

Ontario Smart Grid Forum

Current Status and Investment Plans

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Agenda

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- Methodology
- Technology Areas
- Interview Results
- Smart Grid Investment Costs
- Summary
- Conclusions

Objective

- Develop understanding about investment to date and future investment plans in Ontario utilities in Smart Grid development.
- Research where utilities are today in their understanding of the Smart Grid concept and where it is in their overall investment strategy.
- Gain perspective of the utilities' readiness towards full Smart Grid implementation.

Methodology

- Interview 12 of the largest utilities, representing over 78% of the customers in Ontario, with respect to their Smart Grid development.
- Interview EDA to capture the information on the remaining utilities in Ontario.
- Interview content includes their involvement in Smart Grid development, individual technology areas, and level of investment.

Methodology

INTERVIEWED UTILITIES

Hydro One

Hydro Ottawa

Horizon Utilities

London Hyhydro

Hydro One Brampton

PowerStream

Enersource

Milton Hydro

Toronto Hydro

Veridian

Burlington Hydro

EDA

Barrie



CURRENT STATUS AND INVESTMENT PLANS

Smart Meter

Station Automation

Communications

AMI

Distributed Generation

Customer Care

Feeder Automation

IT Systems

Technology Areas

Smart Meter

- Smart Meter: two-way communication, variety of additional functionalities
- Status of installation is on track for the 2010 deadline
- Distribution transformer smart metering pilots

AMI

- LAN: Mesh and FlexNet
- WAN: SONET Ring, WiFi, Phone
- Data analyses include billing cycle, outage notification, theft of power, etc.

Technology Areas

Feeder Automation

- Self-restoration switches
- Communicating fault detectors
- Mid-span switched capacitors

Technology Areas

Station Automation

- New switchgear with embedded intelligent relays
- Transformer monitoring
- Security cameras communicating into control room
- Real time online gas analyzers

Technology Areas

Distributed Generation

- Photovoltaic, small hydro, wind, CHP, biomass generation
- Microgrid pilot
- Fuel cell/electrolyzer pilots
- Geothermal studies
- Distributed storage studies

Technology Areas

IT Systems

- EMS – Energy Management System
- ERP – Enterprise Resource Planning
- GIS – Geographical Information System
- OMS – Outage Management System
- DMS – Distributed Management System
- SCADA – Supervisory Control and Data Acquisition
- CIS – Customer Information System
- MWM – Mobile Workforce Management
- AVL – Automatic Vehicle Location
- BI – Business Intelligence
- SOA – Service Oriented Architecture

Technology Areas

Communications

- VOIP – Voice Over Internet Protocol
- ROIP – Radio Over Internet Protocol
- SONET Ring
- Licensed Radio
- Unlicensed Radio
- Power Line Carrier
- Microwave
- WiFi
- WiMax
- GPRS
- Dial Up
- Back Office Communications

Technology Areas

Customer Care

- Home Area Networks
- Interactive Voice Recognition (IVR)
- Plug-in Hybrid Electric Vehicles (PHEV) Pilots
- CDM Initiatives

Interview Results

1. How well known is Smart Grid technology in your organization?
 - Board of Directors – none to strong
 - President – average to strong
 - Executive Management – a spectrum amongst the team
 - Managers and Supervisors – none to average
 - Unionized Staff (trades and technicians) – none to average

2. What level or department champions Smart Grid in your organization?
 - Two models at the moment:
 1. Board of Directors -> President -> Senior Management -> Department -> Engineer
 2. President -> Senior Management -> Department -> Engineer
 - Distinguishing feature is how active the Board of Director is.

Interview Results

3. Does your organization have a smart grid vision, strategy or implementation plan?
 - Some have a formalized plan in progress for all three, scheduled for completion 2008 to 2009
 - Generally initiating from Smart Meter initiative
 - Some awaiting for the IESO Smart Grid visioning document
 - Some utilities haven't identified Smart Grid as a corporate priority

4. What is the longer term period for budgeting process?
 - 1, 3, 5, 10 years

Interview Results

5. Has your organization commissioned any specific reports on Smart Grid application within your organization? If so, how many were internally prepared and how many by consultants?
 - Yes and No
 - Both consultants and internal

6. How many staff have attended Smart Grid conferences, seminars and workshops in the past year?
 - Less than 5 – 3 utilities
 - 6 to 10 – 2 utilities
 - 11 to 20 – 3 utilities
 - Greater than 20 – 1 utility

Smart Grid Investment Costs

Technology Area	2008		2009-2013		
	Budget	\$/Customer	Budget	\$/Customer (for 5 years)	\$/Customer (avg per year)
Smart Meter/AMI	249778	87	578889	202	40
Feeder Automation	7508	3	69000	24	5
Station Automation	4880	2	27890	10	2
Distributed Generation	654	0.2	15034	5	1
IT Systems	10099	4	79130	28	6
Communications	39685	14	76450	27	5
Customer Care	76	0.03	58750	21	4

Note: Dollars in '000s

Summary

- Wide variance in the state of planning and development and across the utilities
- Larger utilities tend to be at the forefront of development
- A time of transition
- Incremental costs above smart meters and AMI is relatively modest, but such costs would not implement a full Smart Grid
- Incremental costs identified focus on utility aspects of Smart Grid development. Little investments behind the meter

Conclusions

- Flexibility is required amongst utilities to implement an appropriate Smart Grid to the particular utility
- Addressing the challenge of data management, in particular billing data vs. Smart Grid data
- Progressive legislation and regulation required to facilitate the implementation of Smart Grid