

Grid Innovation Fund Project Details

Lead Proponent: BluWave-ai

Partners: Hydro Ottawa, Moment Energy, Invest Ottawa (Area X.O)

Strategic Area(s):	Enabling Non-Wires Alternatives, Wholesale Market Integration
Project Total Cost:	\$4,830,735
Year Contracted:	2021
Status:	Active
Location:	Ottawa
Economic Development:	34 Jobs

Project Objectives

The increased adoption of electric vehicles (EVs) in the distribution grid introduces challenges for distribution utilities who supply the increased energy demand to charge them. The utility will need to plan its infrastructure to manage the increased capacity and find non-wires alternatives to mitigate peak loads so it can avoid costly and long lead time capital upgrades.

The goal of this project is to demonstrate how a distribution utility and a software provider/aggregator can manage residential EV charging to support capacity limitations at the distribution level. In addition to managed EV charging, the project will leverage two strategically located repurposed, retired EV battery energy storage solutions (BESS) to support the distribution grid.

Hydro Ottawa will explore acting as a Total Distribution System Operator aggregating DER resources and dispatching them in response to local needs. Hydro Ottawa will also aggregate the DER resources and test their ability to provide wholesale services such as operating reserve, energy and capacity outside of the IESO-administered markets environment.

A transmission-distribution coordination protocol will be developed and tested.

The software solution will optimize managed EV charging and energy injection/consumption from the BESS and will incorporate load prediction, power flow optimizations, IoT connectivity, and fast AI inference to autonomously smooth local system peaks.

Expected Outcomes

This project will create a framework in place for Hydro Ottawa to participate in the EV market creatively, leveraging the investment in EVs to provide distribution non-wires solutions in the form of demand response. It will also demonstrate the effectiveness of pairing this strategy with front-of-meter (FOM) batteries with dispatchable injection capabilities.

The project expects to reduce peak demand and will inform potential deferral of future infrastructure upgrades.

This project will also demonstrate the willingness of drivers to accept utility control of their vehicle charging, consumer EV charging behaviour/patterns, and the success of the system at providing near real-time grid relief.

Analysis will be performed in areas such as observed performance of EV chargers to curtail load when required, data/telemetry from the aggregation of EV chargers and FOM batteries, customer participation and infrastructure deferral potential. The performance of the AI system in autonomous behaviour will be evaluated with key performance indicators such as grid health and the ability to limit asset loading.

If successful, this project will provide Hydro Ottawa a non-wires approach to handle the growing demand from electric vehicles while minimizing the capital outlay needed for additional system capacity.