EMERGING TECHNOLOGY ALTERING DEMAND SIDE MANAGEMENT

TENDRIL®

DIVE BRAND STUDIO

or years the utility industry has wanted tools to reduce customers' use of air conditioning during hot days of heavy load. Getting consumers onboard with the idea has always been a tough sell and it's been that way for a long time.

"The utility industry's demand response initiatives have not changed much over the past 35 years – at their core, they still center around cutting off air conditioners during peak times, putting the needs of the grid over the needs of the customer," says Jess Melanson, VP of Utility Solutions and Strategy for Tendril, a software company based in Boulder, Colorado.

Firms like Tendril are currently working hard to change the demand response game through technological advances that bridge the gap between the utility's needs and the customer's comfort and costs. Smart thermostats have been nibbling at the energy efficiency apple and have evolved from early, programmable units to products like the Nest and ecobee, which can be controlled from a smart phone, learn the temperature patterns of it's owners and make adjustments accordingly. But traditionally in these smart thermostat-based systems, the home's cooling system doesn't respond to variables like weather patterns, changing grid conditions and a home's unique thermal profile.

Changing a thermostat, even an expensive one, can be a relatively simple way to make the home more energy efficient. On the other end of the spectrum, consumers can also consider adding rooftop solar, home energy management systems, energy storage and charging stations for electric vehicles.

"THE UTILITY INDUSTRY'S DEMAND RESPONSE INITIATIVES HAVE NOT CHANGED MUCH OVER THE PAST 35 YEARS."

Jess Melanson, VP of Utility Solutions and Strategy for Tendril

Assuming the growth of distributed energy resources (DERs) continues, the basic concept of demand response will eventually be transformed.

Utility companies have wrestled with ways to encourage consumers to use less energy during times of peak load with varying degrees of success. Programs aimed at getting consumers to pay attention to pings from their utility providers about when to turn down the AC are, at best, problematic.

Add in the effects of DERs on balancing the grid as they become more popular and the puzzle becomes a complex yet, enticing conundrum. "Almost everyone in the power business sees DERs in their future," says Steve Corneli, principal at Strategies for Clean Energy Innovation, "but most are having a hard time figuring out how to integrate them into the grid while also giving customers better value for their energy dollar."

Tendril is attacking the issue with a software-based solution called "Orchestrated Energy," and touting it as "continuous demand management." The software is designed to solve issues on both sides of the grid. Distributed resources become more predictable and "dispatchable," while consumers enjoy lower electricity costs with no loss of comfort. To sweeten the pot,

TENDRIL®

Tendril's software is device agnostic, so it can work with just about any smart device, including next-generation thermostats, water heaters and solar technologies.

"Everybody in the business has been thinking about the disruptive influence of distributed energy resources like solar plus batteries, smart appliances, and smart EV charging. But to really work, these kinds of devices need to be controlled in a really smart way that helps the customer, the distribution utility, and the grid solve their very different problems," says Corneli.

The basic architecture of this kind of control system is sparking much debate, and many utilities are trying to decide where they should focus their efforts.

Rather than focusing on building a better thermostat, firms like Tendril are focusing on making better use of the data that thermostats can provide. Orchestrated Energy, by offering a system that is agnostic and scalable, works on the premise that customers can bring their own device to the party. Orchestrated Energy works with many different devices to find less costly ways of maintain-

TE∧DRIL®

ing the same level of comfort or other services customers desire, while using less energy or using it at times when it is less costly. Customers input their own preferences for comfort, savings and environmental sustainability via a mobile application, and Orchestrated Energ takes it from there – though customers can easily alter or over-ride settings whenever they prefer.

Tendril's software learns its customer's preferred comfort band and then goes a step beyond. Algorithms and simulation models dial into each home's unique thermal envelope, homeowner's preferences and each utility's pricing structure to determine the most efficient way to heat and cool the home while maintaining consistent comfort levels. Temperature levels are sampled and if needed, adjusted every five minutes to provide a constant stream of data.

"SOFTWARE SOLUTIONS LIKE ORCHESTRATED ENERGY TAP INTO THE ENERGY VALUE INHERENT IN EACH HOME TO MAKE ENERGY CLEANER AND CHEAPER FOR CUSTOMERS."

Jess Melanson, VP of Utility Solutions and Strategy for Tendril

According to Tendril, who has been beta testing the system with some of the larger utilities, HVAC energy consumption is reduced by 20% and peak usage is reduced by up to 50% without sacrificing comfort.

Tendril's system also holds added appeal for the utility side, as it is set up to optimize around a wide range of variables that signal conditions on the grid – TOU rates, day ahead or real-time energy prices, a solar production curve

TENDRIL®

and distribution system constraints. This means the system can help solve a wide range of major challenges the utilities are facing, all with one optimization engine. All this good news begs some big questions including, how does all this magic happen?

"The answer can be as simple as cooling the house a few extra degrees early in the day," says Marissa Hummon, a senior scientist for Tendril. "This allows the home's own thermal mass to act as insulation, storing the energy and enabling customers to shave $50-$250 a year in energy costs." The utility companies have thrown their support behind the initiative by offering incentives.

"In some jurisdictions utility companies are providing incentives for smart thermostats of up to $100 or more," says Melanson.

For all the finger-pointing aimed at a utility industry accused of being hesitant to change, a strain of progressive thinking about the future is starting to resonate.

"Software solutions like Orchestrated Energy tap into the energy value inherent in each home to make energy cleaner and cheaper for customers," says Melanson.

Attacking the issue with software solutions also provides flexibility in terms of what's coming down the pike as new controllable devices are added to the mix. "Water heaters, dishwashers, washers, dryers, and refrigerators also present ways to cut cost and usage," says Hummon. "Because the new solutions are scalable, they will work now and also work in the future."

Continuous demand management solutions also prepare the utilities for imminent regulatory challenges including REV-like reforms, net-metering battles, a push toward TOU rates, and rate case pressures.

"Programs like Orchestrated Energy have a three way benefit," says Corneli. "The customers get lower bills and better service. The utilities can deploy capital more efficiently and the grid can be run at a lower cost with better efficiency and lower carbon production." At last, a system where everybody wins.

"BECAUSE THE NEW SOLUTIONS ARE SCALABLE, THEY WILL WORK NOW AND ALSO WORK IN THE FUTURE."

Marissa Hummon, senior scientist for Tendril
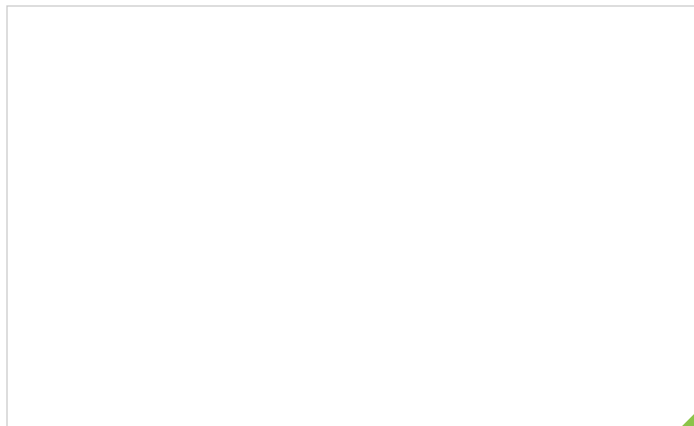
TENDRIL®

Tendril is a fast-growing data analytics and software company committed to the idea that change represents a significant opportunity for energy providers. The company's data analytics on more than 140 million homes delivers value to energy providers while simultaneously helping any company connected to the home meet emerging customer engagement and demand challenges. Built over more than a decade, the Tendril Platform provides real-time, ever-evolving data about energy consumers and their homes in order to improve customer acquisition, increase engagement, and orchestrate home energy experiences.

▼

LEARN MORE