



NRStor Project Spotlight:

2MW/500kWh Minto Flywheel Project



Increase reliability through regulation services, matching system generation to total system load, and helping correct variations in power system frequency.

The Challenges Facing our Grid Today

Electricity systems have undergone a transformation over the last century, from the first basic grids to the highly complex, interconnected and digital power systems of today. Ensuring there is enough electricity to meet demand on a second-to-second basis is an ongoing challenge. Today, the task is made more difficult because of the growing penetration of intermittent renewable generation, distributed energy resources, and increasingly sensitive energy infrastructure. Energy storage allows for the withdrawal and reinjection of electricity on demand to better optimize the flow of electricity throughout the power system. These technologies are generally fuel-free and can even displace the need for greenhouse gas-emitting energy generators.

How Energy Storage is Delivering Real Results in Ontario

Ontario's Independent Electricity System Operator (IESO) has procured a suite of energy storage technologies for both short and long duration utility-scale applications. The technologies include flywheels, solid-state batteries, flow-batteries, and compressed air energy storage (CAES). They can provide a variety of key services to the grid, for example smoothing out intermittent renewable generation, relieving congestion in transmission and distribution, storing surplus off-peak energy for use during peak hours, and providing reliability-based ancillary services.

Canada's First Contracted, Grid-Connected Flywheel Storage Project

In 2012, the IESO selected NRStor to develop a 2MW flywheel project through a competitive RFP process. Located in the Town of Minto and commissioned in July 2014, the Minto flywheel project was the first grid-connected commercial flywheel facility in Canada and has had a major impact on Canada's energy storage landscape.



Flywheels – Proven Technology that Works

A flywheel is essentially a mechanical battery that stores electricity in the form of kinetic energy. Electricity is used to operate a motor that accelerates a rotating steel mass to a high speed. Because the flywheel is spinning in a vacuum there is no air drag and the rotational energy can be “stored” for relatively long periods of time with minimal parasitic losses. The flywheel’s momentum can then be harnessed to generate electricity on demand.

Each one of our flywheels weighs about 12,000 pounds and can spin at speeds in excess of 11,000 RPM. The basic design allows for up to 15 minutes of output at full load, and the units can discharge and recharge to full capacity at an extremely high rate repeatedly (see sidebar next page). Because all of the equipment is mechanical – flywheel technology doesn’t degrade the same way a battery does.

Superior Storage Capabilities

The Minto project increases the reliability of the system by providing regulation service, matching system generation to total system load, and helping to correct variations in power system frequency. The facility’s performance has exceeded the IESO’s expectations and delivered meaningful results – beyond just cost savings – including acting as a real world test bed for understanding how energy storage resources participate on our system and breaking down regulatory barriers to incent other innovative projects.

We continue to deliver a high level of service and are currently exploring new ways to test additional services that provide even further value to Ontario’s electricity system.



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About NRStor

NRStor develops, owns, and operates industry-leading energy storage projects in partnership with progressive stakeholders and leading technology providers.

Contact NRStor today to learn more about our utility offerings

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