



Eaton helps Delaware Electric Cooperative “Beat the Peak,” yielding dramatic energy savings

Location:
Central and Southern Delaware

Segment:
Utility

Solution:
Eaton’s energy automation technologies supporting smart grid capabilities and an active demand response program to enable more efficient, reliable and cost-effective electricity

Problem:
Develop a multi-faceted program to reduce peak demand and energy costs through direct participation from Delaware Electric Cooperative members

Results:
Advanced demand response technology facilitated the creation of Delaware Electric’s Beat the Peak program, which has empowered co-op members to reduce electrical costs by more than \$25 million since 2008

“We’ve been able to achieve dramatic energy savings while preserving important energy resources for generations to come.”

Bill Andrew, president and CEO of Delaware Electric Cooperative

Background

The Delaware Electric Cooperative (DEC) dates back to 1936 and was founded as part of President Franklin Roosevelt’s rural electrification movement to provide affordable and sustainable power to rural parts of the country.

In the past 15 years, DEC has doubled its membership—with the majority of members joining after 2000. The transmission costs in the Delaware Electric service area became more expensive as a result of increased local demand and increasing demand and congestion from the surrounding areas of Baltimore, Washington D.C., and Philadelphia.

With an increasing membership and expensive transmission costs, DEC sought ways to reduce costs for its members, while continuing to provide reliable, high-quality electricity.

Challenge

There are two major factors that affected the price of electricity for DEC: the cost of fuel needed to generate power and the demand for power. DEC recognized the demand for power on its system was greatest in the hot summer months between 3 and 7 p.m. During normal load periods, the co-op pays pennies per kilowatt-hour for power, but those rates can increase to nearly a dollar per hour during times of peak demand.

To address this issue, DEC developed the Beat the Peak program in 2008 to reduce energy costs for its members through a multi-pronged approach that yielded substantial savings.

A key part of this program involved the community. DEC engaged with its members so they became active participants, generating energy savings and significantly reducing electricity costs during peak times.

Early on, the co-op sought ways to notify its members during and before peak energy periods so they knew when peak times were approaching—so they could change their energy consumption habits in ways that made sense for them. Beyond the active participation of its members, DEC also sought new ways to improve energy-efficiency and energy costs behind the meter.



Powering Business Worldwide

Additionally, DEC actively pursued customers with the largest loads to participate in the program—in particular, customers that had the flexibility for power to be shut off during peak rate periods.

All of the irrigation equipment used by local farms could fit these criteria, but much of the power coming into the farms was single-phase, which meant the equipment was using diesel generators. Converting this load to electric could help the utility and its members provide a guaranteed load during off-peak hours, while also dramatically lowering the cost to run the irrigation system for the farms, as the cost of diesel fuel is about three times the cost of electricity purchased from the co-op. As an added benefit, this approach would also reduce greenhouse gas emissions and noise levels in the community, and the farmers no longer would need to move generators from field to field.

DEC had been working with Eaton to advance its automated reading program and engaged with the manufacturer for help with its initial load control program in the 1990s. Due to the success of these projects and the close relationship between the two organizations, DEC selected Eaton to help support its new load management efforts.

Solution

The initial kickoff of the Beat the Peak program involved opt-in members receiving:

- The water heater and air conditioning controls (if they didn't already have one installed)
- Notification via email during peak demand times, so they could take active steps to conserve on energy

Later, Eaton worked with DEC to develop an easy to read and use indicator light during peak loads to simplify customer participation. As a result, the utility can send a Beat the Peak alert during peak periods to participating members; the indicator light is red during peak times, yellow when an alert period is approaching and green during off-peak times.

A key part of the Beat the Peak program is the educational awareness the DEC has initiated to help its members understand effective methods to reducing their energy usage during peak times. These include:

- Raising the thermostat a few degrees in the summer months
- Turning off unnecessary lights
- Delaying the use of major appliances (like dishwashers and dryers) until off-peak times

Beyond advancing energy conservation by its members, DEC looked at other means to increase efficiency, realize energy savings and reduce demand behind the meter. An important aspect of this program was conservation voltage reduction, which achieves energy savings by reducing voltages at the substation level on a continual basis.

DEC had already put in place a variety of smart grid technologies and real-time control technology, enabling the co-op to use Eaton's voltage regulators to achieve lower voltage levels. Energy savings could then be achieved by maintaining voltage levels at the lower end of the 114- to 126-volt range allowed by American National Standards Institute (ANSI) Standard C-84.1. DEC also implemented Eaton's load control devices in its line regulators, so with a single command, it can disable voltage regulators' automatic operation during peak periods.

To convert farm irrigation loads from diesel generators to electricity, DEC worked with Eaton to convert single-phase power coming into regional farms to three-phase power through the use of low-voltage variable frequency drives (VFDs). Converting to three-phase power allowed the farms to run the pumps supporting their irrigation systems through utility power during off-peak hours.

"By converting generators from diesel to electric, farmers could not only save on fuel costs, but also stop emissions from being released into the air to create a cleaner, quieter community," said Bill Andrew, president and CEO of DEC.

Results

By lowering the amount of power being consumed across the system when energy prices are high, participating members are helping lower DEC's energy costs. These savings are directly passed down to members in the form of affordable rates.

Since 2008, active member participation in the program has collectively saved more than \$25 million in electricity costs. More than 50,000 of the indicator lights designed by Eaton have been deployed, representing approximately half of DEC's customer base. The community buy-in and participation in active demand response is exceptionally high, with results reflected clearly through the dramatic energy savings.

Additionally, through the use of Eaton's voltage reduction and load control devices, DEC is saving an estimated \$750,000 per year by closely controlling voltage levels. Under the irrigation program, once the single-phase electric lines coming into the irrigation pumps and pivots were converted to three-phase power, farmers no longer needed to use diesel generators. By extending three-phase power to these lines and installing Eaton variable frequency drive technology, farmers in the DEC service area saved 68 percent per hour in operating costs by using electricity rather than diesel fuel. Further, the program enabled the DEC to add additional resources to its demand respond program and save its members more.

"The most important part of any cooperative utility is its members," Andrew said. "Thanks to the amazing level of participation from our community and our multi-faceted approach to demand response, we've been able to achieve dramatic energy savings while preserving important energy resources for generations to come."



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To learn more, visit Eaton.com/utility

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Printed in USA
Pub No: CS083136EN / GG
May 2018

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