



**Summary of the Upcoming**  
**BPA Wind Integration Team Work Plan 2.0**  
**November 2010**

In June 2009, BPA issued a work plan outlining six projects to improve its ability to support variable wind energy in the BPA transmission grid. BPA committed to completing specific steps on five of these projects by October 2010.

By October 2010, BPA had completed all the steps it had committed to and considerably more on all six Wind Integration Team pilot projects. BPA announced that the Wind Integration Team had completed the elements of its [2009 work plan](#).

We appreciate the sustained participation and creative contributions of the utility, wind power and public interest communities in these WIT 1 projects.

This document briefly outlines the next phase of BPA's Wind Integration Team efforts or WIT 2.0. Much of this work furthers initiatives and efforts begun in WIT 1 and builds on what we have learned in the last 18 months. The success of the WIT projects to date has made it possible for BPA to host dramatically increasing amounts of wind power in its transmission grid while maintaining transmission reliability. The WIT 2.0 projects will help sustain this positive trend as the wind resource continues its fast growth.

**A regional collaboration**

A large portion of this WIT 2.0 work goes beyond BPA. Several of the projects, rather than representing a BPA-only initiative, depend on BPA's participation in larger regional and west-wide initiatives, particularly the Joint Initiative of ColumbiaGrid, Northern Tier Transmission Grid and WestConnect regional transmission organizations.

Most WIT 2.0 projects will succeed only with active participation and collaboration by other parties. Intra-hour power scheduling, for example, works only if parties wish to buy and sell power in half-hour increments and if the terms and conditions for those sales are mutually beneficial.

We therefore are looking forward to continuing to work closely with our utilities, the wind power community and interested stakeholders. Where BPA is changing its business practices or policies, we will afford stakeholder involvement through our regular channels.

For example, we are already working with customers on refining Dynamic Transfer Capability methodologies and award cycles, and have scheduled a full-day informational workshop on the nature of DTC for interested parties on Dec. 2.



## Overview of Projects

As noted, most of the WIT 2.0 projects build on the momentum of the WIT 1 initiatives.

1. **Intra-hour Scheduling Pilot, Phase II:** BPA first scheduled power deliveries on the half hour in December 2009, when it launched its [Intra-Hour Scheduling Pilot](#). This pilot allows wind generators in BPA's balancing authority to schedule excess wind generation on the half hour. The Intra-Hour Scheduling Pilot, Phase II will expand participation in BPA's half-hour scheduling practice to include any generation for any reason. This will include schedules into, out of, through and internal to the BPA balancing authority. However, half-hour schedules will continue to be limited to nonfirm transmission. The Intra-Hour Scheduling Pilot Phase II will meet the requirements of step one in the Joint Initiative's four step intra-hour scheduling proposal.
2. **Intra-hour Transaction Accelerator Platform (ITAP):** To help facilitate intra-hour schedules, BPA and other parties in the Joint Initiative are developing an Intra-Hour Transaction Accelerator Platform. ITAP is an electronic trading platform for bilateral power sales. BPA is one of 16 utilities that are actively involved. BPA will develop systems and processes to enable it to use ITAP once launched, with the goal of allowing BPA to buy and sell power within the hour and hourly through the OATI WebExchange system.
3. **Dynamic Transfer Capability Pilot, Phase II (DTC):** In WIT 1, BPA, in collaboration with the ColumbiaGrid [Wind Integration Study Team](#), developed a methodology for identifying available dynamic transfer capability on transmission paths in its system under existing system constraints. BPA then developed and implemented a process to allocate and award this DTC to requesting utilities, resulting in Dynamic Transfer Operating Agreements that are in effect from July 2010-July 2011. Customers requested that future award periods be aligned with BPA rate periods, and we are doing so. In WIT 2.0, BPA is continuing to work with the Wind Integration Study Team to refine the methodology and to determine what hardware and software expansions are needed to increase DTC. BPA is working with its customers and the wind power community to identify and award DTC quantities available through fiscal year 2013. This includes development of needed business practices. As a subset of this project, BPA, in cooperation with other utilities, will evaluate options for implementing a Dynamic Scheduling System that has been developed by the Joint Initiative.
4. **Customer Supplied Generation Imbalance Pilot Evaluation:** In October 2010, BPA launched a one-year pilot project testing systems to allow a wind project owner to supply its own generation imbalance reserves. BPA will monitor the implementation of CSGI and evaluate the success of this CSGI pilot. The evaluation will seek to determine whether self-supply of reserves can reliably reduce BPA's reserve requirements, help to reduce costs for all parties and work well for wind project owners/operators.
5. **Third Party Supply – Decremental reserves from non-federal generation:** BPA began exploring this third-party supply concept in September 2010 with a three month purchase of 75 megawatts of decremental imbalance reserves from the Calpine Corporation. In fiscal year 2011, BPA will evaluate



the implementation of the third-party decremental reserves contract and refine BPA's criteria and processes for acquiring decremental within-hour reserves from non-federal generators.

6. **BPA Wind Power Forecasting:** To enhance its wind forecasting system, BPA has purchased one year of service from two commercial wind forecast vendors. In fiscal year 2011, BPA will establish data connections with these vendors and with wind generators and will collect additional data from wind generators to enable more accurate forecasting. BPA will make an aggregate forecast of wind in its balancing authority area publicly available through its Web site. By the end of the fiscal year, BPA will assess the benefits of the vendor forecasts and decide how to further improve the forecasting process in fiscal year 2012.

### **More innovation needed**

It is critical to sustain the forward momentum on these various initiatives. The wind resource connected to BPA's transmission grid is growing at an astonishing pace, with more than 3,000 megawatts already interconnected. WIT 1 efforts are proving successful. The region's wind fleet is working smoothly, the lights are staying on, and wind power is becoming a significant part of the Northwest energy supply.

The work that's been done in the last 18 months has enabled BPA to continue to integrate additional wind projects into its transmission grid. But, to accommodate thousands more megawatts of wind power, more innovation is needed. More than 7,000 megawatts of wind projects have requested transmission from BPA in the last three years of the agency's transmission Network Open Season.

The WIT 2.0 projects will further improve BPA's tools to adapt its system operations to reliably accommodate this flood of variable wind power with traditional dispatchable power sources in its transmission grid and with the Federal Columbia River Power System.

### **Unique challenges ahead**

Some of the challenges BPA is addressing in WIT 2.0 projects are similar to those of other areas with a high proportion of wind or solar energy such as Germany, Spain, Denmark or Texas. Like these areas, BPA must manage large swings in energy output from variable power sources while maintaining the constant balance between power output and consumption needed to keep the lights on.

BPA also faces unique challenges. Most of the wind power locating in BPA's balancing authority serves loads in other balancing areas. BPA functions only as the transmission provider, but is required to provide the within-hour balancing reserves for this generation, regardless of where it is consumed.

For the 80 percent of the wind power exported from BPA's balancing authority, there is no relationship between the generation being produced in the balancing authority area and the load being served in that area. This fact greatly increases the challenge of maintaining generation/load balance and system reliability. BPA provides balancing reserves services by taking excess wind power into its system and storing water in federal reservoirs,



or, conversely, by drawing water from reservoirs to provide power to the consuming utility that was scheduled to be provided by wind power but did not materialize.

Hydropower is exceptionally valuable in integrating wind power because its output can be increased or decreased in large quantities (100s or 1,000s of MW) very quickly (seconds). But the amount and variability of the wind resource in BPA's balancing area now exceeds the federal hydro system's ability to absorb wind power's variations under some conditions.

Compared to some of the larger systems in the United States, BPA's balancing authority area has a relatively small load of 5,000 to 7,000 megawatts served by a hydro and nuclear resource base with a firm annual energy capability of about 8,000 MW. BPA has already seen wind output comparable to more than 50 percent of its entire load within an hour, and has seen wind power output swings exceeding 2,400 MW within an hour.

The sheer scale of machine movement needed to counterbalance that much variation in within-hour output is exceeding the flexibility available from the FCRPS, given its other statutory obligations and physical limitations. In addition to BPA's load service obligations to its utility preference customers, federal hydro resources operate within numerous constraints for hydraulic reliability, flood control, fish protection and other non-power requirements. Given this volatility, the FCRPS does not have sufficient flexibility to alone provide sufficient within-hour reserves for additional wind power in its balancing authority.

The WIT 1 projects developed new forecasting tools and commercial practices to help stretch the existing flexibility of the federal system as far as possible. The WIT 1 projects established BPA's ability to enforce limits on the amount of reserves available from the federal hydropower system (Dispatchers Standing Order 216). The WIT 1 projects also added non-federal reserves (customer supplied generation imbalance and BPA third-party reserve supply) to the mix of resources providing generation imbalance services for the rapidly growing wind fleet.

WIT 2.0 projects seek to expand these tools and add more ways to provide generation imbalance services without further stressing the federal hydro system. The WIT projects are developing BPA's core technical capabilities to support and manage large amount of variable energy resources in the grid.

### **Continued stakeholder involvement**

We will keep interested parties apprised of opportunities for participation in WIT-related issues through our [WIT](#) and [Tech Forum](#) e-mail lists and through the monthly WIT Update.

Where BPA is participating in a broader regional effort such as the [Joint Initiative](#), stakeholder involvement will take place as provided by the lead organizations for those processes.



## **BPA wind work beyond WIT**

BPA's Wind Integration Team focuses on adapting power and transmission system operating tools and business practices to accommodate variable energy resources. BPA also is engaged in many other efforts that also further renewable resource development. These include but are not limited to the following:

- BPA funds research and development projects in wind forecasting and renewable energy storage.
- We recover costs of wind integration services through our wind integration rate to ensure that the costs of such services are borne by those creating the demand for the services. Equitable cost allocation is key to the future growth of wind energy.
- We have built and are building numerous substations and tap lines to tie individual wind projects into our grid.
- We are building or have proposed four major high-voltage transmission lines that will increase transmission available to carry wind and other energy from remote locations to cities across the Northwest.
- We are working with the Northwest Power Pool and others to ensure appropriate product designation and tagging designations for variable energy resources.
- We are working with the wind and utility communities to develop additional tools to manage periods when high wind and high water combine to create an oversupply of generation in the Northwest.

Links to these efforts are available on BPA's [wind power Web page](#).