESTIONS (UTILITY PERSPECTIVE)

- Can assets **respond automatically** to event signals without impacting bus operations?
- Is the **compensation structure** easy to understand and sufficient to engage customers?

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- What **information needs to be exchanged** between the assets and the utility?
- Do the **baselining assumptions** hold up over time?

PARTICIPANT COMPENSATION DESIGN

- **FLM 1.0**: based on peak reduction in each month and year. Led to successfully shifting the peak, but with an opportunity to increase participants' compensation in future iterations.
- **FLM 2.0:** based on reduction relative to customers' baseline. The school continues to participate under a version of this structure, which accounts for bi-directional energy transfer.

VEHICLE TO GRID (V2G) FINDINGS

SELECT TECHNICAL RESULTS

- **Right partners and technology.** The combination of suppliers enabled the pilot to have an advanced system for signalling events that used an API with a numbering system to signal full or partial discharge.
- **Careful coordination.** Integration between vehicles, chargers, and the platform worked well once all actors came together. Having an electrification-as-a-service provider was a key support.

LESSONS LEARNED

- **Select communications components that comply with published standards.**
- **Test interoperability** before selecting equipment to be sure everything works together, even when products theoretically comply with standards.
- **Leverage additional learning opportunities.** The equipment was also used to do a 24-hour virtual power plan (VPP) demonstration by connecting the bus to a neighbouring site.

FLEXIBLE LOAD MANAGEMENT PILOT FINDNIGS

4.8 / 5	Average participant satisfaction with FLM 2.0
4.4 / 5	Average rating of simplicity of enrollment

Source: GMP, 2023

- **Design with ESBs in mind.** The pilot successfully showed that broader flexible load programs should consider compensation structures that incentivize ESB V2G (e.g. bus schedules, bi-directional energy transfer). Otherwise, utilities should offer separate programs if enough ESB assets are available.
- **Establishing customer baselines is important.** Developing tools and practices for establishing baselines against which compensation is calculated and keeping them relevant over time is key to program success.
- **Shifting mindsets.** As grid-wide load management capabilities expand, utilities' programs can move from a goal of *peak shifting* to *load managing*.

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 to 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: GMP, 2023. "Case No. 21A-1111 – Green Mountain Power's Flexible Load Management 2.0 Innovative Pilot – Final Report"; GMP, 2025. "Case No. 23A-4188 – Green Mountain Power Flexible Load Management 3.0 Pilot 12-Month Update"; Interview with GMP staff, Jan. 2026; Interview with Highland Electric staff, Nov. 2025.

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