

# Existing Challenges

IESO 18-Month Outlook (November 2012):

- “The conditions for surplus baseload generation are likely to continue in 2013 following the nuclear unit restarts and with the expected increased penetration of renewable generation, combined with lower off-peak demand for electricity.”
- “As Ontario’s coal-fired generation is shut down over the next two years, its associated operating flexibility will be lost.”

Ontario faces both challenges and opportunities:

- Plans to increase “must-pay” intermittent renewable generation
- More SBG days forces operators to sell electricity exports at low or negative prices
- Increased amount of energy curtailments
- Coal phase-out decreases operating flexibility
- Inability to build peaking power where it is needed

The grid will continue to operate and the lights will stay on.

**Energy storage is a tool** that can be used to help manage the grid **more cost effectively** and **more efficiently**.

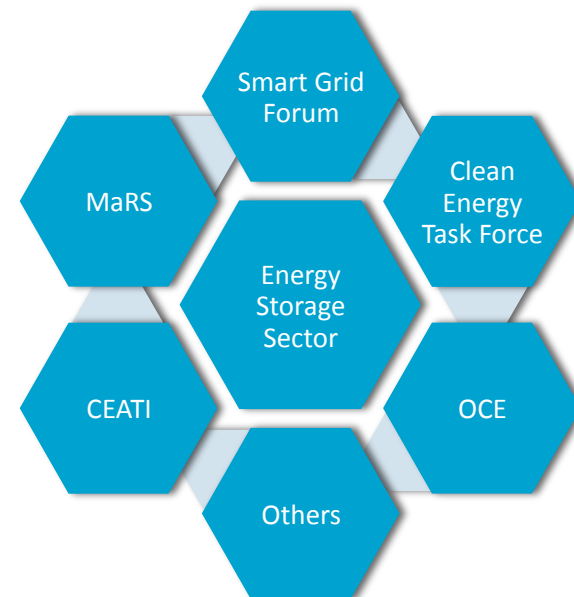
# Sector Coordination

Sector coordination needed to:

- Educate everyone involved from ratepayers to grid operators
  - Applications
  - Operations
  - Benefits
- Advocate for policy change
- Demonstrate technologies

Continuing collaboration:

- Smart Grid Forum
  - Corporate Partners Committee
  - Energy Storage Working Group
- Clean Energy Task Force



# Economic Opportunities

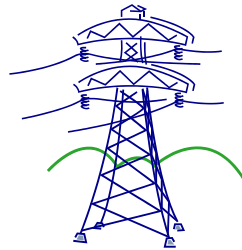
There are many energy storage technologies:

- Compressed Air Energy Storage
- Flywheels
- Pumped Hydro
- Demand Side Management
- Advanced Batteries
- Power to Gas
- Thermal Storage

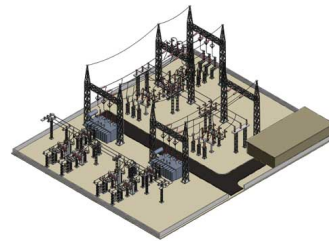
**Low-utilization  
Inflexible**



**Aging assets  
Congestion**



**Power Quality  
Security**



**Rising costs  
Reliability**



Generation

Transmission

Distribution

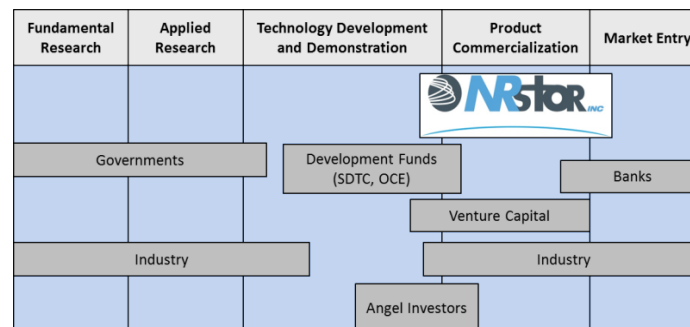
Consumers

# Accelerating Commercialization



NRStor is:

- A vehicle to accelerate the commercialization of energy storage technologies nearing completion of demonstration projects
- Bringing together a consortium of partners to create commercially viable projects
- Proving value with systems dynamic modeling
  - 20 year outlook model used for integrated resource planning
  - Adjustable sliders to create any scenario
  - Runs with conversational speed
- Not specific to one technology
  - Frequency regulation
  - Load shifting
  - Community energy storage projects
- Connecting the dots between **technology, application and implementation**



# Conclusion

We have lots going on:



IESO 10MW RFP for Alternative Sources of Ancillary Service

- Good news is we are not waiting
- Gaining the operational experience from these new technologies
- The grid needs more flexibility and the operators are responding

**We will **develop** these technologies and export them to Canada and the rest of the world!**

