



Fact Sheet

July 2013

Reinvesting in assets

BPA invests in federal power and transmission in the Northwest to meet power demands and keep systems performing as designed.

For more than 75 years, the Bonneville Power Administration has kept the lights on in the Pacific Northwest with energy that is both remarkably clean and affordable. We are committed to keeping those lights on for at least another 75 years and want to help people understand how we intend to do that.

The energy BPA delivers to Northwest customers is generated through U.S. Army Corps of Engineers and Bureau of Reclamation hydroelectric projects. Both the Corps and Reclamation own and operate the federal dams along the Columbia, Snake and Willamette rivers, while BPA markets the electricity they generate and owns the transmission infrastructure needed to transport that power to customer utilities. Together these are called the Federal Columbia River Power System and Federal Columbia River Transmission System.

Additionally, BPA markets the output of the Columbia Generating Station, the Northwest's only nuclear plant, which is owned and operated by Energy Northwest. BPA provides the funding to operate and maintain the 1,107-megawatt facility and in turn receives all of the power it generates.

This federal power system provides low-cost, reliable power valued at more than \$3 billion annually to the Pacific Northwest. The system is made up of 31 hydroelectric dams with an overall capacity of 22,458 megawatts. In an average water year, the system produces nearly 8,700 average megawatts.



The FCRPS also must mitigate the impacts on fish and wildlife of the construction and operation of the system for power with such infrastructure as bypass systems, fish ladders and surface passage weirs. Additionally, BPA mitigates for the impact of the system on cultural resources.

Beyond generation, BPA maintains an extensive network of 15,239 circuit miles of transmission lines, 261 substations and related transmission facilities and information technologies across six states. The Federal Columbia River Transmission System accounts for three-quarters of the high-voltage transmission in the Pacific Northwest. It is an energy highway that not only provides low-cost, reliable power to the entire region, including rural and remote



BPA transmission system and federal dams



BPA owns and operates 15,239 circuit miles of transmission lines across a six-state region that forms the backbone for delivering power from 31 federal hydroelectric dams in the Northwest. Both the Federal Columbia River Power System and Transmission System require regular and strategic investment to ensure a cost-effective level of reliability.

areas, but also allows for the sale of surplus hydropower on the West Coast.

A larger-than-life vision that endures

The Federal Columbia River Power System and BPA arose from a simple mission: Bring power to the remote, hard-scrabble lands of the Pacific Northwest to improve the economic prosperity of its people. By harnessing the sheer volume of the Columbia River in conjunction with gravity, the region could move forward with low-cost, reliable electricity and progress from the abject poverty that marked it in the early 1900s.

The federal system does more than just provide power, though. The system of federal dams provides protection that potentially spared Portland from a devastating flood in 1996. It allows for a navigation system that saw more than \$20 billion in cargo shipped and 40,000 related jobs in 2012. It provides irrigation for nearly 3 million acres of farmland producing \$2.3 billion in crops annually.

But at the heart of this crown jewel is a basic fact: Electric generation from the federal hydropower system costs substantially less than other sources, including solar, wind, gas or coal. This is a system that is incredibly low cost. Montana, Idaho,

Washington and Oregon all enjoy residential electric rates that are lower than the U.S. average.

And because of the hydroelectric system, the Pacific Northwest has carbon-dioxide emissions that are less than one-third of the national average. In fact, BPA has the lowest carbon-dioxide emissions of any utility in the country. We are the largest provider of carbon-free energy in the nation.

Managing risk to optimize performance

BPA must invest in preserving these assets to keep them performing as designed and to meet the power demands of the Northwest with continued low rates.

The simple truth is that maintenance and replacement are necessary. As equipment condition declines over time, the risk of equipment not performing as expected increases. One of BPA's most important responsibilities is to ensure the reliability of the system for the Northwest.

BPA and its federal partners seek to maintain long-term operational health and economic value of the hydropower and transmission systems, along with their related equipment, while balancing those efforts against long-term costs, benefits and risks to both the agency and the region.

To accomplish this, BPA has developed asset management strategies and a capital investment process to prioritize roughly \$9 billion in needed investments over a 10-year period to ensure system performance and reduce the risk of failure.

The asset management strategies, which are primarily focused on sustaining the existing asset base, serve to prioritize investment in those assets. The agency is also developing a capital prioritization process that is focused on investments in new assets and capabilities, known as expansion investments. This new prioritization process applies uniform analysis methods to identify the total economic value of proposed expansion investments and compares those proposed investments across business lines. The total economic value metric will be one of the key determinants used to select a portfolio of

WHAT IS THE FEDERAL COLUMBIA RIVER POWER SYSTEM?

The Federal Columbia River Power System is made up of 21 U.S. Army Corps of Engineers hydroelectric projects with a capacity of 14,651 megawatts and 10 U.S. Bureau of Reclamation projects with a capacity of 7,807 MW. The system has 212 turbine-generating units that vary in size from a 1-megawatt unit at Boise Diversion to an 805-MW unit at Grand Coulee Dam. The FCRPS accounts for about 59 percent of all U.S. federal hydro capacity and 29 percent of total U.S. national hydro capacity.

WHAT IS THE FEDERAL COLUMBIA RIVER TRANSMISSION SYSTEM?

The Federal Columbia River Transmission System is the infrastructure used to deliver the electricity generated from the FCRPS to utilities and other customers throughout the Columbia Basin and beyond. The system has 261 substations and 15,239 circuit miles of transmission lines across six states. The FCRTS, operated by BPA, accounts for three-quarters of the high-voltage transmission in the Pacific Northwest.

expansion investments that can be executed with the agency's available and limited capital resources.

The various components of the FCRPS and its transmission systems were not built to last forever — in fact, they're not even designed with the same operational life. Some pieces have a design life of a century or more, while others may be crafted with only 40 years in mind. Overall, the hydro system is approaching an equivalent average age of 50 years. Minidoka Dam, with units that went on line in 1909,

is the oldest hydroelectric plant in the system, and Bonneville Dam is the oldest federal mainstem Columbia River hydro plant, coming on line in 1938.

Nearly a quarter of all FCRPS equipment associated with the Columbia and Snake rivers has surpassed its original design life. However, our ongoing asset investments have helped us update equipment to keep delivering energy to the Northwest.

Similarly, BPA and Energy Northwest invest in the Columbia Generating Station to maintain and upgrade equipment and systems at the nuclear plant. Every year Energy Northwest issues a 10-year, long-range plan to address issues of age, wear and tear, and equipment obsolescence.

Examples included the planned replacement of almost 30-year-old main step-up transformers, replacement of obsolete electrical systems and controls, and pump and motor refurbishments or replacements.

Preventing loss and harm

Equipment failure can lead to a variety of impacts, including safety, environmental and financial problems. Safety consequences can range from a minor situation that might require the use of first aid to the outlying potential of fatalities. Environmental impacts run a similar gamut from minimal or no harm to natural resources to the possibility of catastrophic damage.

Financial considerations and risks directly correlate to the cost of replacement power for any lost generation and related damages, as well as substantial workforce inefficiencies and the purchase of replacement parts.

BPA further refines such financial impacts through evaluating the risk of lost generation, currently estimated at enough electricity to power some 295,000 residential homes per year. BPA's asset management strategy works to prudently maintain and update the system.

The following are examples of how we preserve assets and maintain their economic value for the region:

KEEPING THE ENERGY HIGHWAY OPEN

With some 4,774 miles of BPA wood pole transmission lines, this category of aging asset plays a critical role in transporting electricity at low rates to often remote areas. More than 40 percent of the lines BPA operates exceed 50 years of age, with 12 percent beyond 60 years of age.

Aside from age, many of these lines still reflect their original installation with a variety of obsolete components, including insulators, conductors, guy systems and structure types.

The most recent depreciation study, from 2010, shows that the average expected life of a wood pole is about 55 years, but this reflects wood poles replaced for all reasons, not just physical condition. In the past, our program focused on replacing wood poles older than the average expected life that had been compromised by rot or other forms of physical damage. This reactive approach allowed for acceptable line performance but also led to increasing backlogs of needed replacements as well as a risk to the reliability and availability of the wood pole system.





Grand Coulee Dam

This \$126 million program focuses on rebuilding and reconducting wood transmission lines and replacing wood pole structures to lessen the risk of line component failures that might result in unplanned outages and adverse impacts to utility customers.

PRESERVING A MODERN WONDER OF THE WORLD

The Grand Coulee Dam in Washington is the largest hydro plant in the U.S. The third power plant contains three 805-MW units that are the largest in the world. Grand Coulee generates 2,421 average megawatts during a typical water year with a total capacity of 6,765 megawatts. That hydro plant, owned and operated by the Bureau of Reclamation, has been the focus of recent and ongoing investments by BPA to ensure this workhorse of the federal system continues performing at a high level.

Since 2001, BPA has funded the replacement of 18 turbine runners that were 50 years old in the left

and right powerhouses. Not only did the state-of-the-art new runners maintain the capacity of the hydro plant, they increased the efficiency of energy generation almost 4 percent. This project, the first major investment by BPA through direct funding, was completed in 2010.

Currently, BPA is funding a Reclamation project estimated at \$275 million to overhaul the six generating units at the third power plant at Grand Coulee over the next 10 years. These generating units provide 4,500 megawatts of generation capacity — or about 18 percent of the total capacity of the entire FCRPS. Much of the generation capacity is used for contingency and balancing reserves, particularly for the integration of wind into the transmission system. Since its construction in the 1970s, little investment has been made in the third power plant and the condition of its equipment, particularly the mechanical components, has deteriorated.



Other projects under way at Grand Coulee include:

- A \$15.7 million effort to replace transformer banks in the left powerhouse that range in age from 62 to 69 years old and are rated from fair to poor condition. The completion date for this project is October 2014.
- An \$11 million project to replace power plant cranes. Cranes are critical not only to the operation of power plants but the maintenance and replacement of components as part of the larger asset management strategy. The project should be completed in 2013.
- A \$46.8 million effort to install a state-of-the-art, modular centralized control system for Grand Coulee, as well as Hungry Horse Dam in Montana, that would in part allow for real-time reservoir operations and water release data. This project is anticipated to be completed in 2016.

Projects such as these help ensure continued transmission and generation reliability for this critical piece of the FCRPS.

A LOOK AT OTHER UPCOMING PROJECTS

Here are just a few of the proposed projects for which BPA is laying the groundwork as part of its asset management strategy:

Walla Walla Reinforcement Project — BPA would construct a 115-kilovolt line between the Walla Walla and Sacajawea 115-kV substations.

Grande Ronde Wind Interconnection — This project would enable an additional 125 megawatts of wind generation.

McNary 4160 and 480V Station Service Replacement — This station service power system is the original equipment on the McNary structure, which is more than five decades old.

IT Disaster Recovery — This project would develop an independent, operating capability on the east side of the Cascade Mountains for all IT systems and processes that support essential functions (the marketing and delivering of federal hydroelectric power in a reliable manner).

A stable future for the FCRPS

Proactively addressing the issue of preserving infrastructure allows BPA to make investments at a strategic level that are timed to ensure business continuity and production capability of the Federal Columbia River Power System and the Federal Columbia River Transmission System with a cost-effective level of reliability. In turn, BPA is able to continue to offer power and transmission rates that are consistently among the lowest in the nation, ensuring both an economic and environmental edge for the Pacific Northwest.

FOR MORE INFORMATION

BPA is committed to providing external stakeholders with clear, transparent information on asset management strategy and the ongoing efforts to preserve the designed function of the FCRPS and related transmission facilities.

To find out more, visit:

www.bpa.gov/Finance/AssetMgmt/Pages/default.aspx