

Energy Management at the Outlet

By Lisa V. Wood, executive director of the Institute for Electric Efficiency

Much of saving electricity is behavioral, and behavior is slow to change. Indeed, most customers in the residential sector, which accounts for one-third of all electricity consumed in the United States, do not know much about their energy consumption, which end uses consume the most power, or how to manage usage effectively. At the same time, everyone would like a lower bill at the end of the month.

Of course, the smart grid will change the way consumers use, manage, and think about electricity. But, until that's in place, utilities are testing several technologies that can help households manage energy usage right now. A burgeoning in-home technology industry offers real-time information interfaces that provide automation and granular electricity usage information at the very point where most customers and electricity meet: the outlet.

Plug It In

For example, Con Edison, in targeting its large proportion of apartment-dwelling customers with window-unit air conditioners, is testing ThinkEco's Modlet and accompanying thermostat remote in 500 units in a New York City residential complex. Generally, customers do not have automated control for room ACs—the Modlet provides it. The pilot project allows for real-time cost information, remote control of ACs via computer and smart phone, and the option to enroll in demand-response programs. Anecdotal evidence shows a positive impact. For five hours on July 21, for example, when the heat index in New York City was 106 degrees Fahrenheit, the utility cycled 90 percent of the pilot's window ACs that were in use (typically about one-third of window ACs are on during the day) and achieved a 37-percent reduction in energy consumption while keeping rooms comfortable. Participants had the option not to participate in the event; those that did participate received \$10. Since then, ThinkEco and Con Edison have run five more demand-response events, and early results indicate similar levels of demand reduction.

Another company, EnergyHub, is working with more than a dozen utilities. Customers can choose from a suite of home energy management tools, including a socket controller, a six-outlet strip, a wireless thermostat, and HomeBase, an in-home controller about the size of a GPS unit. It has a touch screen that provides usage information and control over the thermostat and appliances plugged into a

socket or the strip. Users can program the thermostat via the web; they also can control the sockets and the thermostat using their smart phone. EnergyHub's goal is to save the consumer at least 20 percent through real-time information and control—and, the company claims, simply setting a thermostat on an energy-efficient schedule will accomplish that goal. The savings might be less if the customer relied solely on plug-ins; and, of course, it all depends on the home.

Solutions Without Meters

While these two products and companies share similar design concepts, they have some niche differences. One is their communication protocols. Used as a standalone solution, the ThinkEco Modlet uses ZigBee communication through a simple universal serial bus—USB—hub that can



Courtesy: ThinkEco

be plugged into any internet-enabled computer. ZigBee is a low data-rate, low energy-use network protocol providing a range of 50 yards or so. The absence of numerous pieces of hardware helps the Modlet integrate with other platforms, which is its way to remain agnostic to evolving communication protocols. EnergyHub also uses ZigBee for communication among the HomeBase controller and the peripherals installed in the home; the system then uses Wi-Fi communication to transmit the information to an internet portal or smart phone.

Another difference is the depth of energy information available to the end user. The Modlet provides information on the devices to which it is connected and recommends savings schedules based on an automated analysis of that information. The HomeBase can integrate real-time information from a household's smart meter.

For the in-home market to move forward, the energy management industry must work out the communication protocols (ZigBee, Wi-Fi?) and companies must adapt. But it is safe to say that many companies offer immediate solutions for households that would like to manage their energy use and benefit from demand-response programs. Most of the pilots are still underway, but preliminary evidence indicates that households are saving money, demand-response functions are working, and the payback period for the technology is one to two years.

As economies of scale drive down costs and retailers develop direct channels to consumers, control applications at the outlet will provide huge energy-savings and -management potential—and a new way to think about electricity. ♦

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SEPTEMBER/OCTOBER 2011

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