

# keeping

# CURRENT

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## BPA Infrastructure Projects

The Bonneville Power Administration is proposing to build a number of key infrastructure projects to improve the reliability of the Northwest transmission system and to meet the region's future power needs.

In 2001, BPA identified 20 projects needed to shore up the region's transmission system. An Infrastructure Technical Review Committee, consisting of transmission experts from Northwest utilities, evaluated the projects on economic and technical grounds to ensure the projects were necessary, properly prioritized and designed to provide cost-effective, reliable service to the region.

The committee then narrowed the initial list to focus on infrastructure improvement projects deemed critical to keeping the Northwest transmission grid operating reliably and economically. They recommended that these projects receive top priority for near-term investment and construction. Additional projects were reviewed in 2002 and one was identified as high priority. Another review will take place in 2003.

BPA's Transmission Business Line (TBL) immediately embarked on an aggressive planning process for these projects, working with landowners, tribes and regional governments throughout the decision-making process. This effort was described in BPA's March 2002 *Keeping Current* called "Infrastructure Projects: Ensuring Reliable Delivery of Power."

This edition of *Keeping Current* was created to provide infrastructure project updates and to explain critical issues facing transmission development in the region today.



## The need for new infrastructure

**D**espite significant growth in the Northwest population and economy, there has been no substantial transmission construction since 1987. Over the last 15 years, BPA has reinforced its 15,000-mile transmission system primarily with lower-cost upgrades such as voltage support devices, advanced controls and temporary measures to such a degree that the system is at risk.

Deregulation of the wholesale power industry in 1992 altered the way utilities do business. Utilities are now required to operate and manage their power and transmission systems as separate businesses, guaranteeing that all power generators have equal access to transmission. This increased the amount of transmission system transactions by nearly 5 percent a year while peak use of the electrical system increased by almost 2 percent a year. The situation is similar to a highway system that, over time, becomes congested as the amount of traffic increases beyond what it was designed to handle.

## Congested paths

Today, critical paths on the Northwest transmission grid are congested and the system is nearing or at capacity. Congested paths occur when demand for power exceeds what the transmission system can safely handle.

With increased congestion, computer models and monitoring show the grid to be less robust and harder to control after an emergency, such as a collapse of a transmission tower. Power meters now swing for extended periods following events that were once considered minor. When these swings go out of control, blackouts can occur.

Congestion is not only a risk to public safety and reliability, it reduces BPA's ability to get low-cost energy to market.

## Meeting national reliability standards

As demand for power increases, BPA's transmission system may also no longer be able to meet national and regional reliability standards. These standards prescribe how reliable the transmission grid must be. Organizations such as the North American Electric Reliability Council develop these standards with input from utilities, regulators, consumers and other interested parties to define what events BPA needs to plan for – and survive – such as collapse of a transmission line during a winter storm.

Some standards were made even more stringent after transmission outages in the summer of 1996 that began in the Northwest and led to blackouts in nine western states. Grid reinforcements help BPA meet national standards and ensure reliable service to the region. (For more information about transmission system standards, please see BPA's January 2003 *Keeping Current* called "Reliability Standards: meeting national and regional requirements for electrical system reliability.")

## Potential outages and system failures

Some parts of the Northwest transmission system are currently operating so close to the edge of reliability standards that emergency plans have been put in place. For example, if the demand for power outstrips the capacity of the transmission system, generation north and east of Spokane will be curtailed. During the coldest months, in order to ensure that a line outage does not lead to widespread blackouts, utilities in the Puget Sound area have implemented a winter curtailment plan to disconnect some consumers if an emergency occurs.

## BPA's infrastructure plan

To address these issues, BPA developed a transmission infrastructure program in 2001 that focused on:

- maintaining reliable transmission service to population centers;
- restoring or enhancing transfer capability across key paths; and
- preparing for the integration of much needed new generation when it is ready to come on line.

BPA set out an aggressive schedule to work with tribal, state and federal governments as well as local landowners to determine the location of transmission projects. A public involvement program was designed to allow interested parties to comment on and identify potential impacts of various alternatives and to ensure that the best alternative is selected.

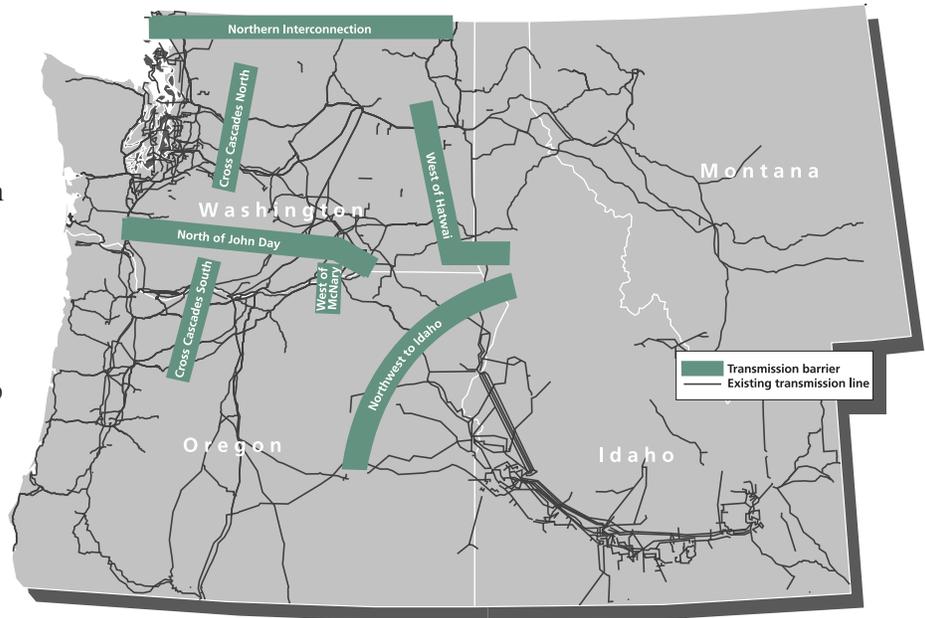
Each infrastructure project was designed to assure compliance with recently adopted national and regional reliability standards.

In 2002, the Technical Review Committee revisited the list of transmission projects, taking into account the ever-increasing need to reinforce weakened areas of the transmission grid, as well as delays in the construction of new generation due to the sluggish economy and low energy prices. The committee reinforced its earlier recommendation on the transmission projects stating that “there continues to be a compelling and immediate need to complete the projects reviewed in 2001 and to further upgrade portions of the Northwest bulk transmission grid.” The committee also emphasized the need for BPA to focus on projects critical to reliability and load service.

## Changing market forces and priorities

Power demand dropped in 2001 as a result of a slowing economy, higher retail power prices, conservation and the closing of several aluminum plants. Stagnant power prices and an inability to finance construction projects stranded many power

## Congested Paths



*This map illustrates the congested transmission paths in the Northwest.*

generation projects sited during better economic times. More than 1,000 megawatts of new generation in the Northwest has been canceled or mothballed.

Reacting to market and financial pressures, as well as BPA's budgetary constraints, TBL prioritized its infrastructure efforts to focus primarily on critical projects needed to maintain reliability. Projects proposed to provide additional, long-term firm transmission service for new generation were put on hold.

These projects will move forward once the requestors of new transmission service are able to provide up-front funding for preliminary environmental and design work and construction costs from generation developers or private third-party financiers. This approach minimizes the risk of stranded costs for BPA and its customers and is consistent with the apparent direction being taken by the Federal Energy Regulatory Commission.

Today preliminary work has been completed on a few generation-driven projects. This allows TBL to be ready to move forward on these projects once the construction financing is secured.

# Infrastructure Project Descriptions

## Projects needed for reliability

TBL identified the following as critical infrastructure projects necessary to enhance both the reliability and the availability of the Northwest transmission grid.

### Celilo Modernization Project

This project replaces the last of the original vacuum-tube mercury-arc converters at the Celilo Converter Substation with solid-state silicon-based thyristors. Celilo is the northern end of the direct-current intertie to Los Angeles. The work will maintain the DC intertie's transfer capacity at 3,100 megawatts instead of degrading it to 1,100 megawatts. If the old

converters were not replaced they could fail and reduce transfer capacity. The Los Angeles Department of Water and Power is rebuilding its Sylmar Converter Station on the southern end of the line.

The environmental review is complete on this project. Construction began in 2001 and is scheduled to be complete by June 2004.

### Schultz Series Capacitors Project

This project will help prevent voltage collapse in the Puget Sound area. Series capacitors boost voltage when it sags during periods of high demand. They are an important tool used to reinforce a transmission grid, short of building new lines. BPA has made extensive use of capacitors in the last decade. The environmental review is complete on this project. Construction is scheduled to start February 2003 and be complete November 2003.

## Infrastructure projects



## Grand Coulee-Bell Project

BPA will replace approximately 84 miles of existing 115-kilovolt wood-pole transmission line with a new, higher capacity 500-kilovolt steel lattice line. The transmission line corridor between the Grand Coulee and Bell substations currently contains two 115-kilovolt transmission lines on two wood pole structures and three 230-kilovolt transmission lines on two steel lattice structures. The existing transmission lines can not reliably move power from existing generation sources east of Spokane to the west.

The 500-kilovolt transmission line will connect BPA's Bell Substation in Spokane to the Bureau of Reclamation's Grand Coulee switchyard at Grand Coulee Dam. The new line would be located primarily on BPA right-of-way, replacing the northern-most wood pole line. The project also will involve expanding the Bell Substation and developing the Grand Coulee switchyard within the fenced area. Four public meetings were held in 2002 to receive public comments on a draft environmental impact statement (EIS).

The final EIS was released in December 2002. BPA announced its decision to proceed on this project in January 2003. Construction of the line began that month and energization is expected in November 2004.

## Schultz-Hanford Area Project

This 500-kilovolt line would be about 63 miles long and would add 600 megawatts of transfer capacity to the heart of BPA's grid in central Washington. The proposed line would connect BPA's Schultz Substation near Ellensburg to a new Wautoma Substation near the Department of Energy's Hanford Reservation. The new line would run up the middle of the Columbia River Basin, cross the Hanford Reach National Monument and the U.S. Army's Yakima Firing Range. It would ease electricity flows in the I-5 corridor and over the intertie to California and increase transmission capacity north of Hanford and allow additional power to move through this area during the spring and summer months.

The final environmental impact statement on this project will be released by February 2003. The record of decision is scheduled for the following March. If BPA decides to proceed, construction of the line could start as early as May 2003, with energization by October 2004.

## Environmental Analysis

Environmental impact statements evaluate whether or not a proposed project impacts water quality, aesthetics, land use, recreation, cultural resources, fish and wildlife, wetlands, vegetation, soil erosion, noise, social and economic effects or public health and safety.

Working with a wide range of local, state and federal agencies as well as tribes, property owners and interested community organizations, BPA's Transmission Business Line strives to identify potential environmental impacts of a project. Once an environmental analysis is complete, TBL develops a detailed plan to determine if preventative and corrective activities are needed before, during and after construction. These activities focus on preventing and minimizing impacts to the natural environment. If impacts do occur, TBL is committed to initiating restoration activities as soon as possible.

## Kangley-Echo Lake Project

The Kangley-Echo Lake Transmission Line Project is a proposed 500-kilovolt transmission line that would connect with BPA's existing Echo Lake Substation in the Maple Valley area of Washington.

The proposed line is needed to improve system reliability in Washington's King County and to enhance the return of power to Canada as required by the Columbia River Treaty. This line would partially eliminate the need for the emergency curtailment plan currently in place. Without system improvements, an outage on an existing BPA line could cause severe overloads and a loss of power in the Puget Sound area as soon as this winter and beyond. BPA considered a broad range of alternatives for this project.

BPA analyzed several transmission line routing alternatives in a supplemental draft environmental impact statement, including: routes inside and outside of the Cedar River Watershed; a no-action alternative; and non-transmission alternatives. The non-transmission alternatives study found that a high level of load reduction or additional generation is required to

defer the line. In addition, the economic value of the energy-loss savings from the line is greater than the cost of the line.

The preferred route parallels an existing BPA transmission line through the Cedar River Municipal Watershed. If BPA decides to build the new line, BPA would mitigate for any impacts to the watershed to ensure a safe drinking water supply for the Seattle area.

The supplemental draft environmental impact statement was released for a 45-day public and agency review on Jan. 14, 2003. The final EIS is scheduled for release in July 2003 and the record of decision in August 2003. If BPA decides to proceed, project construction could start as early as the end of August 2003 and be completed by December 2003. The line would be energized immediately thereafter.

### Pearl Transformer

This project adds a second 500/230-kilovolt transformer at the existing Pearl Substation to provide reliable load service to the Portland area. Without this project, a transformer outage would overload another transformer and line by the winter of 2004. Energization is planned for fall of 2003.

### Cultural Resource Preservation

Most transmission line projects span many miles and pass through diverse terrain, sometimes including Native American cultural sites and historic areas. These archaeological sites have traditional and cultural value and are often considered sacred.

BPA's Transmission Business Line works closely with tribes and state historic preservation offices to determine if proposed transmission line projects have the potential to impact cultural resources. These sites are documented during the environmental analysis phase and every effort is made to avoid and/or mitigate impacts. If cultural or historical sites are discovered, TBL follows strict procedures to preserve the sites. A BPA archaeologist also gathers additional site information and performs preservation work.

### Non-construction alternatives

In an effort to find the most cost-effective solutions to meeting the BPA's regionwide transmission needs — from an engineering, economic and environmental perspective — TBL is investigating how to effectively integrate non-construction alternatives into its transmission planning process. This wide-ranging and comprehensive approach to transmission planning is based on a study commissioned by BPA titled "Expansion of BPA Transmission Planning Capabilities: A Report on Non-Transmission Alternatives." The report was prepared by the firm Energy and Environmental Economics, with consultants Tom Foley and Eric Hirst. As part of the planning process, BPA is evaluating demand reduction initiatives, energy-efficiency programs, pricing strategies, distributed generation alternatives and other measures.

In January 2003, BPA invited key stakeholders and representatives from the four states within the BPA service area to form a Non-Construction Alternatives Round Table. The round table will:

- Provide BPA with individual insights and perspectives on key questions raised by the non-construction initiative and any potential pilot projects.
- Provide a forum for identifying and responding to key issues associated with non-construction alternatives to current transmission planning including institutional issues that go beyond BPA.
- Provide insights from a broad stakeholder base to ensure that BPA's transmission planning process is balanced.
- Provide BPA with input on expanding consideration of non-construction alternatives into BPA's regional transmission planning process.
- Build a broad base of regionwide understanding for the overall goals and results of this initiative including defining effective methods of disseminating the results of this initiative to regional utilities and other key parties.
- Help build regional confidence and acceptance for new approaches to transmission planning.
- Use any clear outcomes from this effort to update other regional planning processes.

## Olympic Peninsula Demand Exchange Pilot Project

BPA is working to contract with seven pilot participants (whole-utility aggregated or individual facilities) to exercise a demand exchange several times during the winter of 2002-2003. A demand exchange could reduce peak demand on the transmission system.

In much of the Northwest, the grid must deliver more power during extreme cold weather events. There may be industrial, commercial or even residential customers who would be willing to accept compensation to move usage to off-peak periods during cold weather events.

During emergency situations, demand reduction may be able to prevent loss of service due to overloading. Local generation would also be effective as part of a portfolio of supply and demand resources that defer certain line reinforcement projects for several years.

The Olympic Peninsula Demand Exchange Pilot Project will help BPA determine what price participants might expect, how long participants might be willing to move their loads off peak during cold weather (for example, will participants still be as willing to move loads off peak on the sixth day of cold weather as they were on the first), and how well this approach works toward meeting short duration capacity needs.

## Infrastructure projects needed for new generation

New generation is important to ensure cost-effective and reliable energy to support the region's economy. TBL identified the following transmission line projects to provide firm transmission to serve new generation. With stagnant power loads and an inability to finance construction projects, several generation plants under construction have been put on hold. Other permitted generators have not yet started construction. Preliminary work has been completed on a few

generation-driven projects. This allows TBL to be ready to move forward on these projects once financing is secured.

### McNary-John Day

This 500-kilovolt line will add about 1,200 megawatts of transfer capacity along the Columbia River from the Tri-Cities to the Rufus-John Day area. Existing lines are at capacity and many new power plants are being proposed to help meet energy needs. The new line will help integrate new gas and wind energy generated in the area. The route is mostly on the Washington side of the Columbia River on a vacant BPA right-of-way. The line will start at BPA's McNary Substation in Oregon and cross the Columbia River, with existing lines, just north of the substation into Washington.

The line will head west about 75 miles along the Columbia River running parallel to existing transmission lines, mostly within existing available rights of way, then cross the Columbia River back into Oregon at the John Day Dam and terminate at BPA's John Day Substation.

The final environmental impact statement was released February 2002 and the record of decision in October 2002. Construction is contingent upon the generation developers signing a long-term transmission agreement and is on hold until financing is secured.

### Wallula-McNary

BPA proposes to construct a 5.1-mile segment of 500-kilovolt transmission line to connect power from a 1,300-megawatt natural gas-fired combined-cycle combustion gas turbine facility (the Wallula Power Project) to a new BPA switchyard at Smith's Harbor near Wallula Junction in Walla Walla County, Wash. An additional 28-mile segment of transmission line was proposed between the Smith's Harbor switchyard and BPA's existing McNary Substation adjacent to an existing transmission line; however, this segment will not be needed for firm transfer of power from the Wallula Power Project. The project developer would construct and operate the Wallula power generation plant and associated facilities, including the makeup water supply line. BPA would design, construct and operate the 500-kilovolt transmission line and

switchyard. To supply natural gas to the plant site, a 5.9-mile pipeline interconnection would be engineered, constructed, owned and operated by PG&E Gas Transmission-Northwest.

The final environmental impact statement was released in September 2002. The record of decision will be released in February 2003. Construction is contingent on developers signing a long-term transmission agreement and is on hold until financing is secured.

### Starbuck

This 15-mile 500-kilovolt line would integrate new generation proposed at Starbuck, Wash., into the transmission grid. The project is currently on hold.

### SW Washington/NW Oregon Reinforcement

The Southwest Washington/Northwest Oregon Reinforcement 500-kilovolt Transmission Line Project would eliminate a transmission constraint by reinforcing the bulk transmission grid along portions of western Washington and northwestern Oregon. This project would create a transmission system that will be flexible enough to meet the growing demand for reliable and affordable electrical energy in Oregon and Washington. A large number of gas turbine generators proposed development in this area. Subsequently, more than 1,000 megawatts of generation under construction were put on hold. Environmental analysis will begin once developers sign agreements to fund the work. The project is currently on hold.

### Monroe-Echo Lake

This 32-mile 500-kilovolt line would increase transmission capacity in the Puget Sound area. It would integrate potential new generation in northwestern Washington, ease loading on existing lines and add changes to improve reliability.

The environmental review has not started. BPA is looking at non-construction alternatives that could defer the need for this line.

## Financing infrastructure projects

**B**PA has \$1 billion in borrowing authority remaining from an original allocation of \$3.75 billion from the U.S. Treasury. All of BPA draws upon this borrowing authority to fund programs. TBL expects it will need about \$785 million of the borrowing authority to fund work associated with crucial reliability projects in the 2003-2007 period.

BPA has requested that Congress increase the agency's borrowing authority with an additional \$700 million through 2007. To date, Congress has not approved this request. If Congress does not increase BPA's borrowing authority, TBL's ability to complete its full infrastructure program will be jeopardized.

BPA borrows funds from the U.S. Treasury. BPA recovers these costs, with interest, through the sale of transmission and power products and services. BPA's infrastructure construction program is designed to recover all costs from transmission customers.

TBL's infrastructure projects are critical to keeping the Northwest transmission grid operating reliably and economically. By prioritizing projects to address highly congested areas, TBL is providing the region with cost-effective and reliable service now and into the future.

## For more information

If you want more information about BPA's infrastructure projects, including upcoming public meetings, construction activities and energization schedules, please visit the TBL Web site at [www.transmission.bpa.gov/projects](http://www.transmission.bpa.gov/projects) or call toll-free 1-888-276-7790.

