

# Integrating New Technologies

Presentation to SAC  
October 28th, 2009



- The electricity system is evolving with a newer, greener resource mix.
- Integrating renewable resources presents new considerations and opportunities for the system and market operator.
- New and unique concepts and grid management technologies are emerging at home and abroad.
- New technologies and alternatives provide opportunities that will help Ontario integrate and operate a greener power system.

- Low demands and a healthy baseload resource portfolio is resulting in more localized and global surplus conditions.
- Variable nature of renewable resources is increasing the demand for load matching resources.
- Emerging technologies can provide more emission friendly, fuel efficient alternatives that promote the objects of the GEA.
- Ongoing concerns related to traditional resource dispatch burden.

- Batteries
- Compressed air storage
- Flywheels
- Plug-in Hydro Electric Vehicles (PHEV)
- Active distributed generation (DG)
- Demand side alternatives (i.e. Distributed load regulation)
- Hydrogen storage
- ???

- 5-minute or alternative load following.
- Surplus management.
- Frequency control.
- Dispatch smoothing.
- Other Energy and ancillary services.
- ???

- Most technologies are first or early generation technologies that are unfamiliar to the market and system operators.
- National and international learning curve is steep.
- Ontario's unique hybrid market may impede ready implementation solutions developed by other jurisdictions.
- Current Rules, policy and protocols are silent on or in some instances present barriers to integration.

- Integration approaches will vary...
  - At times integration will occur directly into existing market structures and services with little or no limitations.
  - Other technologies will need to have a phased and measured integration that will facilitate the necessary IESO learning required to fully integrate new technologies.

- Trials will provide a controlled testing environment used to facilitate IESO learning and acceptance of emerging technologies. Examples include:
  - new technologies providing existing services (i.e. distributed resources providing ancillary services); or
  - new ways of providing existing services (i.e. web based protocols for dispatch services).

- Trials would only be used when learning cannot be done through direct integration. When assessing the need for a trial the IESO will consider:
  - the specific IESO learning objective (i.e. Policy or technical barrier);
  - if the technology is new to the service (i.e. distributed or external to Ontario resources providing existing or new service or web based communications providing dispatch communications); **OR**
  - transferable learning from external resources. (i.e. learning from other sectors within Ontario or comparable experiences from external counterparts).

- Where the Rules do not already permit and the IESO requires a trial it is proposed that new generic enabling rules will be created to allow the introduction and operation of testing facilities.
- These rules would permit the operation and settlement of trial facilities and would be at a high enough level to enable various technologies and/or solutions.

- Trials would be:
  - *time bounded*: Any testing will be limited to a predetermined and specified sunset date.
  - *size limited*: Sizes would be sufficient to achieve test objectives with the principle that trial facilities should not materially impact the Market's operation.
  - *cost bounded*: The IESO would determine a cost threshold needed to facilitate the testing.

- *Cost bounded*: the IESO will determine costs in two ways for market related service tests:
  - Predetermine a threshold for payment for the testing period and/or a payment structure that would be competitive relative to the existing providers of the service (Procured Services); or
  - Provide compensation based on the market prices for that service. (i.e. Market Clearing Price (MCP) for Operating Reserve (OR) and/or energy and Congestion Management Settlement Credit (CMSC) where appropriate)
- These costs will be borne by the market through existing charge codes and processes.
- IESO costs will be borne by the IESO and recovered through the IESO rates. (i.e. Telemetry costs)<sup>2</sup>

- For trials with cost recovery through the market and not through IESO rates, the IESO proposes all trial parameters will be posted for stakeholder comment prior to implementation. This would include:
  - Costing;
  - Size of the trial; and
  - Timing.
- This input would be considered when approving trials.

- The IESO is seeking SAC input on these principles for the integration of new technologies through trials within the marketplace.
- This input will be used as information and background provided to the IESO Board when deciding on the proposed changes to facilitate integration.