Application of an ADMS (Advanced Distribution Management System) for Hydro One

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1.5 million customers (meters)

Project Drivers:

- DG Management
- Safety and security of switching operations
- Volt/VAR optimization
- Fault management and service restoration
- Mobile DMS – Field Switching
- FAT completed
- SAT – Starts July 2012
- Go Live – Nov 2012
Transmission:
28,600 (circuit - km) interconnected
85,000 towers, 4000 km fibre
Peak demand: 27,005 MW
Energy transmitted: 157 TWh

Distribution:
123,000 km of distribution lines,
1.8M poles, 1.3M customers,
640,000 sq km service territory
(twice the size of Texas)
acquired 90 utilities since 2000
(still about 90 utilities left)
The Ontario Situation

- Two program streams: FIT and **microFIT** (<10kW)
- North America's first comprehensive guaranteed pricing structure for renewable electricity production, open to **anyone**
- Offers stable prices under long-term contracts for energy generated from **solar, wind, waterpower and bio energy**
Connecting Renewable Energy

Generation Connected to Our Distribution System

- Solar
- Wind
- Biomass
- Hydro

Type of Generation

Total Capacity (MW)

- 2010
- 2011
- 2012
ADMS – Business Requirements

Distributed Generation (DG)
Integration

• Increased DG Connections to Hydro One distribution system as a result of the Ontario Green Energy Act

• DG Objectives include:
  – Automation
  – Dispatch
  – Monitoring
ADMS – general architecture

- FRTU
- SSA
- Transmission SCADA

Real Time Service Bus – IEC, DNP, ICCP

ADMS
- SCADA
- DMS
- OMS
- DRM
- EMS

Infrastructure middleware

Enterprise Service Bus - IEC / CIM / XML

- ERP (SAP)
- CIS
- GIS
- AMI/MDM
- Energy Market
Solution Overview

Topology

Control Center

Substation A

Substation B

Substation C

DMS

DGC-P

DGC-P

DGC-P

DG1 DG2 DG3 DG4

DG5 DG6 DG7 DG8

R1 R2 R3

R4 R5 R6

BK1

BK2

DG6 DG7 DG8

DG5 DG6 DG7 DG8

DGC-P

Substation C

DGC-P

Substation B

DGC-P

Substation A

hydroOne
Telvent Advanced DMS – Hydro One Platform

- Unification of DMS, OMS, and SCADA
- Comprehensive real-time network management solution

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Hydro One - Vision
Enable Set of Operational Levers to Manage Energy and Optimize the Distribution System
Future Plans - Release 2 Scope

Common
- Project Management
- Organizational Alignment
- Solution Validation

Foundational Projects
- Network Model Build
- Operating Strategy
- EMS-OMS-DMS Integration
- Disaster Recovery DMS (if required)
- Data Management
- SCADASync
- Operational Service Bus
- Smart Grid Security

Functional Projects – IT Systems
- AMI Enablement for Operations
- Demand Management
- Energy Theft Analytics
- DMS Usability Improvements
- MicroFIT DG Dispatch

Functional Projects – Power Systems
- Conservation Voltage Reduction
- Large DG Dispatch
- Energy Storage
Release 2 Benefits

### Release 2 Investment
- AMI Enablement for Grid Operations
- Demand Management for Consumers
- Energy Theft Analytics
- Conservation Voltage Reduction Pilot
- Operational Service Bus
- Large DG Dispatch Pilot
- MicroFIT DG Dispatch Production
- Energy Storage Control Systems
- SCADASync
- DMS-based FLISR Pilot
- Standards – P&C & Lines
- OGCC /Field Operating Strategy
- WiMAX Infrastructure

### Direct Benefits
- AMI Enablement for Grid Operations
- Energy Theft Analytics
- MicroFIT DG Dispatch
  - Meet DG Enablement Mandate
- Productivity Improvement

### Foundation for Future Benefits with Rollout
- Conservation Voltage Reduction
  - Reduce customer energy consumption
- Reliability
  - Improve SAIDI by 60 mins
- Large DG Dispatch
  - Meet DG Enablement Mandate
- Demand Management for Consumers
  - Contributes to CDM Targets
- Energy Storage
  - Meets DG Enablement Mandate