

SMART GRID PRINCIPLES

- The following document outlines a draft set of principles to guide the implementation of Ontario's smart grid.
- The intent is that consideration should be given to each of the principles in a manner that ensures the optimal outcome.
- The principles could be issued in the form of a regulation under the Green Energy Act, or a directive to the OEB. In so doing, they would form the basis upon which all smart grid technologies/solutions are evaluated.
- These principles are targeted at all smart grid stakeholders, and in particular provide guidance to:
 - The Ontario Energy Board
 - Electrical Safety Authority
 - Ontario Power Authority
 - Local Distribution Companies
 - The Independent Electricity System Operator
 - Generators / Transmitters
 - Smart Grid Vendors / Solution Providers

ONTARIO OPPORTUNITIES FUND

- Ontario 2009 Budget allocated \$50 million over 5 years to "enable the research, capital and demonstration projects necessary for the development of a smart grid in Ontario"
- MEI has prepared a draft TB20 to access funding. Current assumption from Corporate Services is that dollars would be allocated starting the next fiscal year.
- MEI is developing (and stakeholdering) criteria for discussion to consider in providing provincial funding for Ontario smart grid opportunities, including:
 - Alignment with smart grid principles
 - Alignment with open standards
 - Export Markets
 - Commercialization ability
 - Cost-effectiveness
 - Technical growth potential
 - Others (to be stakeholdered)

BROAD PRINCIPLES OF SMART GRID

For the purpose of implementing an Ontario smart grid plan, a balanced consideration of the following principles shall serve as a guide for its achievement:

- **CUSTOMER VALUE:** the smart grid must provide benefits to electricity customers.
- **COORDINATION:** Smart grid implementation efforts should be coordinated by, among other means, coordinating smart grid plans among distributors, sharing information and results of pilot projects, and engaging in common procurements to achieve economies of scale.
- **INTEROPERABILITY:** Adopt recognized industry standards that support the exchange of meaningful and actionable information between and among smart grid systems and enable common protocols for operation. Where no standards exist, support the development of new recognized standards.
- **SECURITY:** Ensure both cybersecurity and physical security to protect data, access points, and the overall electricity grid from unauthorized access and malicious attacks.
- **PRIVACY:** respect and protect the privacy of customers. Integrate privacy requirements into smart grid planning and design from an early stage.
- **SAFETY:** Under all circumstances maintain and in no way compromise, health and safety protections, and improve electrical safety wherever practical.
- **ECONOMIC DEVELOPMENT:** encourage economic growth and job creation within the province of Ontario. Wherever practical, actively encourage the development and adoption of smart grid products, services, and innovative solutions from Ontario-based sources.
- **ENVIRONMENTAL BENEFITS:** Promote the integration of clean technologies, conservation, and more efficient use of existing technologies to reduce the environmental footprint of the electricity and transportation sectors
- **EFFICIENCY:** Improve efficiency of grid operation, taking into account the cost-effectiveness of the electricity system.

CUSTOMER CONTROL PRINCIPLES

For the purpose of providing the customer with increased information and tools to promote conservation of electricity, which will “expand opportunities to provide demand response, price information and load control to electricity customers,” a balanced consideration of the following principles in addition to the broad principles for smart grid shall serve as a guide for its achievement:

- **ACCESS:** Enable access to data by authorized parties who can provide customer value and enhance a customer’s ability to manage consumption and home energy systems.
- **VISIBILITY:** Improve visibility of information, to and by customers, that can benefit the customer and the electricity system at large, such as electricity consumption, generation characteristics, and commodity price.
- **CONTROL:** Enable consumers to better control their consumption of electricity in order to facilitate active, simple, and consumer-friendly participation in conservation and load management.
- **PARTICIPATION IN RENEWABLE GENERATION:** provide consumers with opportunities to provide services back to the electricity grid such as small-scale renewable generation and storage.
- **CUSTOMER CHOICE:** enable improved channels through which customers can interact with electricity service providers, and enable more customer choice.
- **EDUCATION:** Actively educate consumers about opportunities for their involvement in generation and conservation associated with a smarter grid, and present customers with easily understood material that explains how to increase their participation in the smart grid and the benefits thereof.

***For continued development outside of principles:** Coordinated programming to build on smart metering platform, e.g. coordinated roll-out of programming for in-home devices to actively encourage the adoption of a conservation culture in Ontario. Such a roll-out could follow the adoption of smart grid principles.*

UTILITY FLEXIBILITY PRINCIPLES

For the purpose of “enabling the increased use of renewable energy sources and technology, including generation facilities connected to the distribution system,” and recognizing varying system needs among distributors for establishing a smart grid, a balanced consideration of the following principles in addition to the broad principles for smart grid shall serve as a guide for its achievement:

- **DISTRIBUTED RENEWABLE GENERATION:** enable a flexible distribution infrastructure that promotes increased levels of distributed renewable generation.
- **VISIBILITY:** Improve network visibility of grid conditions for grid operations where a demonstrated need exists or will exist, including the enablement of distributed renewable generation.
- **RELIABILITY:** Maintain reliability of the electricity grid and improve it wherever practical, including reducing the impact and frequency of outages.
- **CONTROL AND AUTOMATION** – to the extent practical, move toward self-healing grid infrastructure to automatically anticipate and respond to system disturbances.
- **QUALITY:** Maintain the quality of power delivered by the grid, and improve it wherever practical.
- **OPERATIONAL SECURITY** – ensure security of information systems and physical infrastructure in accordance with recognized standards.

ADAPTIVE INFRASTRUCTURE PRINCIPLES

For the purpose of “accommodating the use of emerging, innovative and energy-saving technologies and system control applications,” a balanced consideration of the following principles in addition to the broad principles for smart grid shall serve as a guide for its achievement :

- **FLEXIBILITY** – provide flexibility within smart grid implementation to support future innovative applications, such as electric vehicles and energy storage.
- **FORWARD COMPATIBILITY** – protect against technology lock-in wherever practical to minimize stranded assets and investments. Incorporate principles of modularity, scalability and extensibility into smart grid planning.
- **ENCOURAGE INNOVATION** – Nest within smart grid infrastructure planning and development the ability to adapt to and actively encourage innovation in technologies, energy services and investment / business models.
- **MAINTAIN PULSE ON INNOVATION** – encourage information sharing, including cross-agency, cross-distributor, and government coordination of information and programming relating to innovation and the smart grid.