NH Utility's Next Big Expenditure: Batteries in Your Garage

By Bryanna Devonshire and Bob Cheney

New Hampshire has some of the highest transmission and distribution costs per kilowatt hour (kWh) in the country, making it a worthy candidate for battery storage deployments that reduce transmission coincident peak-demand and curb the need for rate-payer funded distribution projects. (https://www.statista.com/statistics/630090/states-with-the-average-electricity-price-for-the-residential-sector-in-the-us/)

Liberty Utilities (Liberty) is seeking the New Hampshire Public Utilities Commission's (NHPUC) approval to use Tesla Powerwall batteries (Powerwalls), sited behind-the-meter of 1,000 customers' homes, to test one such alternative.

The savings come in two forms — transmission and distribution-upgrade deferral.

Transmission Savings

ISO New England (ISO-NE) allocates the cost of the electricity transmission system based on the number of megawatts (MW) a utility consumes during the highest demand period. For example, if the highest period of transmission demand for ISO-NE is August 25 at 6 p.m., ISO-NE takes the total cost it needs to recoup to meet that demand and determines how many MWs of transmission capacity each utility needed then. Recently, Liberty had to pay $11.55 per kw-month in transmission peak coincident charges, or $11,550 for every MW it consumed at 6 p.m. on August 25 last year. However, if battery backups are discharging 5MW of power into the grid at 6 p.m., then Liberty needs to pull 5MW less from the transmission system to meet that peak demand, which would save the utility $57,750 for the month. In theory, these cost savings would get passed on, in part, to Liberty's 44,000 New Hampshire customers.

Distribution Savings

Liberty needs to make an approximately $640,000 substation upgrade before 2021 to maintain sufficient capacity to serve the peak demand of about 1,500 customers around West Lebanon, New Hampshire. (http://www.puc.state.nh.us/Regulatory/Docketbk/2017/17-189/Initial%20Filing%20-%20Petition/17-189_2017-12-01_GSEC_dtestimony_Tebbetts.PDF)

Instead of performing this upgrade and passing the cost along to the ratepayers, Liberty is investigating the use of batteries as an alternative. If 5MW of locally-sited batteries are discharging during peak period, the utility will presumably have 5MW of "extra buffer" and will not need to make that upgrade in the foreseeable future.

Customer's Savings

Liberty proposes to install approximately 1,000 Powerwalls in the homes of customers, each paying $1,000. The benefits to the utility (and, potentially, the ratepayer) are roughly $57,750 per month, assuming all 5 MWs of power are displaced by energy from the Powerwalls. The benefit to the Powerwall customer is driven by switching that customer from a regular residential rate schedule (the Liberty "default rate") to a time-of-use (TOU) rate schedule. To benefit from this change in rate schedules, the customer must use the battery-stored power during peak pricing periods and shift their consumption from the grid to off-peak pricing periods.

For example, assume customers are paying a flat ~$0.17/kWh under a standard default rate. Hypothetically, under a TOU pricing schedule a customer might pay $0.25/kWh for every kWh consumed during the critical peak period, $0.17/kWh for every kWh consumed during on-peak hours, and $0.10/kWh every kWh consumed during off-peak times. The customer would use power from the battery during higher rate periods and recharge the battery during the off-peak period, presumably resulting in an average cost per kWh lower than the standard default rate.

Under Liberty's proposed plan, it would maintain the right to reserve power from those batteries for a set number of hours per year and to dispatch that power into the grid during projected peak hours to shave peak hour consumption and help the utility capture the transmission and distribution savings outlined above.

Effectively, customers get to arbitrage power throughout the year, except for the 30 or so hours that Liberty has reserved in the battery storage system for its own purposes.

Why it's a Big Deal

It's a big deal, in part, because it's new — at least in New Hampshire. Green Mountain Power is pioneering the same concept in Vermont. For a utility to try to charge its entire customer base for large-scale equipment installed in individual homes is irregular. It's as if Liberty were to charge all of its customers for a solar panel it was going to install on John Doe's house because of the utility-wide benefits.

Additionally, it's typically a local solar installer (and not utility) that sells this type of equipment. It may work — it's just different. For customers, it appears to offer the potential to save money on electric energy costs, at least over the long run. For regulators, it's yet another departure from past practice where they, once again, must weigh the benefits and risks of innovation against benefits and potential detriment to utility customers.

This matter is an open docket at the NHPUC, and, as of the time of publication, there has been no order or decision.

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