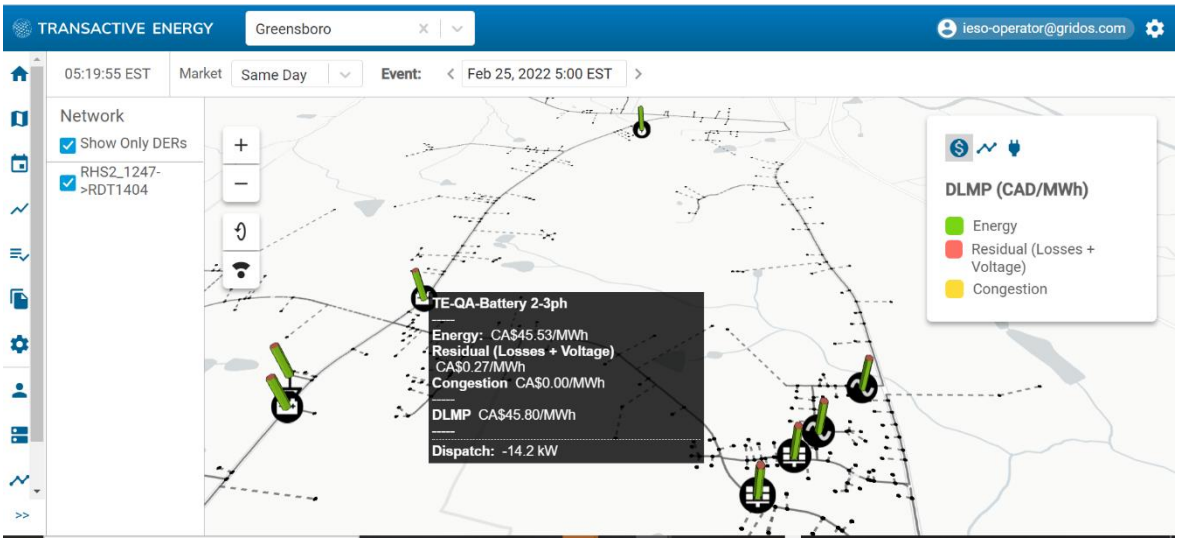
Transactive Energy Network for Clean Generation, Energy Storage, Electric Vehicle Charging and Microgrid Integration

Grid Innovation Fund Project Details

Lead Proponent: Opus One Solutions

Partners: Toronto Hydro, Hydro Ottawa, Lakeland Power

Strategic Area(s):	Wholesale Market Integration
Project Total Cost:	$5,050,000
Year Contracted:	2018
Location:	Pickering, Ontario
Economic Development:	N/A



GridOS GIS view of Distribution System Platform (DSP) displays asset DLMP prices

Project Objectives

This project aims to develop and demonstrate a transactive energy network for the dynamic, locational, temporal marginal valuation, integration, and operation of distributed energy resources on distribution networks integrated with the IESO wholesale market. This project aims to advance Ontario's distributed resources landscape towards an animated, vibrant, and multi-sided network through the first deployment of economic and locational marginal pricing signals at the distribution system level.

This project, in collaboration with three local distribution companies, will develop and demonstrate the ability to generate locational marginal prices at the distribution system level to facilitate the economically efficient integration of energy storage, microgrids, smart EV supply equipment, and other resources into the electricity system while protecting reliability.

Expected Outcomes

If successful, this project will demonstrate the technical feasibility of a radically innovative, resource-agnostic, and market-based approach to unlock the value of DER to both the distribution and bulk systems while coordinating with local system safety constraints, enhancing both market efficiency, and system reliability.

Over a longer time period, historical Distribution Level Locational Marginal Price (DLMP) would send clear economic signals to DER developers and the IESO planners regarding where new resources, including energy efficiency, would provide the greatest value to the electricity system, optimizing the location of new investments.

Project outputs will include:

- Further development of GridOS technical and economic modules to enable DLMP generation
- Software integration with the three LDCs.
- Generation of locational-temporal prices for real power at Toronto Hydro and Hydro Ottawa and real and reactive power at Lakeland Utilities.
- Development of an evaluation methodology in consultation with the IESO for assessing various distribution-level price signal calculation methodologies.
- Project reporting including LDC commentary on how the shadow prices influenced network operation and opportunities to transition from shadow to actual market.