

'Smart' Not Necessarily Efficient

Technology puts control in hands of consumers

By Derrill Holly

Home automation systems are placing control in the hands of consumers, but questions remain about the best ways to use systems to save money and energy.

"Most smart home technology is about comfort and convenience," says Brian Sloboda, director of consumer solutions for the National Rural Electric Cooperative Association. "Consumers interested in saving money on monthly energy purchases should look at internet-connected thermostats first."

Around half of all thermostats sold today are smart thermostats. These devices have the potential to reduce air conditioning energy consumption by 10%. During winter months, the thermostats could save 7% on energy used to heat the home.

Brian has watched home automation systems evolve. He is particularly interested in identifying ways to enhance efficiency and savings.

"Laundry, dishwashing and water heating can be set to occur outside of your co-op's (or your utility's) peak demand periods, which typically are during weekday business hours," Brian says.

NRECA is working with one of the Department

of Energy's national laboratories on a demonstration project examining energy-saving options that could time-shift some activities. However, Brian says actual cost savings for the consumer is likely to be limited.

"Pool pumps, dishwashers, thermostats and car chargers can learn their owners' behavior and then communicate with the utility so the data can be used for demand response," Brian says. "The goal is to determine if a system like this can be implemented without inconveniencing the consumer, providing energy demand savings to the utility."

Security system notifications and thermostat controls that adapt to home automation are among the most popular options available.

"There are different kinds of smart when it comes to smart appliances and devices," says Peter May-Ostendorp, principal researcher at Xergy Consulting, which specializes in emerging technologies for energy savings in buildings. "For some, smart simply means 'We connected this thing to the network,' which adds minimal value to the consumer. In other products, smart means that there is some intelligence either built into the product or connected via the cloud that enables a taste of artificial intelligence."

Not every product using artificial intelligence is designed to save energy. In many instances, energy use is secondary to convenience or connectivity.

"Most smart devices have nothing to do with energy use, grid management or other resource conservation, like saving water," Peter says. "Generally, the benefits—dollar savings to the consumer—have not been proven, with the exception of smart thermostats, grid-connected water heaters and similar devices."

According to the Environmental Protection Agency, interest in connected or smart appliances is trending upward among consumers. Manufacturers are responding with a growing list of products.

"If you are thinking of purchasing a smart appliance or thermostat, look for one that is Energy Star-certified with connected functionality," EPA officials suggest. "Those that meet our criteria are designed to encourage interoperability and offer the following features: low energy use, energy use reporting and consumer ownership of all data."

Products available include room air conditioners, refrigerators and freezers, laundry equipment, light-bulbs and fixtures, and power strips.





Today, more than **4,000 smart devices** are available to consumers.

A recent international survey asked people how they are using smart home assistants.

65% check weather and news, and play music
6% control lighting, televisions and other appliances



While owning a smart product doesn't automatically save you energy, if you are smart about using them, they can make a significant difference in your home, according to EPA officials.

That means making the investment pay off could take lifestyle changes.

"I don't think many people want infinite control over dozens of appliances and systems in their homes," says Spencer Sator, president and CEO of Crimson Consulting, an energy-efficiency adviser. "What we really want is set-it-and-forget-it features that we don't have to actively manage. The best devices get installed, adjusted and the consumer can walk away and still potentially save some energy."

Spencer says consumers are looking for simplicity. That's feeding the popularity of virtual assistant technologies such as Amazon's Alexa and Echo, Google Assistant and Apple HomeKit. Other companies—including Samsung, Logitech and Wink—offer home-management hubs and platforms designed to help manage connected technology.

Convenience and programming simplicity are among the most important factors fueling consumer acceptance of what Spencer describes as "home ecosystem" products. Home security controls—including locks, alarm systems and lighting—are popular.

"We're seeing adoption of the technology not necessarily for energy-saving reasons, but for life-enhancing applications, including some that help elderly consumers maintain independence in their homes," Spencer says.

The challenge for consumers is deciding which features justify the investment, and how well products work together under a particular hub device or app.

"No one wants a hodge-podge of technologies that can't communicate with each other," Spencer says. "The technology isn't very smart if devices can't work together."

Command, Control and Energy Savings

Artificial intelligence is changing the way we live, and that has the potential to bring major changes to the way we use energy.

Smart home automation allows folks from all income levels to become more energy efficient. Using a platform to further tie together appliances and loads, consumers can pick and choose their preferred efficiency routes depending on their lifestyle and budgets.

According to the Consumer Technology Association, about 5.5 million units of Wi-Fi enabled devices are added to the internet each year. By 2020, the total is expected to surpass 21 billion.

That prediction has designers and manufacturers of consumer products looking for new ways to add value to products with Wi-Fi enabled features.

As artificial intelligence devices create opportunities for home automation, consumers will play larger roles in deciding how and when systems in their home are controlled.

Smart thermostats have been around for a while. Some electric utilities offer discounted smart thermostats to not only encourage consumer savings, but to help manage peak energy demand.

As the energy sources we use to generate power evolve—and management of the electric grid becomes more agile and sophisticated—the true potential of energy load control provides opportunities for more savings through wholesale power supply.

That's challenging electric utilities to find ways to strengthen partnerships with consumers who are more interested than ever in actively managing their energy use. Two-way, real-time communications and artificial intelligence offer opportunities to learn consumer preferences and how best to reduce energy during peak demand periods.

"We could soon see serial commands allowing your appliances to interact with other devices," says Keith Dennis, senior director of strategic initiatives for the National Rural Electric Cooperative Association. "Your HVAC system could learn your schedule and regulate heating and cooling for your comfort based upon when you are home. Instead of maintaining a steady supply of hot water when no one is home to use it, water could be heated during periods when demand is lowest and electricity costs less, and then boosted to ideal temperatures to meet specific needs like bathing, laundry or washing dishes."

Thus far, expectations are not being met.

"The Jetsons-like experience—where your Fitbit recognizes you're awake, tells the coffee to brew, queues up your morning news on a smart speaker, ramps up the heating setpoint—isn't really happening," Peter says. "People have thought that Alexa or Google Home might be the answer, but do we all really want to talk to our home, Star Trek style, to accomplish basic tasks?"

From a technology perspective, Spencer says, "This is still the Wild West. When you consider available options and actual performance of the devices available, some gadgets perform well and can save consumers money and energy, while others don't measure up to the hype." ■