

Turning Point

Growth of wind farms yields larger harvest of clean energy

By Mike Federman

The U.S. wind energy industry expanded its generating capacity by 45 percent in 2007, bringing the nation's wind power capacity to 16,818 megawatts (MW), according to the American Wind Energy Association, an industry trade association in Washington, D.C.

Nowhere is the flurry of wind farm development more apparent than in Oregon and Washington on either side of the Mid-Columbia Gorge.

Tall bluffs and barren canyons north and south of the river are prime habitat for wind turbines, where they are near the large network of transmission towers already in place to serve The Dalles, John Day and McNary dams.

In 2007, the Bonneville Power Administration (BPA) announced that, for the first time, wind power across its transmission lines exceeded 1,000 MW, more than a 50 percent increase from 2005.

BPA predicts wind power connected to its grid could increase to 2,877 MW by the end of fiscal year 2009.

Much of the wind power generated in the Northwest is sold to utilities in California, a state that has an aggressive program to increase the use of renewables.

BPA's portfolio consists of 248 MW (65 average MW) of wind power, which it integrates with the firm hydro-power and nuclear energy it sells at cost.

Wind also is considered an environmentally preferred product. Premium funds BPA receives from utilities that offer renewable energy programs are used for research and development (64 percent), and the Bonneville Environmental Foundation (36 percent).

"We're always on the lookout for projects that are carbon neutral and make sense for our portfolio," says BPA spokesman Scott Simms. "Consumption of electricity is going up in the Northwest, and we're always looking to expand our portfolio."

One project that made sense to a coalition of four public utilities in Washington is the White Creek Wind Project, a 205-MW wind farm in eastern Klickitat County that began commercial production in November.

Although White Creek Wind I is owned by an investment group that sells the output to the four utilities, its development was initiated by the utilities as members of



The White Creek Wind Project in south-central Washington has 89 2.3 megawatt turbines. Photo by Mike Federman.

Last Mile Electric Cooperative, and is the largest public wind farm in the country.

"The goal with White Creek is to invest in renewable resources," says Greg Gallagher, power manager at Klickitat County Public Utility District (PUD), which owns a 26-percent share of the wind farm's output. "We are selling the power at market price, above our purchase agreement. We're laying it off through 2011 until we know what we will have with our BPA contract."

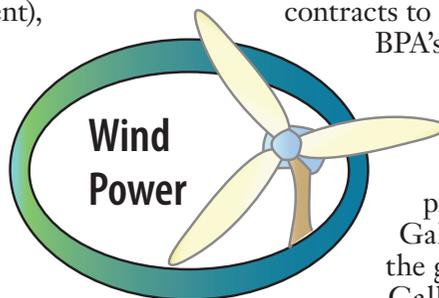
BPA and its customers are negotiating long-term contracts to replace contracts that will expire in 2011.

BPA's new rate structure will continue to provide low-cost power, but will cover load requirements based only on historical use.

"The key difference is you have to provide for load growth in the future," Gallagher says. "We want to be able to meet the growth needs of Klickitat PUD."

Gallagher says once his utility has a clear picture of its long-term contract with BPA, it will re-evaluate how it will use its share of White Creek.

Echoing that sentiment is Steve Walter, manager of Tanner Electric Cooperative, based in North Bend, Washington, which owns a 2-percent share of the White Creek output. Tanner bundled its initial load with the PUD's short-term sale until its BPA contract is complete.





Turbines In Alaska Displace Diesel

As the cost of petroleum fuel soars, power providers in Alaska have sought alternatives to diesel generation.

Wind turbine-generated electricity in five of the 53 communities served by Alaska Village Electric Cooperative (AVEC) reduced the Anchorage-based utility's diesel use in 2007 by 81,481 gallons.

One village has four 65-kilowatt (kW) turbines, two others have three 100-kW turbines each. Interties connect two more villages, with additional interties planned or under construction.

The turbines work in combination with diesel generators, which have been upgraded with sophisticated control systems to integrate the two kinds of generation.

"Our power winds are October through March," says Brent Petrie, AVEC's manager of community development. "Wind speeds are higher and the air is colder, so we get more energy from winter wind speeds. In some months, turbines have displaced more than 30 percent of the diesel that would have been used in that month."

Villages are eager to use the new technology.

"We can't do it fast enough," Petrie says.

Because some of the villages have tiny populations, with electric loads smaller than a single building in large communities, economy of scale is an obstacle to bringing more wind turbines online, Petrie says.

"We try to synchronize our projects with other construction projects in the area, where a village might need a crane, to get the best value for a wind turbine," he says.

AVEC sinks its turbines deep into the ground so nearly half the tower is underground. The area around the support structure is kept permanently frozen to match the permafrost where the tower base is embedded. This prevents destabilization when the ground shifts during the seasonal freeze/thaw cycle.

Many villages AVEC serves have a Class 4 or better wind regime, high enough to power turbines.

AVEC has used state and federal funds for its wind projects, and plans to expand its use of renewable energy.

"We're looking at the possibility of bringing wind power to as many as 34 villages," Petrie says. ■



Sunrise silhouettes one of three 100-kilowatt wind turbines in Kasigluk, Alaska. Photo by Brett Pingree, Northern Power.

"We can make a fair margin off the sale of wind power," Walter says. "We will have to make a decision whether we want to use the profits to buy Tier 2 power."

Tier 2 is a BPA term for energy purchases utilities will have to make after 2011 beyond their baseload contracts.

Tanner expects rapid growth in its service area for the next decade, Walter says, especially in commercial sales, with the addition of several large businesses, including a casino, middle school and rock quarry.

Because it does not have a service agreement, Tanner must compete for customers with investor-owned Puget Sound Energy. Having green power is a useful tool to attract new co-op members.

"The trend in the area and the nation is toward environmentally friendly power," Walter says. "White Creek sets us up differently than utilities that don't have their own generation. It gives us viable choices."

In its first eight months of operation, White Creek performed better than expected, says Bjorn Hedges, plant manager of the wind farm, which is operated by North American Energy Services.

"We're 10 percent above our predictions for total production," Hedges says, acknowledging there has been a learning curve for operating a utility-scale wind project. "There were a lot of bugs that had to be worked out, but we haven't had a turbine down for an extended time frame." ■