

MMWEC Forecast and Dispatching Program Helps Members Avoid \$2.8 Million in Costs

MMMWEC's new peak load forecasting and dispatch services have resulted in sizable cost avoidance for its Members. From May through September, the program resulted in \$2,867,089 in avoided costs for participating Members.

This summer, MMWEC partnered with eight Members to help lower their transmission and capacity bills through peak load forecasting and dispatch of distributed generation. Using data regression analysis and ISO system load data, MMWEC's Energy Commodities Manager Stephen Smith and his team developed a model to effectively predict peak demand days and times. Based on their findings, MMWEC dispatched distributed energy resources (DERs), including generators and batteries, to operate during those peak times to save Members money on their ancillary costs.

The formula specifically identified capacity and transmission peaks, which impact MLP costs. In New England, the capacity peak typically occurs during the summer due to air conditioner usage. If MLPs know when their capacity and transmission peaks will occur, they can operate DERs during that time to limit how much energy is pulled from the grid, resulting in reduced peak loads and significant savings to them, and ultimately, to their customers.

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Rented generators at Holyoke Gas & Electric. This equipment was rented through MMWEC to run during transmission and capacity peaks from May through September 2018.

West Boylston Launches Innovative Flywheel Energy Storage System

West Boylston Municipal Lighting Plant (WBMLP), in partnership with MMWEC and Amber Kinetics Inc., is nearing construction completion on its new flywheel energy storage system (FESS).

The project will be completed in December, and is expected to reach commercial operation on January 1, 2019.

WBMLP's system is the first long-duration flywheel project in the Northeast. The 128-kilowatt behind-the-meter FESS is interconnected through the plant's existing 370-kilowatt solar project. WBMLP's flywheel system will store solar energy generated midday and discharge this energy during periods of peak usage in the afternoon and evening.

The FESS uses electricity generated from the adjacent solar field as well as from the WBMLP distribution system to drive a motor that spins the steel flywheel, storing kinetic energy. It can rotate thousands of revolutions per minute, and once up to operating speed, that speed can be maintained easily using little more energy than is required to power a lightbulb. When the flywheels are called upon to discharge energy, the motor then functions as a generator powered by the momentum of the flywheel, converting kinetic energy back to electricity.

WBMLP's system contains 16 flywheels with a capacity of 8 kilowatts each. The

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Sixteen flywheel energy storage systems have been installed at WBMLP.

FERC Proposes Modification to Transmission Return on Equity Calculation

The Federal Energy Regulatory Commission (FERC) has proposed changing the way it determines a just and reasonable return on equity (ROE) for New England transmission owners. The new methodology would affect the four pending FERC complaint proceedings in which MMWEC and other municipal utilities, attorneys general and consumer advocates from across New England argued that the ROE, or the amount transmission owners earn on their investments, should be reduced.

FERC’s order stems from a U.S. Court of Appeals ruling on the first complaint that found FERC had not adequately explained how it determined that the 11.14% base ROE earned by New England transmission owners was unjust and unreasonable. The court also found that FERC had not adequately justified the 10.57% ROE it put in place instead.

Under FERC’s proposed methodology, the “zone of reasonableness” would be calculated using three different analyses. For many years, FERC used a calculation derived from what is known as the discounted cash flow (DCF) analysis. Under the proposal, in addition to the DCF analysis, a capital asset pricing model (CAPM) analysis and an expected earnings analysis would also be conducted. The three analyses would be used to create a consolidated zone of reasonableness, using an average of the top end number to determine



the cap on the base ROE plus incentives. The average of the low-end results would determine the bottom of the zone.

FERC said it intends to dismiss an ROE complaint if the targeted utility’s existing ROE falls within the range of presumptively just and reasonable ROEs for a utility of its risk profile, unless that presumption is sufficiently rebutted.

When a new ROE is to be established after the existing ROE has been found unjust and unreasonable, FERC will use the three above analyses, along with a risk premium analysis.

FERC contends that its proposed methodology using four different analyses to calculate the ROE will make it unnecessary to assess

whether current capital market conditions are anomalous. The contention that anomalous market conditions affect the justness and reasonableness of the ROE has been argued heavily in the complaints.

Under the proposed methodology, preliminary calculations determine that, in the first complaint, the transmission owners’ pre-existing 11.14% ROE is unjust and unreasonable, and the new just and reasonable rate should be 10.41%. However, the revised incentive cap would be 13.08%, compared to the previously identified cap of 11.74%.

FERC has set a December 17 deadline for submission of briefs regarding the Commission’s new ROE methodology. ∞

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system will function similarly to battery systems, but with less of a carbon footprint over the lifecycle of the system. Flywheel systems run chemical-free, have the potential to operate much longer, and are recycled easily when necessary. Because of the innovative technology utilized, this project also will generate alternative energy portfolio standard credits.

Based on peak forecasting, MMWEC will dispatch the operation of the flywheel system during peak load times to cut down WBMLP’s transmission and capacity costs. MMWEC plans to dispatch the system to run twice per day to cover the morning and afternoon/evening peaks.

“West Boylston is extremely proud, as a public power utility selected by

MassCEC (the Massachusetts Clean Energy Center), to demonstrate innovative energy storage flywheel technology and to support the growth of renewable energy so that it is more dependable and dispatch-able when needed most,” said WBMLP General Manager Jonathan Fitch.

The project was made possible through a \$243,000 Advancing Commonwealth Energy Storage (ACES) grant, which covered 50% of the cost. The ACES Program, a partnership between MassCEC and the state Department of Energy Resources (DOER), is a competitive grant initiative aimed at piloting innovative, broadly-replicable energy storage projects to advance energy storage technologies in Massachusetts.

The West Boylston flywheel system grant, which was awarded in December of 2017, was

one of 26 energy storage projects granted through the ACES program, totaling \$20 million. MMWEC members Ashburnham Municipal Light Plant and Wakefield Municipal Gas and Light Department also were awarded grants through the ACES program for the construction of lithium ion battery storage systems, which are set to be completed on January 1 and February 1, 2019, respectively. ∞



Seabrook Relicensing Process Moves Forward with New NRC Report

The relicensing process for the Seabrook nuclear power plant is moving ahead after the Nuclear Regulatory Commission found no issues with Seabrook’s response to addressing cracks in the concrete of the plant.

NRC’s latest report, issued in October, expressed satisfaction with the way Seabrook Station is handling the alkali silica reaction, or ASR, which is a chemical reaction that causes concrete to expand and crack. Seabrook, located in Seabrook, New Hampshire, is the only nuclear plant known to have experienced ASR.

The plant’s license renewal is contingent upon NRC’s acceptance of its ASR remediation plan. The issue was discovered first in 2010, the same time Seabrook owner NextEra applied for a license extension. NextEra is seeking a 20-year license extension, which would extend the current 40-year operating license expiration date from 2030 to 2050.

ASR is a chemical combining of reactive silica from the concrete aggregate with the alkali from the cement paste in the presence of moisture. The reaction creates a gel, which can expand and cause micro-cracks in the concrete.

The NRC asked NextEra to provide a long-term plan for addressing the problem, and in May, inspectors went to the

plant to take a closer look at the issue and NextEra’s plan to address it. This latest NRC report is a result of that inspection, and indicates that the NRC believes NextEra is addressing the problem adequately. The NRC maintains that the ASR at Seabrook is not a safety issue. According to the report, the plant’s monitoring is “acceptable and provides reasonable assurance that these structures continue to meet the relevant requirements.”



Seabrook Station nuclear plant

A team from Seabrook and staff from the University of Texas, where Seabrook ASR testing is done, are testifying over a series of three hearings before the NRC as part of the license renewal process. The NRC’s final ASR safety evaluation report will be issued sometime after the conclusion of these

hearings, which are scheduled to wrap up on December 6. Following the issuance of the safety report, the NRC will consider the nuclear watchdog group C-10’s contention that the Seabrook license extension should not be granted. Earlier this year, the NRC upheld an earlier ruling by the Atomic Safety and Licensing Board to grant a hearing to C-10 on the license extension.

MMWEC owns an 11.59% share in the 1,248-megawatt Seabrook Station. MMWEC’s Seabrook project participants include 28 Massachusetts municipal utilities and one Rhode Island municipal utility. ∞

ISO Submits Energy Storage Market Rule Changes to FERC

ISO New England and the New England Power Pool (NEPOOL) have submitted market rule changes to the FERC to better enable energy storage resources to fully participate in the New England wholesale energy markets.

ISO-NE’s proposal would allow batteries and other emerging storage technologies to be dispatched in the real-time energy market so they can continuously and quickly move from charging to discharging. The proposal also would allow energy storage to simultaneously participate in the energy, reserves and regulation markets. It would allow for storage participation from resources of at least 100 kilowatts and exempt the dispatchable load associated with a storage facility from transmission charges.

The ISO began working on an energy storage market

participation mechanism in 2016. Earlier this year, FERC issued Order 841, which directed grid operators to develop rules allowing energy storage to participate in the wholesale energy, capacity and ancillary services markets. Under the order, storage could be dispatchable and set market clearing prices as both a buyer and a seller. ISO-NE says its market rule changes are a big step toward meeting the requirements outlined in Order 841.

MMWEC filed comments in 2017 in response to a FERC Notice of Proposed Rulemaking (NOPR) regarding electric storage participation in regional transmission organizations and independent system operators such as ISO New England. MMWEC supports efforts to enable energy storage participation in markets, and believes new rules accommodating emerging and innovative energy storage technologies can assist their development.



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MMWEC began peak forecasting in fall 2016 and dispatching services in October 2017.

Following that initial success, MMWEC reached out to its broader membership to offer peak forecasting and dispatch service, and eight members signed on for the summer months. In some cases, MMWEC leveraged its ability as a Joint Action Agency to rent equipment for its Members and operate them to reduce peak load.

From May through September, MMWEC was able to predict capacity and transmission peak times with 100 percent accuracy, resulting in the \$2.8 million in avoided costs.

These savings directly support customers, according to MMWEC Generation Engineer Jason Viadero. "Because

municipal light plants are not-for-profit public entities, they are able to return these savings to their customers through investment in rate stabilization or by choosing to invest in the future by purchasing new equipment or upgrading their existing distribution system. It's a win all around."

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Jason Viadero
MMWEC Chief Emerging Technologies Engineer

While all temporary units have been returned for the year, MMWEC continues to dispatch permanent assets for four of its Members. MMWEC is currently providing peak forecasting to all Members and Members with behind the meter generation are

eligible for dispatch service. Next summer, MMWEC expects to again provide a rental generator program and will reach out to gauge Member interest in early 2019. ∞

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However, MMWEC urged the FERC not to make market participation mandatory for small energy storage resources. The market rule changes do not require energy storage to participate in the markets. MMWEC supports the option for municipal utilities to keep energy storage resources behind the meter to curtail load and reduce customer costs.

While the number of grid-connected batteries in New England is low, it is expected to increase because of regional public policy goals like the Massachusetts goal of 1,000 megawatt hours of energy storage capacity by 2025. As of September 1, 2018, there were over 800 megawatts of proposals for energy storage in the ISO-NE interconnection queue.

The market rule changes submitted to the FERC by ISO-NE and NEPOOL include a request for FERC to respond by December 10, so they could become effective on April 1, 2019. ISO-NE has developed educational materials, posted on its website, to help potential energy storage market participants prepare for these changes. ∞



A contractor conducts high energy piping inspections during the Stony Brook Energy Center fall 2018 maintenance outage. MMWEC's largest generation asset, SBEC 's intermediate unit is a 354-megawatt combined cycle (gas and oil) unit, while the peaking unit is a 172-megawatt oil-fired simple cycle unit. It is a valuable asset to the 25 Massachusetts municipal utilities and six Vermont utilities that are project participants. It is also plays a critical role for ISO New England because of its agility, fast-start capability and large capacity for oil storage.



Massachusetts Municipal Wholesale Electric Company

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