



# Fact Sheet

October 2010

## BPA's wind power pilots launched, working well

In June 2009, the Bonneville Power Administration committed to starting five pilot projects by October 2010 on new tools and techniques to support wind power in the transmission grid.

Today, all the tasks promised — and more — are done. As a result, BPA expects to support thousands more megawatts of wind power reliably in its transmission grid, and the robust growth of the Northwest wind fleet continues.

BPA is proud of the work its Wind Integration Team has accomplished in a very short time to increase the agency's ability to support large amounts of wind power integrated with the Northwest federal power system. We look forward to the next steps on an exciting journey to adapt the power grid to new, variable renewable power sources.

### Wind power is changing the way the grid works

BPA's primary role in supporting wind power is to provide transmission from remote wind farms to the utilities purchasing the wind power. Most Northwest wind power clusters east of the Columbia River Gorge in the heart of BPA's high-voltage transmission grid. Most — 80 percent — of the wind power connected to BPA's grid is exported to other utilities' systems, and half is exported from the Pacific Northwest. To support

this growth, BPA has developed and implemented new approaches to prioritizing new transmission line construction, providing access to transmission for more than 7,000 megawatts of additional wind generation



in the Northwest.<sup>1</sup> For more on BPA's broader efforts related to wind power, go to [www.bpa.gov/go/wind](http://www.bpa.gov/go/wind).

BPA manages wind energy as it is transmitted over BPA's grid to receiving utilities. Utilities traditionally schedule power output by the hour and control how much electricity each generator produces, but wind generation is controlled largely by nature and can vary widely and unexpectedly within an hour. BPA provides generation balancing reserve services to correct for differences between wind's scheduled and actual output inside each hour.

## WIT projects advance the state of the art

The Wind Integration Team was designed to help stretch the federal hydro system's ability to support wind power in BPA's transmission grid. The WIT projects include:

**Putting a limit on hydro reserves:** BPA built a dispatchers' tool that limits the amount of federal hydropower BPA must set aside to back wind while maintaining reliable power service. The level reflects wind projects' desire to keep costs low. When wind projects have consumed all the generation imbalance reserves they have purchased from BPA, BPA dispatch now automatically sends an electronic signal to wind plants to reduce their generation to scheduled levels. Similarly, when large decreases in scheduled wind generation deplete BPA's ability to provide balancing energy, BPA revises the wind schedules downward, and receiving utilities must make up the difference with their own resources. In the year since it went into automatic operation, this tool, Dispatchers Order 216 or DSO 216, has maintained system reliability while actually triggering less often than expected. DSO 216 has become BPA's bedrock tool for maintaining grid reliability while the wind fleet grows.

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<sup>1</sup>For an overview of BPA's broader wind power efforts, see: "[BPA's wind power efforts surge forward](#)." For BPA's transmission initiatives, including its Network Open Season approach to prioritizing new transmission line construction, see "[Network Open Season nets robust response](#)" on the open season concept, and "[Network Open Season 2010](#)" for this year's results. Look for these documents on [www.bpa.gov](http://www.bpa.gov).



*BPA's anemometer fleet lets dispatchers see where the wind is coming from, and how fast.*

**Improving wind forecasting:** BPA and the wind power community are working to improve the accuracy wind generation scheduling. Forecasting when the wind will rise or subside, by how much and how quickly is notoriously difficult, particularly in an area like the Columbia River Gorge where wind patterns are driven variously by coastal, Arctic and inland storm fronts. BPA installed a fleet of 14 anemometers from the Oregon and Washington coast to the inland Columbia Basin and has developed (and is patenting) displays so system dispatchers can literally see wind fronts coming toward and blowing through the wind power area. We are sharing these tools with wind power operators so they can see the information on their own plants. BPA has developed its own in-house wind forecasting system and, for the next year, is also purchasing two commercial wind generation forecasts. Data from all three forecasts will be used to help determine the most accurate forecasting approach.

**Giving customers a choice of reserve suppliers:** Until September 2010, wind projects located in BPA's transmission grid purchased all their generation reserves from BPA. Today, the largest wind project owner in the Columbia Basin, Iberdrola Renewables, is supplying its own generation imbalance reserves for its 1,100 megawatts of wind turbines in the basin. Iberdrola has purchased reserves from nonfederal hydropower and coal plants in Washington and is also supplying reserves from its own natural gas fired plant in southern Oregon. Offering wind power

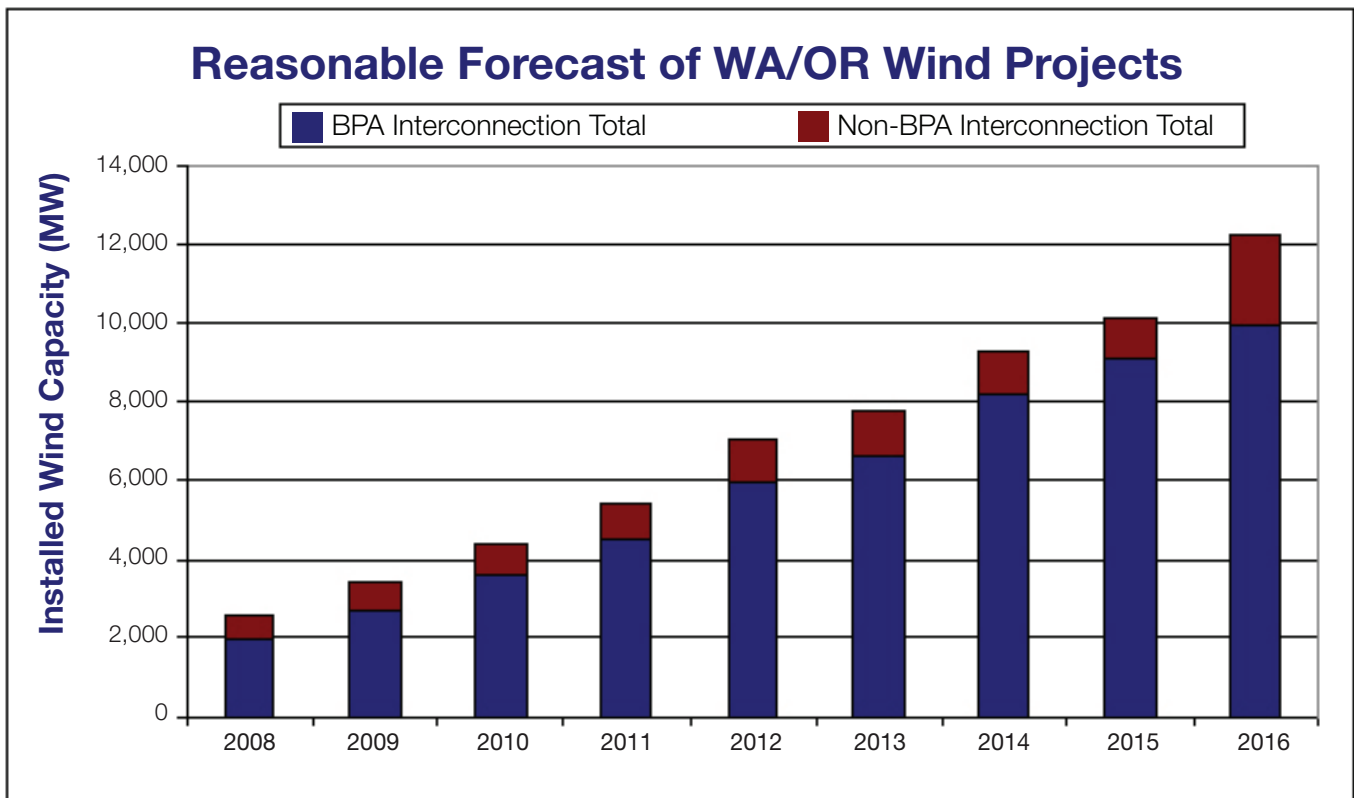
owners the opportunity to supply their own reserves from nonfederal sources reduces the amount of reserves the federal hydro system must supply, in this case, by roughly 300 megawatts.

This effort took two pilot projects. First, BPA identified transmission capability available to deliver reserve power to wind power consumers (dynamic transfer capability) and offered that capability to prospective users, including Iberdrola. This was accomplished by July 2010. Second, BPA worked with Iberdrola and its partners to develop, install and test the requisite communications and control equipment so dispatchers for all parties always know what's happening. This was completed by Sept. 1, 2010. So far, this pilot is going smoothly.

**Selling power within the hour:** Another way to reduce the difference between hourly power scheduled and actual output is to change the schedules more often. This isn't as easy as it sounds. Utilities have scheduled power by the hour since the grid was built,

and decades of automated systems are founded on that premise. By December 2009, BPA had systems in place to allow sales of wind power on the half-hour where wind overgeneration would otherwise trigger DSO-216, the reliability protocol. BPA is working with other utilities to develop common business practices for within-hour power sales and to expand use of this technique.

**Purchasing nonfederal reserves:** A sixth WIT pilot project also has been accomplished. BPA has purchased 75 megawatts of generation imbalance reserves from a Calpine Corporation natural gas fired plant in Hermiston, Ore. When wind generators overgenerate, BPA can ask Calpine to reduce its natural gas-fired generation. Calpine will then buy the excess power on BPA's system to fulfill its existing obligations to customers. The arrangement optimizes use of renewable hydro and wind power resources that do not emit carbon dioxide while conserving natural gas supplies and maintaining power system reliability.



*While the amount of wind power that will actually be developed in the Northwest remains uncertain, wind project requests for integration to BPA's transmission grid continue to grow.*

## This is just the beginning

When BPA launched its WIT work plan in June 2009, the agency had just come out of a period in which it had temporarily suspended signing contracts to integrate more wind projects in its transmission grid because it had no assurance it could support more wind power and maintain transmission system reliability.

Today, based on interconnection requests, regional experts foresee up to 12,000 megawatts of wind power operating in the Northwest transmission grid by 2016, with about 80 percent integrated to BPA transmission. The work of the Wind Integration Team over the last 16 months, in concert with utilities and the wind power community, has made it possible to begin to look forward to realizing this possibility. While this work will not alone suffice, it has gone a long way toward making this potential feasible.

Much more necessary innovation lies ahead.

BPA is now working with utilities and the wind power community across the Northwest and the broader interconnected transmission grid of the western United States, British Columbia and Alberta on consistent, effective and mutually beneficial utility practices to support variable power sources. BPA's principles in this effort are to:

- Support renewable resource development.
- Assure reliable operations.
- Avoid cost shifts — cost recovery must follow cost causation.
- Meet hydro system fish obligations.

This is a challenging and exciting time to be in the electric utility business. BPA has experienced significant success as we've delivered on the WIT initiatives to date. These initiatives have allowed us to integrate more wind onto our system quickly and reliably.

With the WIT projects of June 2009 well launched, BPA is reflecting on its next set of objectives to further the art of wind integration. In the weeks and months to come, we will lay out our round of wind integration activities, objectives and projects.

To keep abreast of BPA's ongoing wind integration initiatives, sign up for the WIT mail list. Go to [www.bpa.gov/corporate/WindPower/WIT-Contact.cfm](http://www.bpa.gov/corporate/WindPower/WIT-Contact.cfm). Send an e-mail to [BPWindIntegration@bpa.gov](mailto:BPWindIntegration@bpa.gov) or call Eric King, WIT projects manager, at 503-230-5236.

For general information on BPA's wind integration efforts, see [www.bpa.gov/corporate/WindPower/](http://www.bpa.gov/corporate/WindPower/).