Utility Benefits of Advanced Metering Infrastructure (AMI)

SESSION 2B

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Presentation Overview

- Context
- Strategy behind an AMI Deployment
- Utility Benefits
- Prove the Business Case
- Deliver the Advanced Distribution Solution
Ontario Ministry of Energy Direction – Changing Landscape

• Create an energy conservation culture across Ontario and help consumers better manage their electricity use
  – IPSP identified need to replace 80% of generation over next 20 years (~$70B)
  – LDCs invest 3rd tranche MBRR in CDM
  – Material targets for renewables and conservation
  – Smart Meters in all residential / small commercial by 2010

• Green Energy and Green Economy Act
  – FIT rules facilitate significant penetration Distributed Renewable Resources
  – Identifies the need for Smart Grid
**Territory**

**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,
- acquired 90 utilities since 2000
  (still about 90 utilities left)
We are at a Tipping Point

**Fact:** According to the DOE Grid 2030 report, in the next 20 years, the U.S. will spend $450B on electric infrastructure; just to meet load growth. In Canada we have the same challenge.

We have a choice…

**Perpetuate a traditional 20th Century Solution**

**OR**

Invest in a 21st Century system that facilitates the digital age, improves reliability and security, enables productivity and economic growth, enables efficient use of electricity and promotes consumer services.

Source: Shpigler Group
Hydro One’s Vision

Deploy a smart metering/network solution that meets the Ontario Ministry of Energy and Infrastructure’s requirements at the lowest possible cost and is an enabler for other business processes and transformations.

The Foundation

IP/Standards/Secure/Open/Non-proprietary
2005 BCS / Architecture

Smart Meter Minimum Requirement

Smart Network – Utility Requirements

Third Party

Bandwidth Growth

1200 bps

Basic
- AMR
- kWh, kW, kVA
- Outage Detection
- Meter Management
- Real-time Outage Management

Basic + In-home Services
- Remote Disconnect Connect
- Load Limiting
- Theft Detection
- Load Control
- In-home display
- Multi-Utility AMR
- LDC AMR
- Home Security

Basic + In-home Services + Hydro One Backhaul
- Power Quality
- Feeder Analysis
- Station Monitoring
- SCADA
- Office Backhaul
- DG

Basic + In-home Services + Hydro One Backhaul + Mobile Office
- Mobile Dispatch
- Mobile Time Reporting
- Mobile Accomplishment Reporting
- Mobile Asset Condition & Defect Reporting
- Safety Monitoring
- Fleet Management
- Asset Security
- Cellular – Paging – Email
- Optimized Dispatch
- Automated Map Updates

Basic + In-home Services + Hydro One Backhaul + Mobile Office + Rural Broadband
- Residential Broadband
- MUSH Broadband

**Value Added Services

△ Benefit > △ Cost by 3:1 for Utility applications and (level 4)
Hydro One’s AMI Solution: Over 1 Million Meters Deployed
Angus Proof of Concept
Architecture - Leveraging AMI Infrastructure
Angus Smart Grid Applications Proof of Concept 2005/6

Asset Security

Mobile IT

SCADA

AVL/Safety

Rationalize Communications Network
# Bringing it together

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<tr>
<th>1. DG Integration</th>
<th>2. Dx Reliability</th>
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<td>• Interplay of multiple DG’s, DR, energy storage on a rural feeder</td>
<td>• Self healing network operations improvement</td>
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<td>3. Outage Restoration</td>
<td>4. Dx Network Asset Planning and Tools</td>
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<td>• Enhanced field force mobilization</td>
<td>• Data mining for improved planning</td>
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• Meters Deployed, Ubiquitous LAN
• Roll out of enablers
  – WiMax / WAN
  – GIS (Customers / Assets)
• Realize mandated programs
  – DG
  – CDM
  – Smart Meter
• Develop – Advanced Distribution Solution
  – Trial in the “Living Lab”
**ADS Status**

- **Living Lab:**
  - Meters Deployed
  - WiMax Q2 2010

- **ADS RFP**
  Closes Q1 2010

- **ADS Solution** – Planned for 2012

**Questions??**