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Smart grid data communications

Version 1 (updated May 31, 2017)

Context: The existing Toronto Hydro-Electric System Ltd. (THESL) data communication network is made up of many siloed and application specific communication mediums. Currently, THESL is modernizing its delivery and service network which depends on advanced communications architecture.

Problem: While meeting current system requirements it is not scalable for expected/future growth. Rapidly approaching requirements of the Green Energy and Green Economy Act will require THESL to develop a robust communication strategy that compliments their 25 Year Road Map for Grid Modernization.

Solution: To address the network gaps, a multilayered network architecture is proposed. This multilayered network would encompass the core access and device networks and would have a hybrid tree/ring/meshed topology.

Impact: The solution created by the research team will allow the THESL communication system to grow with the modernization of their distribution system while working in conjunction with their commitments to a sustainable energy system.

CUE's role: CUE researchers investigated network architecture, quality of service, data compression and network security in addition to physical and environmental constraints to identify potential communication mediums for specific components with respect to the geographic area of the City of Toronto.

✓ Completed

Sponsors:

Toronto Hydro, NSERC, Ontario Research Fund

Timeline:

January 2011–December 2011

Research Team:

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Key stats

630km²	Covered by THESL system
60,500	Overhead/underground transformers
24,400	Overhead/underground switches
25,400	Circuit kilometers of conductors