

High-Wire Act



Wind turbines stand near transmission towers above Stonehenge Drive in Maryhill.

Photo by Mike Federman

Expanding transmission is linchpin to meeting changing power needs

By Mike Federman

The windy bluffs overlooking the Columbia River Gorge long held the promise of renewable energy. Now that this resource has been tapped, wind turbines have sprouted like rabbitbrush along the southern rim of central and eastern Klickitat County.

Turbines not only have been raised along the river, but also on rolling hills and through canyons for several miles north and south of the river in Washington and Oregon.

The Bonneville Power Administration has about 3,000 megawatts of wind power running along its transmission system. That is a nearly 2,000 MW increase in two years. To put that into perspective, Bonneville Dam, the first federal hydro project in BPA's portfolio, has a total generating capacity of just under 1,100 MW.

While the majority of wind power is produced by independent energy companies for markets in California, a few smaller wind farms are operated by public utilities, such as Klickitat PUD, which owns a share of the output from the White Creek Wind Project.

The pace of construction is not slowing. Several more wind farms are in the works.

BPA is expanding its transmission system to meet the growth of wind power. The federal agency predicts wind capacity could double by 2013, with as much as 10,000 MW of wind power on its system

by 2016, if development trends continue.

“Wind was one of the major driving forces behind requests for more transmission,” says BPA spokesman Doug Johnson.

A potential for other types of power generation, such as natural gas, also is a factor in expanding transmission, Johnson says. With BPA’s traditional energy resources of hydro and nuclear power reaching capacity, new sources of energy in the Northwest will need to be explored. Natural gas is considered one of the least expensive options and one that is quick to develop.

“We are looking at the most strategic and cost-effective way to meet future needs of utilities of all sizes that use BPA transmission lines,” Johnson says. “Anytime you expand the capacity of your network, you improve your ability to serve the needs of our preference customers.”

Balancing Requirements

BPA must address state mandates for more renewable energy, while maintaining its obligation to its customers who buy wholesale power.

BPA’s wind integration program not only assesses line expansion, but how energy producers work within the system, balancing their needs with BPA’s mission of maintaining a steady flow of electricity.

The intermittent nature of wind often creates a generation imbalance that must be met through another resource, typically hydroelectricity. Wind operators in BPA’s balancing authority pay for integration services that use hydroelectricity to balance their loads—one of the reasons California consumers pay a premium for wind power.

The integration program places more burden on wind producers to solve balancing problems.

“As this moves forward, there are pretty good measures in place so that public utilities won’t get hit with costs they shouldn’t have to bear,” Johnson says.

An agreement in 2010 with Iberdrola

Renewables compels the multinational energy company to manage its generation imbalance using nonfederal resources. Iberdrola, the largest wind producer in the Northwest, generates about 1,100 MW of wind power in the region. The Iberdrola agreement frees up 300 MW of federal power for flexible use by BPA.

While BPA’s wind integration program is in its infancy, a system where more wind operators supply their own generation imbalance would increase the availability of low-cost hydropower—a potential component of future contract negotiations with distribution utilities in the Northwest, Johnson says.

Job Creation

The federal stimulus bill paved the way for transmission projects by raising BPA’s borrowing authority by \$3.25 billion. The total amount of bonds that can be outstanding at any one time is \$7.7 billion.

The \$246-million transmission line being built between McNary and John Day dams on the Columbia is expected to create 700 construction jobs, according to BPA. The 79-mile McNary-John Day project is scheduled for completion in 2012.

In all, the agency is planning 225 miles of new transmission line. Three other projects in the planning stage must clear public input on placement and environmental reviews before construction begins.

- Big Eddy-Knight is a proposed 28-mile transmission line that would connect a substation near The Dalles with a new substation near Goldendale.
- Central Ferry-Lower Monumental is a proposed 40-mile transmission line that would start at a new substation near Pomeroy and run to Pasco.
- The I-5 Corridor Reinforcement is a proposed 70-mile transmission line between new substations in Castle Rock and Troutdale, Oregon. This would be the first new high-voltage transmission line built in the Interstate 5 corridor near Portland in 40 years. ■

America’s Electric Highway Gets a High-Tech Upgrade

The United States is linked by 300,000 miles of transmission lines, connecting 3,000 utilities to 10,000 power plants and 1 million megawatts of electricity, according to the National Rural Electric Cooperative Association.

There is a national push to repave this electric highway, with the goal of allowing electric systems to operate at peak efficiency, while giving consumers better choices for keeping bills affordable.

Through the American Recovery and Reinvestment Act, funding from the U.S. Department of Energy is being used by the Bonneville Power Administration for a smart grid project with 12 Northwest utilities to monitor the efficiency of smart appliances, smart meters, distributed generation, electric vehicles and automated distribution.

Updating the transmission grid with new technology is expected to help meet load growth and reduce demands on the hydro system, according to BPA.

Other Northwest electric cooperatives—12 members of PNGC Power—are using DOE funds to implement a smart grid project that includes installation of more than 97,000 smart meters, the first step in developing automated two-way communications with consumers.

In Arizona, Southwest Transmission Cooperative, based in Benson, is using DOE funds to add a fiber-optic communications system to its 600-plus miles of transmission that will improve the reliability and efficiency of its facilities, says Bill Riley, co-op manager of transmission, operations and maintenance.

“Fiber optics give us the ability to communicate and transfer vast amounts of data across the system,” Riley says. “We will be able to analyze changes in the system remotely and greatly reduce the amount of time of an outage.”

With greater reliability, Riley says, outage prevention will increase.