

Fact Sheet

July 2013

Fueling the energy efficiency powerhouse

BPA and its partners put energy efficiency first, making it the region's third-largest power resource.

You can't see it, hear it or smell it, but you can count it. And one kilowatt at a time, the Bonneville Power Administration has helped build the second-biggest generator in the Northwest over the last 30 years: the energy efficiency powerhouse.

In the power industry, a kilowatt saved is equal to a kilowatt produced. If you add up all of the kilowatts saved through BPA's energy efficiency program, the capacity of the "generator" would be second only to Grand Coulee Dam — the largest power plant in the United States. Energy efficiency has become the region's third-largest resource, behind hydroelectric and coal.

By building the EE powerhouse, our region has acquired more than 1,400 average megawatts¹ of low-cost, carbon-free power. That's about one-and-a-half times the energy produced by a typical nuclear plant in a year. BPA and its public power partners avoided building other, more expensive resources, such as coal and natural gas plants that pollute the air. Through energy efficiency, we enjoy the same output — the same comforts and conveniences — with a smaller energy input.

Efficiency first

Why would the region's largest power marketer want to save energy? BPA's mission is to provide reliable power



By supporting the installation of energy efficient technologies, such as LED light bulbs, BPA stretches the value of the hydropower it markets, allowing more people to benefit from the clean, cost-effective resource.

at low rates. And energy efficiency is the most cost-effective way to meet our customers' power demands. Plus, it complements our clean power portfolio, which includes 31 hydropower projects in the Federal Columbia River Power System. Efficiency allows us to stretch the value of the hydro system, allowing more people to benefit from this clean, cost-efficient resource.

BPA started building the EE powerhouse in the late 1970s as the Northwest neared a turning point: The federal hydro system alone wouldn't be able to meet the Northwest's power needs much longer. Having just

¹ An average megawatt is a measure of energy output, equal to the output of a one-MW generator operating continuously for a year.



suffered through a foreign oil crisis, Congress passed a law in 1978 (repealed in 1987) to prohibit building new gas-fired plants. The obvious option was to build new coal or nuclear plants to meet the growing power demands. But the Northwest, accustomed to hydropower, chose an untried path.

Enter the Pacific Northwest Electric Power Planning and Conservation Act of 1980. It called on the region to do more with its existing power sources, and it put energy efficiency in the same category as all other generating resources, a radical idea at the time. The Act required BPA to take direction from the Northwest Power and Conservation Council, an organization that sets energy efficiency targets for the region, and to make cost-effective energy efficiency its first choice for meeting the region's growing power needs. Two weeks after the Act passed, BPA increased its spending on energy efficiency and hired 181 employees to embark on the mission. With no guidebook to follow, the agency cast a wide net for new ideas, paving the way for the innovative, effective programs in place today.

Along the way, the agency has followed a 20-year power plan that the Council updates every five years. The plan includes a resource strategy to guide the region's power acquisitions. In the Sixth Power Plan, released in 2010, the Council called on the region to achieve 1,200 average megawatts of energy efficiency from 2010 through 2014. The plan does not specify targets for individual utilities. Instead, it calls on BPA to work with its publicly-owned utility customers to achieve public power's share, or 504 average megawatts, of the region's total goal.

Our programs

Meeting the Council's target is a regional effort. As a wholesale power supplier, BPA does not work directly with energy consumers. Instead, we work with our utility customers to develop programs and incentives that encourage more efficient energy use in homes and businesses.

BPA has strategies to achieve energy efficiency in four sectors: residential, commercial, industrial and agricultural. Our portfolio includes turn-key programs to help our customers reduce staffing needs as well as a marketing program to help utilities promote energy efficiency to

their end-use customers. We also sponsor programs to encourage the adoption of more energy-efficient building standards and the development of more energy-efficient appliances.

Before implementation, each BPA program must meet rigorous standards to ensure it will provide a cost-effective, reliable resource. Afterward, BPA tracks and verifies the amount of energy savings that its customer utilities gain. This measurement and evaluation ensures that the region can count on the savings we report.

To help our utility customers carry out programs, BPA provides technical support and funding. Each utility's funding is proportional to the amount of federal power it purchases, so they all have a guaranteed level of funding to invest in their communities.

Finding tomorrow's technologies

The technologies on the shelf won't be enough to help us meet our long-term energy efficiency targets. That's why BPA funds the research and development of new technologies. Through the Emerging Technologies for Energy Efficiency program, known as E3T, BPA works with experts across the region to research innovations that have the greatest potential benefits.

We conduct research and demonstration projects to understand the readiness, availability, potential savings and other criteria of new technologies. Our approach includes surveys, laboratory testing, field monitoring and product demonstrations. The E3T initiative, like all of our energy-efficiency efforts, draws from a broad network of partners who provide research and other program support. These collaborations are supported by two social networking resources BPA helped develop: *E3TNW.org*, a database of information about new technologies; and Conduit, a web-based resource that facilitates information-sharing and coordination among EE professionals in the Northwest.

BPA's Office of Technology Innovation also plays an important role in the future of energy efficiency. Through the National Energy Efficiency Technology Roadmap, BPA engages a diverse group of experts across North America to determine what we should study, test and pursue next.

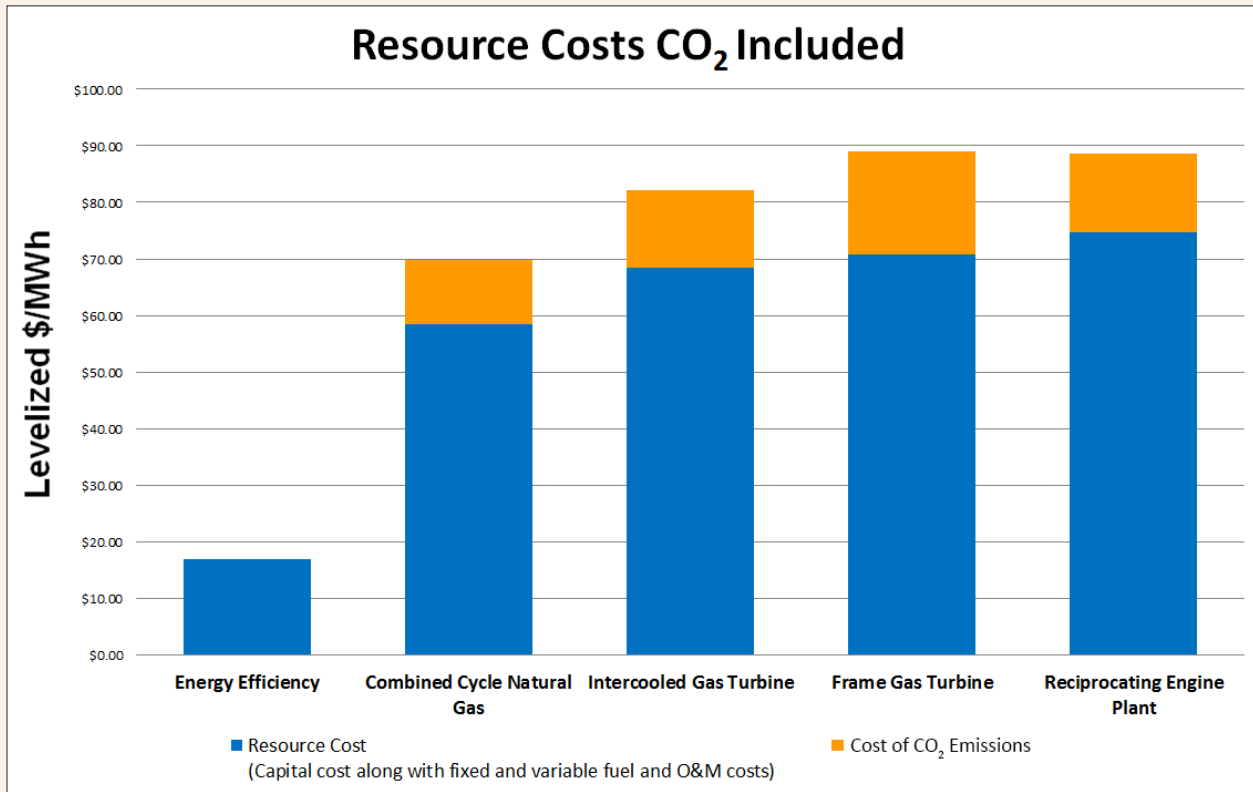
THE VALUE OF ENERGY EFFICIENCY

Cleaner air

The Northwest has the lowest intensity of greenhouse gas emissions in the country, according to the Council. More than 3,600 tons of carbon-dioxide emissions are avoided for each average megawatt of energy efficiency savings. The carbon-dioxide benefit we've achieved since 1982 is equivalent to taking nearly one million cars off the road.

Lower power bills

Energy efficiency has saved the region's energy consumers nearly \$3 billion. When you consider the costs of a power project over its lifetime, EE comes in at about \$18 per megawatt-hour, while generation from a new combined-cycle natural gas plant would cost about \$60 per megawatt-hour. Even during the recession, as the growth in power demand slowed, EE remained a wise investment, given its affordability and the region's long-term outlook for load growth.



A stronger economy

Energy efficiency saves money for the people, businesses and industries of the Northwest, allowing them to invest more in the region's economy. And more directly, implementing energy efficiency projects requires skilled labor. Our regional investment in energy efficiency supports a host of jobs in every Northwest community.

A smarter grid, more savings

Just as people are getting smarter about ways to save energy, so is the power system itself. BPA is investing in a more intelligent system, called Smart Grid. Among the many benefits of Smart Grid is the ability to make the system more efficient.

One component of Smart Grid, called demand response, uses two-way communication between the grid and consumers to improve power delivery and use. This is especially valuable to balance the output of variable resources, such as wind. Because energy can't easily be stored, reliable power systems require a constant balance of generation and consumption. BPA typically manages unexpected increases or decreases in wind generation by adjusting the output of federal dams. Alternatively, with demand response, BPA and its partners have found that they can maintain the balance by increasing or decreasing power consumption.

In a pilot project, BPA and its partners modified the use of refrigeration condensers and evaporators to adjust energy use at SnoTemp Cold Storage facilities in western Oregon. A signal sent to the warehouses simulated an increase or decrease in wind generation, representing the amount of power BPA needed to balance. The energy use at the storage facility moved up or down in response, while keeping food temperatures at acceptable levels. This was part of a larger pilot, launched in 2013, that involved other cold warehouse facilities, electric water heaters and thermal storage. It showed that the technology is feasible and can be cost effective.

Since 2009, BPA has managed a variety of demand-response pilots in the residential, commercial, industrial and irrigation sectors. Now we are scaling up our pilots to tap the potential of this budding technology. And through our technology programs, we continue to search for smarter ways to use the energy we have.

For more information about BPA's energy efficiency programs, go to www.bpa.gov/Energy/N/.



From seed to shelf, BPA's energy-efficiency programs target stages of the food production process. Top: An efficient irrigation system reduces water and energy use. Bottom: The smart refrigeration system at the SnoTemp Cold Storage facility can use more or less energy, as needed, to help balance power supply and demand.