Fact Sheet

November 2011

Demand Response and BPA

What is demand response?

Demand response (DR) is a type of energy management that involves adjusting the use of electricity to optimize the power system. It allows electricity providers and consumers to better manage how and when electricity is consumed and, in some cases, at what price. Demand response may benefit the region and/or local utility service areas by helping to level out the spikes of energy consumption during times of peak use, such as in the morning when people wake up and turn on lights and appliances. Here in the Pacific Northwest, we have a unique potential use for DR, using load control to increase the use of electricity to accommodate extra wind or hydro generation available to the BPA power system. We may also benefit from traditional load control, as used in the rest of North America, to reduce consumption during certain times of high use.

How does it work?

Demand response works by using control devices to shut off, shift the use of, or reduce the energy consumption of appliances and other equipment during a desired time frame. Several BPA pilot projects are testing the technologies and cost effectiveness of DR in the Pacific Northwest. For example, in some areas, customers can volunteer for a program in which they allow their utility to reduce the energy consumption of certain appliances, such as water heaters, clothes dryers and dishwashers, at times of the day when the demand for electricity is high. In another pilot, participants' water heaters are equipped so they can automatically turn on when a wind generator is producing power. In this pilot, sophisticated wind forecasting allows for the water heaters to be "starved" before the wind blows so they are ready to accept the wind power. The goal is for consumers to not experience inconvenience or discomfort during the DR event. Participation in these pilots is voluntary and consumers can opt out at any time.

The benefits are numerous

Demand response can be a money saver for many utilities and their consumers because it reduces the amount of energy used during peak times, potentially minimizing fees consumers pay for their peak power demand. Flattening out electricity use during peak hours can help keep rates lower for a longer period of time by reducing the need for utilities to purchase more costly market energy to meet periods of high demand. Ongoing consumer participation in DR projects also can reduce the likelihood of potential brownouts and other disruptions during periods of peak energy use.

In-home display monitors show consumers how much, and during what times, they use electricity. This can help them change their behavior to reduce consumption or use power during off-peak times.

Demand response can also defer the need for transmission and distribution system capital investments, another way that DR can save money for utilities.

For the region, DR may be able to reduce some of the pressure on the federal hydro system. Electricity use is growing, as are operational demands to protect fish runs and to integrate variable resources such as wind.

A variety of research, field test, and demonstration projects in the works

BPA is currently involved with numerous residential, commercial, public building and facility, and industrial demand response pilot projects with utilities throughout the Pacific Northwest. These projects involve a variety of technologies, objectives, and end uses such as control units on water heaters and thermostats, ceramic blocks that can be heated during off-peak times to store energy for later use, and in-home displays to show consumers how much energy they are using at what times during the day.

BPA is also sponsoring a project that includes a thermal storage component in which large industrial processes can be adjusted to shift energy use to off-peak times or when the wind is blowing. For example, the compressors and fans at cold storage facilities such as frozen fruit and vegetable warehouses can be turned off or on, depending on what the power system needs for enhanced reliability, optimized resource use, or for wind integration. Another project tests how large industrial processes can be shifted in time to be more optimal for BPA.

Using a demand response unit attached to an electric water heater can reduce energy use during peak-use times, such as in the morning when people wake up and start turning on lights and appliances.

For more information

Check out our website at *www.bpa.gov/Energy/N/Smart_Grid-Demand_Response/index.cfm* or contact the BPA Smart Grid Outreach Coordinator, Katie Pruder-Scruggs at (503) 230-3111, *kpruder@bpa.gov*.