Ryerson University

Centre for Urban Energy

Research case study > transmission and distribution

Supply diversification challenges

Version 1 (updated May 9, 2017)

Context: Increasing numbers of extreme weather events has distribution companies evaluating their systems. The reliability of the Toronto Hydro system is essential to everyday life as it supplies electricity to over 700,000 residential, commercial and industrial customers in central and downtown Toronto.

Problem: Aging infrastructure is vulnerable to extreme weather events and other malfunctions that can cause equipment failure. Failure of the infrastructure developed over 25 years ago can cause widespread service disruptions to customers and huge economic losses.

Solution: A comprehensive model of the Toronto Hydro system serves as a basis for analysis along with probabilistic models which have been successfully employed by BC Hydro.

Impact: The tools developed will be applicable not only to Toronto Hydro but other distribution companies providing valuable solutions for municipalities across Ontario facing similar challenges.

CUE's role: Researchers established a working data set and its accompanied connectivity diagrams of the transmission infrastructure supplying Toronto. They also created a probabilistic planning tool was also created in addition to a new algorithm to optimally reconfigure distribution feeders.

✓ *Completed*

Sponsors:
Toronto Hydro, Ontario Research Fund

Timeline:
January 2011–February 2014

Research Team:
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Key stats

761,000	Toronto Hydro customers
25,373 GWh	Electricity delivered
4,638 MW	Peak load
36%	Renewable capacity supply (Ontario)