

CASE STUDY

Harnessing the Wind: How New Brunswick Power Raises System Reliability with Enbala

The Challenge

Wind blows in abundance in the Maritime region of eastern Canada, producing a valuable source of energy that is both clean and renewable. In fact, the Maritime region could potentially have the highest penetration of installed wind capacity in Canada over the next 15 years, according to Powershift Atlantic, a government-funded research consortium.

Taking a leadership role in the Powershift Atlantic initiative, NB Power turned to electricity customers for help supporting the reliability of the power system and integration of wind power. With an aggressive goal of generating 40 percent of its portfolio from renewables by 2020, the utility needed some way to address capacity firming issues presented by variable energy resources (VERs) like wind and solar power.

At the heart of Enbala's Renewable Firming application is the Enbala Platform. A smart grid technology, the Enbala Platform engages commercial loads in real-time energy dispatch, thereby facilitating grid management and optimization.

Customers sit at the heart of the solution, as well, because Enbala's Renewable Firming application leverages customer participation. The network of participating loads in New Brunswick primarily consists of heating, ventilation and air conditioning (HVAC) systems found in small to medium-sized buildings, including commercial and retail sites, as well as warehouses, schools and community facilities. The network also includes several municipal water pumping stations, creating a total of 30 customer sites with nearly 2,000 connected assets. Participating customers are providing approximately 3 MW of renewable firming capacity to NB Power.

Dispatchable demand management is playing an important role in speeding up adoption of green, renewable energy resources and helping to create a better legacy for future generations of Maritimers.

– Michel Losier, Program Director, NB Power's PowerShift Atlantic project.

The Solution: Enbala Renewable Firming

Enbala implemented its Renewable Firming application that connects a variety of distributed energy resources – in this case, a network of commercial electricity customers – to create a real-time, dynamic response solution that firms the renewable energy resources without impacting customer operations or comfort. The Enbala team deployed this solution from start to finish, working arm-in-arm with the utility to recruit C&I customers, enable the sites and operate the system on a 24/7 basis.

At each site, Enbala engineers worked closely with customers to determine the operating parameters necessary to keep operations running as usual, ensuring minimal impact for program participants. Then, Enbala installed enSITE, the communications tool that enables energy shifting of connected devices in real-time based on the grid's moment-to-moment fluctuations. Since the devices controlled are things like chillers and HVAC equipment, they don't require a continuous energy supply to maintain acceptable comfort levels within buildings.

Enbala's optimization and control software platform enables secure, two-way communication through existing Internet connections, taking advantage of existing infrastructure and grid-connected resources. The Renewable Firming application operates 24/7; NB Power sends energy dispatch requests to Enbala that call for a specified increase or decrease in energy consumption over a set period of 15-minute intervals. Enbala's platform determines the optimal power consumption setpoint to send to each customer site, taking into account the real-time operating status of each device at each customer site as well as the owner/operator-defined operating parameters. The response from individual sites is consolidated and viewed as a single, dispatchable resource for NB Power. This network effect enables the utility to incorporate more wind generation into the resource mix without the need for expensive, volatile and environmentally harmful generation resources.

Results: A Greener Grid

NB Power successfully sends energy dispatch requests to Enbala's platform every 15 minutes with an immediate response from the connected demand-side loads. Enbala's network response has successfully provided as much as 3 MW of energy capacity without disrupting the participating customers' normal operations.

Enbala's technology platform continuously adjusted power usage of available assets to follow the 15-minute energy dispatch requests from NB Power. The ramping times of the network are comparable to ramp times for generators, allowing the utility to use this network of demand-side loads as a single, dispatchable resource to manage day-ahead forecast risk and intra-hour ramping due to changes in wind speed.

NB Power is the first company in Canada to connect and intelligently manage loads to balance the intermittency of wind power. This means that the utility and Enbala are playing an important role in accelerating the successful adoption of renewable energy.

About NB Power

New Brunswick (NB) Power is the primary electrical utility for the province of New Brunswick, providing services for 750,000 customers with a 2010 peak demand of 2,850 MW. The utility and its more than 2,300 employees are committed to public safety, low rates, high reliability, conservation education, positive community relationships and meeting the future energy needs of New Brunswick in a sustainable way.

Enbala: The Operating System for Distributed Energy Resources

Operational since 2011, Enbala software facilitates real-time management of distributed resources. The platform manages and optimizes real and reactive power, storage system levels, and other power system parameters, while maintaining operations within defined constraints. This ensures that customer operations are unaffected, intermittent generation is utilized to its maximum capacity, and power system losses are minimized. The managed devices may include generation, storage systems, and customer devices. This control and optimization technology is capable of managing a wide variety of applications to support the decentralized, evolving electric grid.

Fast Facts: New Brunswick Power

- 2,000 individual devices
- 10 MW of connected load on 15-minute operation
- 30 sites geographically distributed
- Participating customer types: schools, retail, warehouses, community facilities
- Controlled resource types: HVAC, pumps, chillers, industrial process controls, motors and fans
- 24x7 operations

Project Benefits

- Reliable integration of intermittent wind power
- Reduced utility operating and maintenance costs
- Positive engagement and program participation from commercial end users
- Enhanced grid reliability and efficiency
- Deferred investment in new infrastructure

