

Smart Metering & Advanced Metering Infrastructure

McMaster University, Energy Studies, DeGroote School of Business

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Transforming the Grid into a Smart Communicating Network

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Presentation Overview

- EDA – Who we are and what we do
- A ‘Green’ approach to energy policy
- Smart Metering Initiative precursor to smart distribution grids
- *The Green Energy and Green Economy Act*: a framework for Creating Ontario’s Smart Grid
- Envisioning a future of smart grids



Pursuing a 'Greener' Approach to Energy Policy

- Government is pursuing a 'greener' approach to production and use of electricity with focus on renewable and clean energy alternatives and energy conservation
- *Green Energy and Green Economy Act, 2009* represents fundamental legislative reform of Ontario's power sector and is ushering in another wave of fundamental change for Ontario's electricity distributors
- Legislation encompasses wide spectrum of new roles and responsibilities for distributors in: renewable and distributed generation; Conservation and Demand Management (CDM); Smart Grid development
- Province's distributors will have significant role to play in development and implementation of a smart grid

Smart Meter technology is precursor to the kind of technologies that will be deployed to develop Smart Distribution Grids

Smart Metering Implementation and TOU Pricing

- Over 3 million smart meters installed
- Electricity customers are making the transition to Time-of-Use pricing – approx 1 million by summer of 2010
- 3.6 million electricity consumers will be on TOU rates by 2011

Distributors working with IESO to **integrate into the MDM/R**:

- Currently in production – Milton, Newmarket/Tay, Chatham-Kent, Toronto and Horizon Utilities
- In process of integrating – Hydro One Brampton, Veridian, Ottawa and Enersource

- This important chapter in the smart meter initiative comes as Green Energy legislation is also being implemented
- The smart meter initiative will support key aspects of the new legislation:
 - will play a critical role in helping achieve the province's conservation and demand management goals by providing both consumers and distribution companies with the tools to engage in load shifting and electricity usage management.
 - are expected to represent an initial step in the creation of smart local grids that will transmit user information freely between customers and distributors and harness advanced technologies to facilitate the connection of small-scale generators

Smart Grid will Transform Ontario's Power System

- Already seeing **benefits and opportunities** that smart distribution grids represent to the future of Ontario's electricity system
- New opportunities for customers and LDCs – including a **fully automated power delivery network that monitors and controls every customer and node**, ensuring a two-way flow of electricity and information between the power plant and household appliance, and all points in between

Smart Grid will Transform Ontario's Power System

- Smart grid technologies will fuel modernization of province's power system:
 - Smart Grid will have 2-way power and information flows that enable not only the distribution of power from centralized power plants, but the gathering of power from smaller distributed generation sources to distribute to local communities
 - Intelligent grid will enable greater customer choice - technology will allow for more precise management of power flows, and real time information on consumption so distributors will be able to offer a variety of demand response and conservation programs
 - Smart Grid will provide quality and security, improved reliability, automated system management and self-healing

Transforming Distribution Networks into Smart Grids - GEA

Smart Grid is now defined in *Electricity Act* as information systems that facilitate renewable energy, demand response, new technologies and other things to be prescribed later.

[Electricity Act, amended section 2(1) and new subsection (1.3)]

Province expected to provide policy framework for Smart Grid development sometime in the spring of 2010 to support the new legislation

Transforming Distribution Networks into Smart Grids - GEA

- GEA gives government power to issue regulations governing implementation of Ontario's smart grid - may be issued to include timing of development, roles & responsibilities, standards for communications
- Will be incumbent on Ontario Energy Board to implement Directives in order to establish, implement and promote the smart grid
- Directives could allow OEB to amend licences to improve distribution systems

Transforming Distribution Networks into Smart Grids - GEA

- In interim, OEB is allowing LDC smart grid activities to **get underway** by establishing guidelines for deferral accounts and funding adders
- **Enabling distributors to get an early start on investments in smart grid development** for smart grid studies and demonstration projects, smart grid planning and smart grid education and training
- **Framework is both preliminary and transitional** – at this time OEB is not requiring distributors to file formal system development plans covering smart grid development or renewable energy connection activities

Transforming Distribution Networks into Smart Grids

- Increased industry activity - piloting smart grid projects and initiatives - most involve **key partnerships with a wide range of stakeholders** from industry, local and/or provincial governments

Some examples include:

- **Burlington Hydro** – Burlington Hydro's 'GridSmartCity' brings together a wide range of stakeholders from industry to government to work together to promote the growth of smart grids in the City of Burlington
- **Enersource Mississauga** - focusing on system reliability, customer care and Smart Grid technologies such as an Integrated Operating Model
- **Veridian Corporation** - intelligent switch and control system – self-healing distribution network for 6,000 customers in Ajax

Transforming Distribution Networks into Smart Grids

Some issues to consider in moving forward:

- **Cost recovery** for smart grid development
- Challenge of **keeping up with technological advances** as smart grid is phased in over time
- Challenge of ensuring **compatibility of technologies** – importance of developing minimum industry standards or commonalities that will provide assurance and clarity for distributors in moving forward

Envisioning a Future of Smart Distribution Grids

- In 2008, EDA conducted extensive consultation with its members that resulted in consensus 20-year Vision for the future role of province's electricity distributors
- Envisions future of smart grids, advanced technologies, energy efficiency and conservation, renewable and clean generation – coming together to create sustainable electricity systems to power future generations
- Electricity distributors are ready to **lead the electricity distribution sector** in Ontario towards a future that provides flexibility and value to customers, **through a modern and efficient grid**, and which supports environmentally sustainable communities

Building Sustainable Communities of Tomorrow



Envisioning a Future of Smart Distribution Grids



Smart distribution systems will open up numerous opportunities, contribute to the achievement of Provincial goals, and build a strong and sustainable electricity sector in Ontario

Thank you.