

Peak Partners Program At A Glance

Fort Collins Utilities provides Wi-Fi enabled “smart” thermostats and two-way communication devices for water heaters to help customers save money and reduce peak usage. The program is open to all customers with air conditioners and/or electric water heaters. Fort Collins Utilities installs the devices free of cost and provides home and mobile applications, which let customers track usage and make adjustments. Fort Collins Utilities will soon introduce a one-time \$25 incentive.

Fort Collins Utilities deployed multiple technologies and mined a rich set of interval meter data to match what works best in their service area for their customers.

Program Statistics

- Target: 2,500 air conditioning customers; 2,800 water heating customers. As of September 2015, they are 92% subscribed on HVAC and 54% subscribed on water heaters
- Average summer season reduction for air conditioning = 1.03KW; average reduction for water heating = .17KW (summer)

*What makes Fort Collins Utilities unique?
Their dedication to mining data and using it to continually improve their program.*



Data Drives Depth

When Fort Collins Utilities received a Smart Grid Investment Grant in 2009, they were able to kick-start their Advanced Metering project and lay the groundwork for their **Peak Partners** Demand Response Program. Peak Partners has become the foundation for upcoming programs that will focus on areas including managing electric vehicle charging, grid responsive water heaters, and the dispatching of curtailment events by a third party. Building upon their success, Fort Collins Utilities has used the wealth of information collected to help refine the Peak Partners program and improve customer engagement.

Background

Peak Partners encourages customers to start using a programmable thermostat and, for customers with an electric water heater, to also use a two-way device, allowing their unit to be cycled for load control. Fort Collins Utilities provides both the device and professional installation services free of cost.

Peak Partners: Nuts & Bolts

Thermostat Program

Fort Collins Utilities equips the customer's home with “smart” web-programmable thermostats. Thermostats can be programmed from any mobile device or computer.

Customers can save up to 10% annually on their heating and cooling costs.

Water Heater Program

The customer allows Fort Collins Utilities to install a two-way communication device that can remotely turn off the water heater for short periods of time when the city's electricity grid approaches peak capacity.

Customers receive a monthly bill credit of \$4.

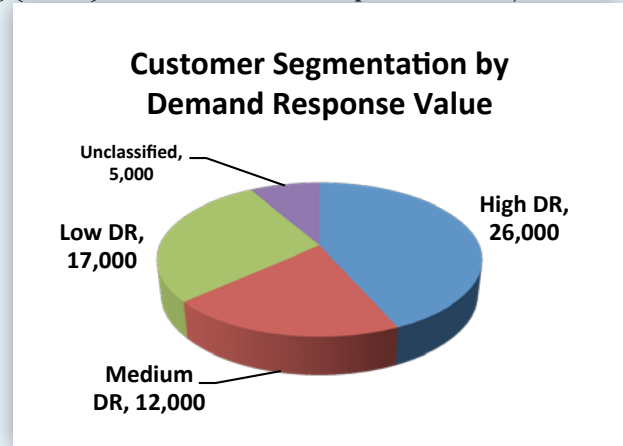
Peak Partners messaging focuses on sustainability for the customer and the community. The program is easy and automatic for consumers while helping the community preserve natural resources, avert power outages, improve air quality and overall environmental health. This messaging resonates with most residents, who enjoy their vibrant community nestled in the Rockies.

Enabling Technology

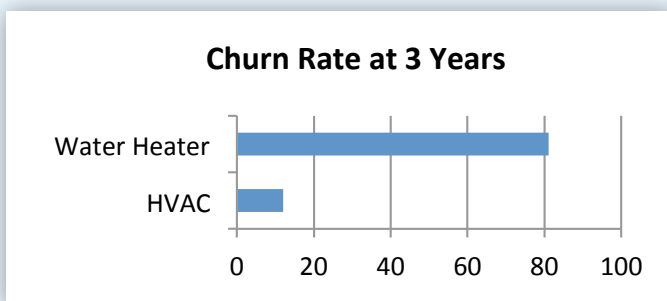
Fort Collins Utilities planned for a variety of technologies before settling on the Wi-Fi-enabled thermostat and cellular-enabled controllers for water heaters. The advantage of both technologies is that these networks already exist in most homes in the service area and are compatible with a range of devices.

Data Drives the Initial Strategy

Before Fort Collins Utilities initiated the Peak Partners program, they used existing consumer insights to plan two key components of the program: estimating the potential demand response resource and selecting the communication network technology for heating, ventilation and air conditioning (HVAC) and water heater components. First, to identify the highest value demand response households, Fort Collins Utilities leveraged their advanced metering infrastructure (AMI) data and correlated it with their multi-dimensional customer segmentation. This is a great example of targeting a specific segment (environment-driven) and associating these customers with their usage profile (high electricity usage). Fort Collins Utilities identified 26,000 households where usage was high enough to generate significant demand response resources. These households were individually contacted through direct mail and telephone calls. Approximately 10% of households responded positively, even without the offer of a monetary incentive.



Data also helped identify the best choice of communications network for each program component. Leveraging multiple communications networks can help manage program risk, but by analyzing dwelling type and “churn rate,” Fort Collins Utilities was also able to minimize the effects of “churn,” or the rate at which individuals relocate, on program costs. In Fort Collins, central air conditioning is generally installed in single-family detached homes. The churn rate for these premises is low, so the number of program participants who relocate in any 3-year period is also low, taking about 12 years to lose 50% of the participants due to churn. Given this data, using customer Wi-Fi networks with the HVAC element of the program is a stable and durable option.



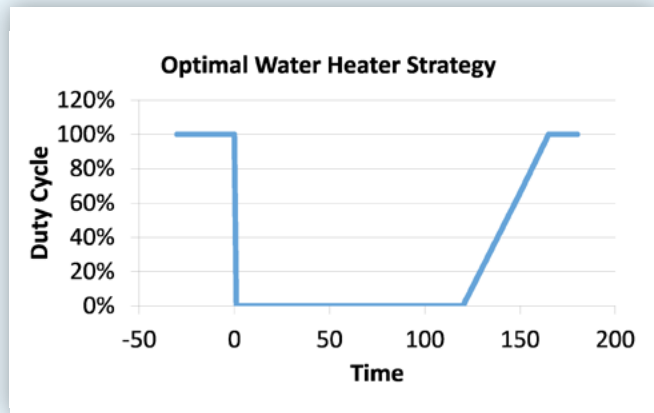
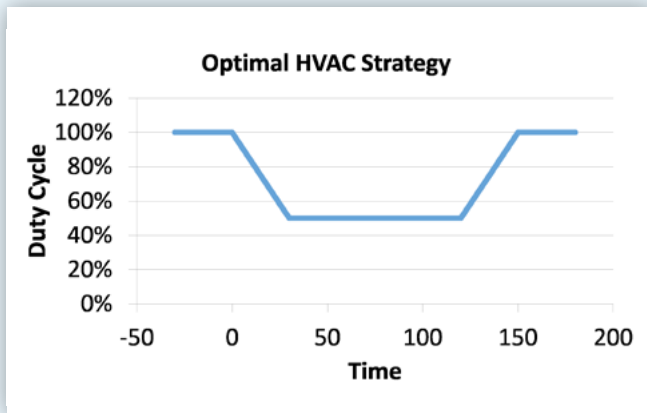
In contrast, the potential effects of churn within the context of the water heater program are significantly greater; most electric water heaters in the city are in apartment complexes which are occupied by renters. On average, it would take a little less than 2 years to lose 50% of the participants in a water heater program due to the elevated churn rate. A new customer that moves into the complex could be re-enrolled in the program, but commissioning a Wi-Fi water heater device would require a technician visit, driving up

the operations and maintenance costs of the program. This reality drove Fort Collins Utilities to choose the cellular network for data transmission, as this type of network is not customer-dependent.

Data Shines a Light on Program Adjustments

Fort Collins Utilities has implemented a model of learning through “Plan-Do-Check-Act” processes that rely on data analysis. Analyzing program data has helped Fort Collins Utilities improve system operations during events, maximize enrollment effectiveness and optimize communication with customers.

Improving Operations: Various load control strategies were tested in order to determine the optimal strategy for HVAC and for water heaters. Fort Collins Utilities found that a 50% duty cycle with a slow ramp-in and a slow ramp-out worked best for HVAC; it put less stress on the distribution system while ensuring all participating customers experience the same event duration. Fort Collins Utilities found that an alternate strategy worked best for water heaters: a 100% duty cycle with a fast ramp-in and a slow ramp-out.



Maximizing Enrollment Effectiveness: With the knowledge that the water heater target-segment was largely composed of renters, Fort Collins Utilities focused on enrolling multiple-dwelling units via the property management office. This action allowed for efficient use of installation crews and ensured that all units in a complex were part of the program. After having to engage out-of-state installation crews in the early weeks of the thermostat program, Fort Collins Utilities learned to pace their marketing efforts to levelize the use of installation crews.

Optimizing Communication: Caller-ID is a useful tool, but in a program like Peak Partners it can work against a utility if they are making use of outside resources. Fort Collins Utilities learned that a local-area phone number for outbound calls and installation crews greatly increased the likelihood that the customer would answer the phone. Fort Collins Utilities also found that it would be beneficial to inform the local police department so the police can confirm utility outreach programs and encourage consumers to contact the utility with questions.

Data Drives Deeper Questions

Fort Collins Utilities has found that **customer engagement persists even after the initial few months**. The digital thermostat portal has seen more than 100,000 sessions in just over a year. That's about 1 session per customer per week. Since most of the participants did not have a connected thermostat prior to enrolling in the program, Peak Partners has opened a new engagement opportunity between Fort Collins Utilities and their customers.

Questions to Consider: What exactly are customers doing when they use the portal (changing their programmed settings, opting out of an event, checking the temperature, something else)? When customers interact directly with the thermostat, are they doing something different? What drives that choice and are there opportunities to improve functionality? Fort Collins Utilities expects their multidimensional model of AMI data, end-use telemetry data and customer segmentation with socio-economic and dwelling style/age data will provide real insight into these behaviors and the resulting energy savings.

Fort Collins Utilities has also started a program with the local library to check-out devices to residents in order to **test consumer response to in-home displays**. The goal of this program is to provide new services to customers and increase their knowledge about energy use.

Questions to Consider: Do customers change energy usage behavior after using the device? To answer this question, Fort Collins Utilities will again compare their AMI data to weather-adjusted electricity consumption pre-and-post customer use of this device.

Fort Collins Utilities and their customers have mutually benefitted from the Peak Partners program. Based on the first summer of program analysis, HVAC load reductions average 1.03 Kilowatts (kW) per customer and water heating load reduction is approximately 0.17 kW per customer for the summer period (water heating load reduction is expected to increase in winter months as peak-time shifts later into the evening). Generally, the U.S. Department of Energy estimates 10% of the heating/cooling load can be saved with a programmable thermostat. Fort Collins Utilities has used this estimate to encourage customers to participate in the Peak Partners program.

Questions to Consider: Can these benefits be quantified even further by combining the AMI and thermostat data together? What level of savings do customers in Fort Collins experience? By separating non-participating devices from those devices that participate in events, can Fort Collins Utilities provide a more realistic baseline of what usage would have been during the event without the Peak Partners program participation?

Stay tuned...

The Smart Grid Consumer Collaborative would like to thank Fort Collins Utilities and Pablo Bauleo, Energy Services Engineer, for sharing their story with us.