



Leveraging Smart Thermostats to Curtail Peak Demand

About EnergyUnited

EnergyUnited Electric Membership Corporation (EMC) is the largest electric cooperative in North Carolina, serving more than 135,000 metering points. Headquartered in Statesville, EnergyUnited provides electric service in portions of 19 counties in west central North Carolina. Now the largest electric cooperative in North Carolina, EnergyUnited has roots that date back to the late 1930s by way of two smaller community-based providers: Crescent EMC and Davidson EMC.

Developing a New Program for the Demand Response Portfolio

EnergyUnited's Energy Services division offers many specialized programs for its residential members, including resources for members who are considering the purchase of an electric vehicle, energy management programs, net metering for rooftop solar, demand response and heat pump rebates, to name a few.

Under the demand response category, the cooperative historically offered three legacy programs: conservation voltage reduction, own generation, and traditional load management. But in July 2020, EnergyUnited partnered with Virtual Peaker, a cloud-based distributed energy software company, to create a new demand response program for its members, Peak Time Perks.

Peak Time Perks engages EnergyUnited cooperative members in reducing energy consumption during peak periods, which can result in significant savings for the cooperative in the process. The program provides incentives — an initial \$50 bill credit, plus an additional \$20 credit for each subsequent year — for members who enroll their Google Nest, ecobee or Honeywell Home smart thermostats.

Leveraging these thermostats' cloud-based IoT technology, members are rewarded for virtually sharing their devices with EnergyUnited. During strategic hours on specific days, the utility makes temporary adjustments to customers' thermostats using Virtual Peaker's platform to curtail the effects of high electricity demand. Participating members receive notifications through text and email when their thermostats will be remotely adjusted, and they always have the option to opt out of that day's event.

“ Since we started providing electricity services in the late 1930s, EnergyUnited has grown significantly, now serving more than 135,000 metering points in 19 counties, yet we've always remained committed to delivering reliable energy services at competitive prices. The Peak Time Perks program is just the latest example of how we strive to improve the quality of life for our co-op members. ”

— THOMAS GOLDEN, CHIEF EXECUTIVE OFFICER, ENERGYUNITED

Ultimately, EnergyUnited created the Peak Time Perks program to help reduce their power purchasing costs, engage with participants, and help keep rates low for all their members. Reducing peak energy demand through small, temporary adjustments to program thermostats helps reduce “rate pressure” for the utility, allowing it to keep rates lower than they would otherwise be.

PROGRAM AT A GLANCE

In July 2020, EnergyUnited partnered with Virtual Peaker, a cloud-based distributed energy software company, to create a new demand response program for its members, Peak Time Perks. The program engages cooperative members in reducing energy consumption during peak periods, saving the entire cooperative money in the process.

RESULTS SO FAR

After less than a year of customer recruitment, EnergyUnited was able to enroll over 1,000 smart thermostats into the Peak Time Perks program. In the summer of 2021, the cooperative initiated six demand response events during predicted peak days and hit nine of the 10 major peak hours.

Enrolling and Engaging Consumers Through One Digital Platform

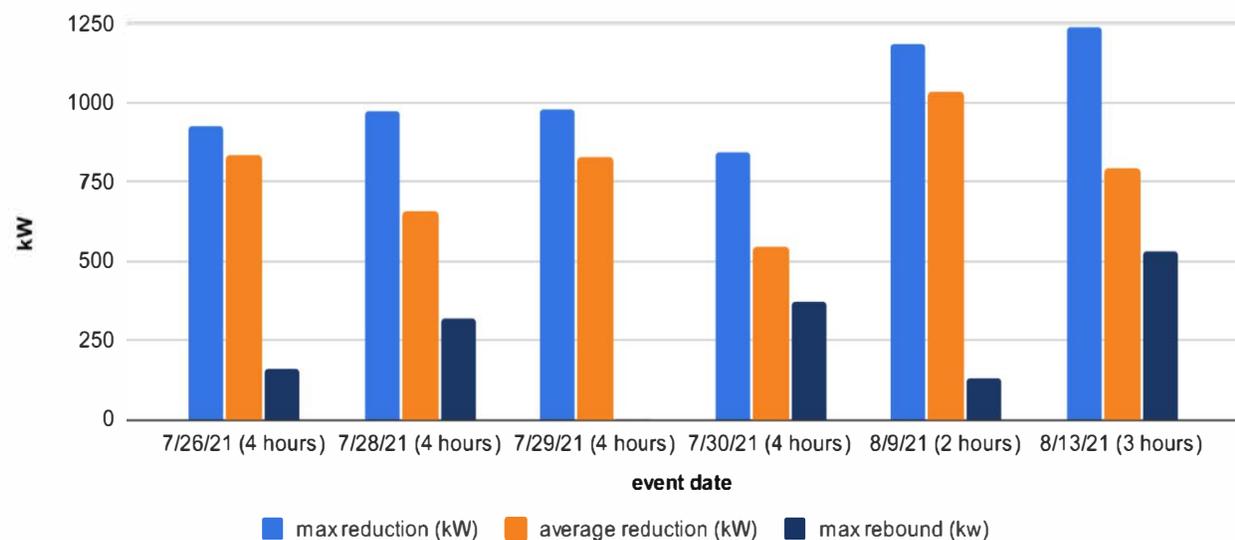
Using Relay, Virtual Peaker's Customer Engagement suite¹, customers provide basic information in a mobile-responsive web form and are then guided through their thermostat manufacturer's specific application. Once this application process is complete, the customer care team at EnergyUnited reviews and approves their application and processes the customer's program incentive. This process automatically authorizes and authenticates WiFi-enabled devices and gives insights to EnergyUnited on the customer's HVAC energy use and demand response participation.

Once a customer and their thermostat are enrolled and approved, the utility can view real-time aggregated device information and construct peak-shaving events using Virtual Peaker's primary software, Shift. Program managers at EnergyUnited easily log into the secure web-based portal and schedule events ahead of time, allowing them to attach notifications to communicate with participants via email, text or both. Once an event is completed, EnergyUnited can view reporting on the event's performance.

Results So Far and Key Lessons Learned

After less than a year of customer recruitment, EnergyUnited was able to enroll over 1,000 smart thermostats into the Peak Time Perks program. In the summer of 2021, the utility initiated six demand response events during predicted peak days and hit nine of the 10 major peak hours (EnergyUnited's model is based on the top 10 hours with Southern Company, a major supplier of energy in the region).

Figure 1: Summary of Energy Savings During 2021 Demand Response Events



This event also contained a pre-cooling period in the hour before the event window started at 3 p.m., which prompted the increased energy consumption of participants' HVAC systems and created additional comfort during the actual event window. This practice of pre-cooling helps ensure that the strategic hours of the event see the most participation and slows the rate of customer opt-outs.

The event results for the program provided dependable energy reductions and savings, benefiting all cooperative members. It should be noted that during the post-season analysis conducted independently at EnergyUnited, there were some minor disparities between the savings calculated using the utility's real-time AMI data and Virtual Peaker's estimate. Some additional modeling will be necessary to accurately calculate the realized benefit. Both parties are working to overcome this challenge and Virtual Peaker incorporated this critical product feedback to allow for customizable, adjustable baselining to help account for some of these differences.

¹ Learn more at www.virtual-peaker.com/platform/customer-engagement-suite/.

Additionally, from a customer engagement perspective, there were lessons learned around the need to improve member education and reduce attrition from the program.

“Some thermostat customers were quick to assume that any adjustments to their thermostat settings were initiated by EnergyUnited, but they were not always aware that their devices also had learning algorithms and schedules which were making automated adjustments.”

— NIKOLAI ROBLES, CONTINUOUS IMPROVEMENT PROJECT ENGINEER, ENERGYUNITED

The team at EnergyUnited transformed these initial complaints and points of contact with participating members into an opportunity to provide additional information around energy efficiency, device optimizations, and more, and reminding members that the cooperative will always notify them early in the morning on the day the peak event is scheduled.

Another lesson centered around customer attrition. During the first year of the program, EnergyUnited noticed that some devices were no longer responsive or present for peak-shaving events and struggled to identify the reason behind this “unenrollment.” The challenge is identifying which specific reason for this absence — whether a customer potentially unenrolled directly with their OEM, disconnected the device from WiFi or otherwise removed the device from being cloud-connected. In response, Virtual Peaker has worked to provide more granular information in their new Enrollment Report.

A positive lesson learned was the realization that the most important factor for initially engaging customers in the program was the upfront incentive to enroll that was offered. This specifically was the main drive behind members' interest in participating, and potentially increasing this upfront incentive.

The early success of EnergyUnited's Peak Time Perks program demonstrates that many consumers are willing to shift their electricity consumption to benefit their electricity provider, particularly if participation is streamlined and communication of the benefits is clear.