

# Wind Firming-New Brunswick Power Engages Customers to Achieve It

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by Betsy Loeff

Generation reflects load, right? Utilities anticipate demand and plan generation around it. Well, try telling that to the wind that's turning turbines on your local wind farm, where breezes might or might not blow on schedule. That's a problem, particularly if you're in an area that's targeting 40 percent renewable generation by 2020. Managers at New Brunswick (NB) Power, a utility that serves some 394,000 residential, commercial and industrial (C&I) customers, face this problem every day.

"We have a lot of wind available in New Brunswick, so we want to integrate that wind power cost-effectively and actually bring more on," said Michel Losier, program director for PowerShift Atlantic, a renewable firming initiative led by NB Power.

To achieve those goals, utility managers knew they needed more storage for wind firming, and they decided to find it by altering long-established relationships.

First, the utility challenged the concept that generation follows load and took the reverse approach: load following generation. Then, to make that happen, the utility tapped the storage in loads themselves by leading PowerShift Atlantic, which started with a research grant funded by Natural Resources Canada.

PowerShift Atlantic has been a collaborative effort among Nova Scotia Power, Maritime Electric (Prince Edward Island), the University of New Brunswick and St. John Energy. NB Power and its project technology partner, Enbala Power Networks, were among the first to prove that demand-side resources can be used for renewable firming.

## Firming With Process Storage

Losier will tell you that managers at his utility knew they needed a storage solution to deal with the intermittency of wind power, and the run-of-the-river hydropower the utility has available wasn't up to the job. So the utility leveraged process storage, which is what you get when you control the processes of loads themselves.

"We are allowing the system to do the work it was going to do anyway, whether it was chilling a building down, heating up a tank of water or pumping water from point A to point B," said Bud Vos, president and CEO of Enbala, the software and service provider that aggregates the process storage available in NB Power's network and turns it into dispatchable load for a utility. "That energy is going to do that work anyway, and we are just deciding how much we want done and when to do it."

In the PowerShift Atlantic program, NB Power used process storage from residential and commercial and industrial (C&I) loads. The utility plans to engage all customer classes, said Gaëtan Thomas, president and CEO of NB Power.

"This all comes down to building a new partnership with our customers based on trust," Thomas said. "Engaged customers with new, value-added service offerings are essential to a sustainable electricity future. Our ultimate goal with this new partnership is to reduce our fossil fuel dependency,

increase renewable energy and offset the need to build new generation while helping our partners better manage their bills and gain an enhanced experience.”

The utility trialed multiple types of load, the most prominent being water heaters and electric thermal storage systems on the residential side combined with various C&I load control. Residential water heaters constitute a load resource Losier sees as filled with opportunity.

“New Brunswick Power is uniquely positioned because we have 250,000 hot water heaters rented from us by our customers,” Losier said. “As well, there is a lot of electric baseboard heat in New Brunswick.”

On the C&I side, Enbala connected a network of loads that consist of heating, ventilation and air conditioning (HVAC) systems in buildings, municipal water pumping stations, arenas and swimming pools, creating a total of 25 customer sites with some 2,000 connected assets. 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.

With 1,400 households and the business customers combined, the utility connected to some 17 MW of load. More than 3.9 MW of controllable capacity is coming from the two dozen C&I customers, Losier said.

### **Technology Matters**

Throughout the system, Enbala installed enSITE, its communications technology that enables energy shifting of connected devices in real time based on the grid’s moment-to-moment fluctuations. The Enbala team worked only with the C&I customers directly, but all of the load associated with the PowerShift Atlantic program moves through the Enbala platform, Losier said.

Enbala’s optimization and control software platform enables secure, two-way communication through 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- or operator-defined operating parameters.

The response from individual sites is consolidated and viewed as a single, dispatchable resource for NB Power. This enables the utility to incorporate more wind generation into the resource mix without the need for expensive, volatile and environmentally harmful generation resources.

“What I’ve been telling people all along is that the future of electricity is about everybody,” Losier said. “Everyone used to look to the utility and say, ‘I want more renewables, less fossil, don’t raise rates, keep the lights on, and work it out.’ Now it’s all about a partnership where utilities are opening a new conversation with customers and saying, ‘We can’t do this alone. We need partners.’”

Thomas said the study proved utilities can succeed when they change that customer relationship into more of a partnership and let process storage deliver renewable firming.

“PowerShift Atlantic and our work with Enbala is demonstrating the real potential of load following generation as a strategic advantage for NB Power and our customers,” he said.

***Betsy Loeff has been a freelance writer since 1993. She specializes in covering the utility and information technology sectors.***