

## ➤ Residential Demand Response

### A. Description

The Company's Residential Demand Response product contains ~~two~~three offerings:

- Saver's Switch
- AC Rewards
- Smart Water Heaters

~~Both~~The products seek to reduce system load by curtailing central air conditioners and electric heat pump water heaters and are generally utilized on hot summer days when Public Service's load is expected to reach near-peak capacity.

#### Saver's Switch®

Saver's Switch offers residential participants a \$40 annual bill credit as an incentive for allowing the Company to control operation of their central air conditioners. Since the launch of Saver's Switch in 2000, Public Service has declared an average of seven control events per year. When a customer enrolls, a switch device is installed near the AC unit that can interrupt the operations of the compressor.

When activated, a control signal is sent to interrupt the customer's central air conditioning load during peak periods, typically between the hours of 2:00 p.m. and 7:00 p.m. on weekdays. The product has deployed switches with varying load control strategies:

- Switches installed prior to 2004 are cycled 15 minutes out of every 30 minutes (a 50% cycling strategy) during the control period.
- Switches installed after 2004 have utilized an "adaptive algorithm" cycling strategy. This strategy allows the switches to "learn" how a customer's air conditioning is being operated in order to achieve a 50% reduction in load. The newer switches generally provide greater load reduction per unit. Approximately 98% of the approximately 203,000 switches in the field (as of December 31, 2017) use the adaptive algorithm strategy.

Control events, normally last for about four hours on a control day and take place in the late afternoon or early evening. With the expanding participant population, Public Service has created sub groups of participants to enable the activation of less than the entire population at a time. This gives the Company flexibility to better manage peak demands on the system.

#### AC Rewards

Following a pilot in 2015 and 2016, Public Service launched the AC Rewards offering in July 2017. Like Saver's Switch, AC Rewards seeks to reduce AC load at peak times, but the methodology is different.

Customers can join AC Rewards by installing and enrolling a Wi-Fi enabled thermostat. Currently, certain devices from ecobee, Honeywell, and Emerson are eligible for enrollment. There are two channels for customers to join:

- Bring Your Own Thermostat (BYOT) – customers that already have a qualifying thermostat installed at their residence can enroll it at a company provided portal. BYOT participants receive a one-time bill credit upon joining AC Rewards.
- Direct Install – for customers not comfortable installing their own device, the company can provide and install one free of charge.

In addition to discounts, bill credits and devices, customers receive an annual bill credit of \$25 for their participation.

In a control event, the Company communicates with the thermostat over the customer's Wi-Fi system and adjusts the set point by a few degrees. Customers have the ability to override control events by returning the device to a different set point. Currently, customers are not penalized for opting out of control events. However, the Company will monitor program performance over time and may make adjustments to incentives depending on how often events are overridden. The Company expects to experiment with different control approaches including event pre-cooling in the coming years to determine optimal operations.

### Smart Water Heaters

This is a new offering for 2020. Customers owning qualifying electric heat pump water heaters that are capable of receiving control signals from the utility are eligible for enrollment. Qualifying enrolled water heaters will be controlled in two ways:

- Peak demand load reduction – in a peak load event, normally on hot summer afternoons, the enrolled water heaters would be turned off for the duration of the control event. Previously heated water would be available for customer use. But water heaters would not heat new water until the end of the event. Unlike the AC program, water heaters can be turned off at any time of system need, not just during the traditional summer afternoon peaks.
- Daily load shifting – the temperature setpoint of enrolled water heaters would be adjusted to shift heating load away from the daily system peaks. I.e. the water temperature would be increased at night and reduced during the day. This strategy is also designed to save the customer energy. The daily load shifting is designed to be largely invisible to the customer.

In order to participate, customers need to have a water heater equipped with a receiver for over the air operating instructions and a mixing valve as a safety measure for when water in the tank is heated beyond the original set point. Participants in the program will receive an annual \$25 bill credit for their participation.

## **B. Targets, Participants & Budgets**

### Targets and Participants

Saver's Switch is aimed at single family home owners with central air conditioning. Between Saver Switch and AC Rewards , the Company aims to install/enroll 12,000 devices per year. This will be quite challenging as Saver's Switch has been an offering for almost two decades. As a result, it has an installed base of participants that accounts for an estimated half of the eligible customers in the state. AC Rewards currently targets single family homes (detached) but is expanding to attached family homes such as townhomes and duplexes as well as multifamily facilities to reach more customer segments while adding resource options for system load relief. To the extent possible, the Company aims to promote AC Rewards in ways that minimize cannibalization of existing Saver's Switch participants. The main target customers for Smart Water Heaters are customers replacing existing electric water heaters. The offering is constrained to the universe of eligible water heaters which is currently relatively small. Therefore, we anticipate modest participant volumes early on.

### Budgets

The primary costs in operating Saver's Switch are: the cost of switches, switch installation, rebates for participating customers, and promotional expenses for recruiting participants. For AC Rewards, the primary costs are incentives (bill credits and device discounts) and promotional expenses. Over time, as Residential Demand Response has been a focus of the Company, advertising and promotional expenses have been escalating with increasing product penetration.

## **C. Application Process**

Customers may sign up for Saver's Switch via mail-in forms, over the phone, or at the Company website <http://www.xcelenergy.com/saversswitch>. Applications are generally processed, and switches installed within six to eight weeks. Due to variations in air conditioner age, code compliance, and where the AC unit is located (next to the house), the installer will make the final on site determination as to whether the customer qualifies for the product. The installation work normally takes place entirely outside, allowing customers not to be home for the installation.

Customers wanting to join AC Rewards can do so at the Company's enrollment portal <http://smarthtthermostat.xcelenergy.com>.

## **D. Marketing Objectives & Strategies**

Saver's Switch and AC Rewards are promoted to residential customers using a variety of channels including bill inserts, company newsletters, print and radio advertising, direct mail and email.

Based on an analysis of customer energy usage during the summer months and market research, Public Service estimates that approximately 325,000-375,000 residential electric customers in Colorado have central air conditioning. Of those, about 193,000 were signed up for the product at the end of 2017. Where possible (i.e. in direct mail and telemarketing), the Company directs its promotional efforts to customers identified as likely to have central air conditioning. Through ongoing research, the company is still determining the participation impact adding multifamily facilities will have to the program.

In 2019 and 2020, Public Service expects to continue an intense promotional effort with activities including:

- Direct mail, including up-front incentives to new participants;
- E-mail marketing;
- Bill inserts;
- Radio advertising; and
- Print advertising.

## **E. Product-Specific Policies**

Saver's Switch has the following additional requirements:

- The product does not offer customers the choice of opting out of individual control days. The one exception is in the case of medical emergencies where customers can be removed from the product on very short notice.
- When a customer moves into a premise with a pre-existing switch, they are automatically enrolled in the product, but notified that they may opt-out.
- Upon request for a Saver's Switch from a customer, a third-party implementer installs the switch. The third-party makes the determination in the field as to whether or not a switch can be successfully deployed, depending on the age of the A/C unit, electrical code compliance, etc.

AC Rewards has the following additional requirements:

- Participants must have central AC to join AC Rewards. As there, in most cases, is no contractor at the premise to validate this, we assume participants have central AC. The Company reserves the right to remove customers from the product who are deemed to not have central AC.
- The Company also reserves the right to remove participants from AC Rewards if the device goes 'offline' for too long or if the customer opts out of most or all control events.

## **F. Stakeholder Involvement**

Public Service recognizes that the HVAC community and homebuilders are in a position to influence customer attitudes towards the product. The HVAC community may also have lingering misconceptions about Saver's Switch being harmful to customers' air conditioners. Public Service is planning to increase its efforts to educate the HVAC / builder community about the benefits of Saver's Switch to customers.

## **G. Rebates & Incentives**

Saver's Switch participants will receive a \$40 discount on their October energy bills following participation in the preceding summer control season. AC Rewards participants receive a \$25 discount on their October bills. AC Rewards participants that enroll an existing qualifying thermostat receive a one-time \$75 bill credit. Customers without a qualifying thermostat can get a discount when purchasing one at <https://www.xcelenergystore.com>. Participants in Smart Water Heaters receive an initial \$75 bill credit for enrolling and an annual \$25 bill credit for their participation.

## **H. Evaluation, Measurement, & Verification**

Public Service's load research organization leads an annual research project to evaluate the load relief achieved from installed Saver's Switch and AC Rewards units. The team hires a consultant—that specializes in load research—to conduct the data gathering and most of the analysis. A sample of participants is included in the research, undertaken annually. This is done with data loggers deployed onsite to monitor A/C run time and device operations during the cooling season. The results are used to document the extent of load relief achieved during a control day.