



Quantifying the T&D Benefits of Distributed Energy in Ontario

Workshop Context and Objectives

Chad Abbey

CANMET Energy Technology Centre



Natural Resources
Canada

Ressources naturelles
Canada

Canada¹



Overview

- NRCan research programme
- Workshop motivation
- Anticipated outcomes
- Future work





Grid Integration of DER

- Impact of renewable and distributed generation on planning and operation of distribution networks
- Communication systems for decentralized energy resources (DER)
- Regulatory support program
- Harmonization of DER interconnection requirements
- DG products and standardization





DGRAPS - overview

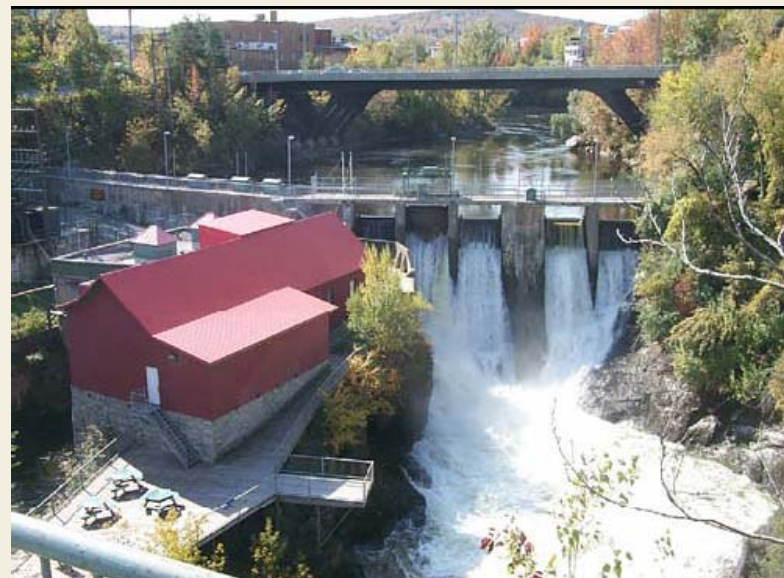
- Provide technical and regulatory support for the implementation of DG in a competitive electricity market.
 - study the cost-benefit of DG integration to the electricity network;
 - address net-metering and reverse-metering issues with meter regulatory agency;
 - time-of-day pricing that include peak-shaving value; and
 - standard interconnection procedure and contracts.

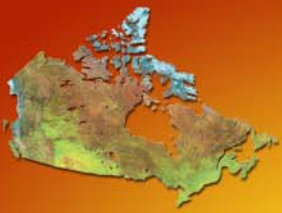




Example - Sherbrooke Hydro

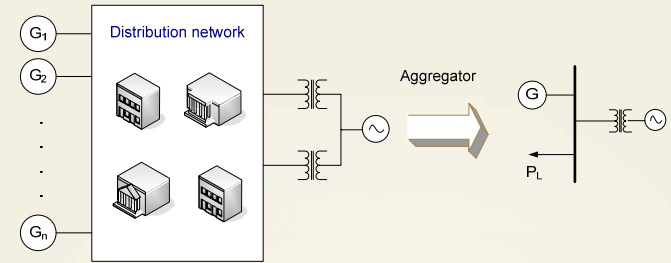
- 72 106 customers (2004)
- 94 % of customers in Sherbrooke
- Territory of 492 km²
- 1 232 km of MV lines
- 3 substations
- 8 hydro (19.4 MW)
- 95% energy purchased from HQ





Demand response

- Back-up generators
 - 25.86 ¢/kW
 - First year bonus
 - From 13.70 \$ / kW to 25 \$ / kW
 - 100 kW to 1500 kW linearly
 - 22 customers, 25 generators
 - 5.6 MW of available power
 - 300 000 \$ of savings in 2004
- Customer load curtailment





FortisAlberta

- A medium voltage (25-kV), high DE penetration system
- 3-MW hydro power and 3.78-MW wind generation
- 4.82-MW distributed load
- Series voltage regulators (R1 & R2)



Temp.
25kV feeder

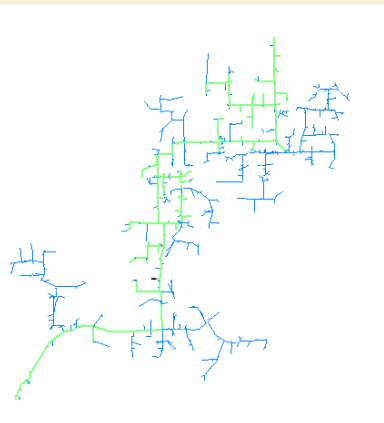
Main
Substation
69/25 kV

R1

R2

Run-of-river
Hydro

Six wind
turbines

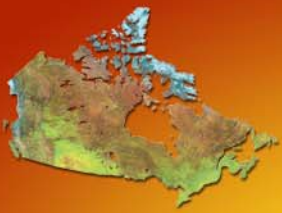




DE – cost-benefit analysis

- T&D upgrade deferral
- North American studies and tools
 - Massachusetts DG cooperative
 - Navigant Consulting Inc.
 - Southern California Edison
 - Navigant Consulting Inc.
 - Optimal Technologies
 - WADE model





T&D benefits workshop

- Motivation
 - Avoid reproducing work already done
 - Consult Ontario (and Canadian) stakeholders before proceeding further
 - Benefit from experience and knowledge to help guide future R&D
 - Ontario
 - logical choice
 - share outcomes with other Canadian stakeholders





T&D benefits workshop

- Agenda
 - Theme
 - T&D benefits of DE (emphasis on Distribution)
 - Focus on clean DE technologies (CHP, storage)
 - Locational benefits
 - Presentations
 - Overview of the Ontario situation
 - Tools for cost-benefit assessment
 - Utilities currently addressing these issues





T&D benefits workshop

- Outcomes
 - Share experience with Canadian stakeholders
 - Identify the key issues
 - R&D needs
 - Define studies for Ontario
 - Opportunities for coordination and collaboration
- Establish action plan and next steps

