Customer Spotlight:

Temple University Earns Millions by Stacking Demand Response Programs

With on-site natural gas generation resources, a strong push towards renewable energy, and a staff focused on sustainability and conservation, Temple University is a role model for strategic energy management. As part of its energy management and sustainability efforts, Temple University has prioritized opportunities to offset its energy costs and improve the resilience of its campus while contributing to the local community.

The Challenge

Located in Philadelphia, Pennsylvania, Temple University is served by the grid operator PJM, which manages the largest electric grid in North America serving consumers across multiple states in the Mid-Atlantic and Midwestern US. Large commercial and industrial energy users in the PJM footprint have access to multiple demand response (DR) programs, which provide incentive payments for reducing energy consumption temporarily when called upon. Administered by utilities and grid operators worldwide, DR programs help to keep the lights on and energy prices low in the community by reducing demand for power at times when the grid needs it most.

However, while access to these programs represents an opportunity for Temple University to increase its DR earnings, capitalizing on this opportunity can be complex.

Participating in multiple DR programs requires in-depth visibility into both grid-level demand activity and facility-level energy performance and needs, as well as the ability to reduce demand at the right times for each program without disrupting operations in the school's facilities. Additionally, participating in multiple programs requires working with a single provider for each program—otherwise, participants would lose access to a significant amount of the payments available.

LOCATION

Philadelphia, PA

SAVINGS & REVENUE

$14.5M+ over approx. 10 years

PROGRAMS

PJM SRM
PJM ELRP
PJM Economic DR
PECO Act 129 DR
Energy Supply Mgmt.
Demand Mgmt.

The Solution

For more than 10 years, Temple University has partnered with the Enel X North America team to maximize performance in all available DR programs while minimizing disruption in its facilities. This approach has also helped Temple University significantly reduce energy costs and improve resilience for the campus by providing advanced notification of potential grid outages or power quality issues.

Here is an overview of the strategy that Temple University and Enel X North America developed to capitalize on their energy market opportunities.

Synchronized Reserve Market

Enel X has helped Temple University enroll in PJM's Synchronized Reserve Market (SRM) program, which requires fast-response participation during brief power system disruptions, such as transmission line or power plant outages. These pre-planned reductions last only 10 minutes and have resulted in over $2.3M in earnings for Temple University since 2007, an average of $226K annually.

Enel X notifies Temple University of these events across all requested channels of communication (email, text, phone) and remotely toggles its facilities' energy consumption via a remote dashboard, allowing university staff to streamline the process and cost of its participation. As a full-service partner, Enel X North America also helps Temple staff understand when it is cost-effective and beneficial to participate in SRM—and, more importantly, when the school should not participate. To date, SRM has been the university's most lucrative and successful DR program.

Contract Negotiation and Capacity Charge Management

Temple University has also enlisted the Enel X North America team to develop a strategy for procuring electricity and natural gas supply contracts, which has helped to secure agreements that best align with the university's risk profile, operational needs, and financial goals.

Through this approach, the university is now able to reduce its capacity charges, which make up a significant amount of the monthly energy bill. Capacity charges are calculated based on a customer's electricity consumption during the five highest one-hour periods of demand across the electric grid. Temple University participates in Enel X North America's System Peak Predictor Program, which uses predictive analytics to assess the likelihood of these peak demand events and notifies Temple University when it should use its energy reduction plan to minimize these charges.

Emergency Load Response Program

With a reliable income stream via SRM and a handle on its energy procurement strategy, Temple University recognized that diversifying their approach to DR participation could further increase revenue.

Temple University expanded its DR participation to include PJM's Emergency Load Response Program (ELRP), which supports grid stability by paying large energy users to reduce their facilities' consumption temporarily when grid demand outweighs supply. ELRP is a good fit for organizations which, like Temple University, also use their energy reduction plan to manage capacity charges, providing an income source if they are unable to reduce consumption when a peak event occurs.

"I have a clear responsibility to Temple to curb energy costs and establish conservation methodologies that don't disrupt campus functionality. When I started working with Enel X, the clear value of a DR strategy was a no-brainer. As the relationship developed, I leaned into their expertise, insights, and solutions to drive a more targeted strategy for the university."

— Kurt Bresser, Director of Utilities and Energy Management, Temple University

"This program has not only resulted in increased income potential for the university, but has allowed me the freedom to deliver on Temple's commitment to conservation, sustainability, and efficiency."

— Kurt Bresser, Director of Utilities and Energy Management, Temple University

To date, Temple University has reaped more than $998K via PJM's ELRP program, a rate which far exceeds the program's average earnings.

Economic Demand Response

As part of its campus-wide energy strategy, Temple University boasts on-site natural gas and solar power generation resources, central chilled water plant optimization, and direct digital control of all HVAC systems. This unique infrastructure makes the campus a prime candidate for PJM's Economic Demand Response (DR), which is activated in response to high wholesale energy prices and offers energy consumers the same rate for the capacity that they remove from the grid as traditional generators receive for capacity they supply to the grid. As an added benefit, Economic DR also minimizes exposure to high energy prices and allows participants to choose whether they want to participate in response to a dispatch.

During Economic DR dispatches, Temple University reduces grid demand by shifting energy-intensive machinery such as chillers to operate during off-peak hours, as well as leveraging its on-site power generation assets to power other energy-intensive equipment while removing capacity from the grid.

This approach has earned Temple University $340K in revenue since 2012.

PECO Act 129 Demand Response

In addition to Emergency DR, which carries with it a short notification period and response plan, Temple University participates in Pennsylvania Act 129 Demand Response, which is available to those operating in Pennsylvania's First Energy and PECO service areas and helps to reduce peak demand levels on the grid. With 24 hours advance notice, Temple University reduces consumption and activates its on-site generation assets to participate in the program.

In less than seven years, Temple University has earned more than $1.3M in net revenue through this approach.

Results

In just over a decade, Temple University's demand response participation has earned nearly $4.1M in gross revenue as of Q1 2018, in addition to approximately $1.5M in cost savings through strategic energy supply management and over $9M in avoided capacity costs through targeted demand management practices.

In addition to the financial benefits, the Temple University team has also improved the efficiency of the campus, maintaining a consistent electric load of 300,000 MWh despite a surge in student population and the construction of new facilities. With an approach that maximizes all available energy opportunities, Temple University has demonstrated the full benefits of a comprehensive energy strategy across supply, consumption, and demand.