Ryerson University

Centre for Urban Energy

Research case study > energy storage

Large-scale battery

Version 1 (updated May 16, 2017)

Context: The electricity system in Ontario and other areas are moving away from a grid anchored by large power plants towards one that focuses on renewable energy, local distributed generation and conservation and demand management. Energy storage is one technology driving this change.

Problem: Instantaneously matching electricity supply with demand is difficult with new technologies, particularly with renewables which are weather dependent. These supply methods also introduce power quality problems into the system. Solutions to these problems are limited by the finite space available in urban environments.

Solution: This one-of-a-kind project tests and demonstrates a utility-scale and stationary energy storage system in downtown Toronto, utilizing lithium-ion super polymer 2.0 battery technology. The unit charges during off-peak hours, when electricity prices and usage is low, and discharges during periods of peak loading.

Impact: By supplying electricity during times of high demand or bad weather, the battery can cost-effectively reduce system stress, compensate for the intermittency of renewables, and address power quality issues. The project findings also guide the regulatory and policy framework for energy storage in Ontario.

CUE's role: Researchers integrated, tested and operated a large-scale battery. Work continues on both exploring protection and control features and measuring its impact on an urban distribution grid. By providing access to Ryerson students and industry, CUE is also helping train energy workers on storage infrastructure.

✓ *Completed*

Partners:
Electrovaya, OCE, Toronto Hydro

Timeline:
July 2012-June 2016

Research team:
Bala Venkatesh, Bhanu Opathella, Matthieu Bila, Nastaran Hajia, Nimish Bhatnagar, Inderjeet Duggal, Rae-Anne Miller, Daniel Cheng, Michael Santorelli, Romulus Gheorge

Key stats

150kW	Power capacity
625kWh	Energy capacity
15 years	Potential shelf life of system