



Bonneville Power Administration

Wind Integration Team Work Plan

May 22, 2009

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BPA Wind Integration Team Work Plan

In June 2008, BPA and its customers agreed to establish a Wind Integration Team to develop improved techniques to integrate large amounts of wind power and other variable renewable power sources in the BPA transmission system. A 2009 Wind Integration Rate Case Settlement laid out specific areas for the team to address.

Over the past winter, BPA has worked with its customers, the wind community and other interested parties to carry out the mandate of the Wind Integration Team. BPA is now accelerating this work. This draft BPA Wind Integration Team Work Plan lays out the specific projects with their objectives, deadlines and follow on activities BPA proposes to accomplish through the Wind Integration Team this summer through 2011.

Background

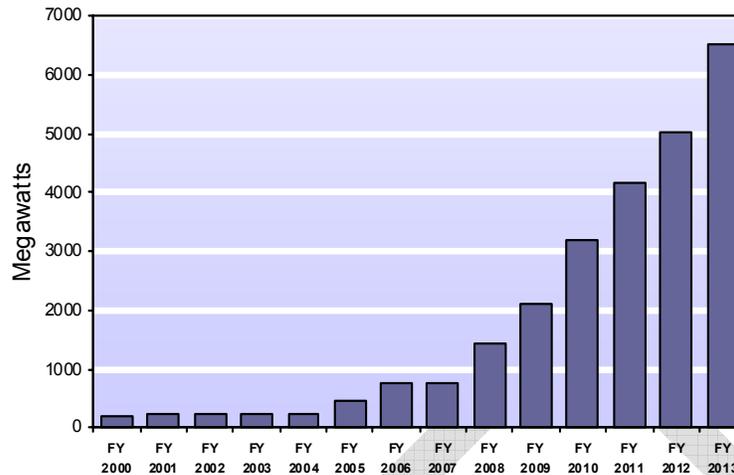
The Pacific Northwest is advantaged by a federal hydroelectric system that is a major source of carbon-free, renewable electricity. This system is now being called upon to support the growth of another source of carbon-free, renewable electricity - wind energy.

Washington and Oregon rank fifth and sixth today in wind power installed among the 50 United States. They are two of nine states in the American Wind Energy Association's "Gigawatt Club" of states with more than 1,000 megawatts of wind installed.

Oregon and Washington rank 23rd and 24th, respectively, in wind power potential of the 50 states, according to the American Wind Energy Association. Wind power's early success in the Pacific Northwest is due in part to the advantages provided by the Northwest's federal hydropower system and its transmission system.

The transmission grid built to carry power from remote hydro electric dams to Northwest cities and to California and the Southwest now also carries up to 2,000 megawatts of wind power - at peak wind power output, that's enough to serve the average power needs of Portland and Seattle.

Historical and Forecasted Wind Totals in BPA's Balancing Authority



BPA expects to have three times as much power in its transmission grid in 2013 as today.

Integrating High Levels of Variable Generation

One of the most important challenges in meeting this national goal is to improve techniques to integrate large amounts of intermittent, carbon-free renewable resources such as wind power into the transmission grid.

BPA's transmission system is a major component of the Western Interconnection, which extends from Mexico to Canada and supports long-distance transfer of electricity. This grid is carrying increasing amounts of wind power. BPA is helping meet the nation's renewable energy goals by expanding its ability to integrate large amounts of wind power in the transmission grid. BPA is:

- **Building** (and financing) transmission to physically interconnect remote renewable resources to metropolitan areas.
- **Revamping** the way BPA operates its system to allow the grid to work reliably with large amounts of variable generation.
- **Creating** new wind power-friendly business practices and institutional arrangements with other utilities across the Western Interconnection.

The work that's being done today to manage variable wind power will also help BPA and other utilities across the nation manage solar, wave and other renewable power sources whose output is controlled by Mother Nature, as those resources also come on line in large quantities.

BPA has interconnected 21 wind projects into its transmission grid. We have built five substations and six tap lines to do so, with more in the works.

In addition to physical project integrations, BPA has developed three innovative new mechanisms to increase available transmission capacity, so that more wind projects can get their wind power to market. These include:

1) New transmission service without new construction.

Last year BPA conducted a first-of-its-kind Network Open Season to sort out a complicated queue of service requests from customers seeking access to BPA's transmission system. The Network Open Season obtained financial commitments and signed service agreements that allowed BPA to conduct system engineering studies to determine what service could be provided from the existing capacity of the transmission system, as well as what service required new infrastructure. We found that we could provide service for 1,780 megawatts of new service without major construction, simply by withdrawing from the queue those not ready to commit to taking service. Of the more than 6,000 megawatts of new power projects that requested service through the Network Open Season, more than 4,700 megawatts are wind power projects. The 2009 Network Open Season is now in progress.

2) Greater use of existing transmission capacity.

In March 2009, BPA began offering Conditional Firm transmission service to another 1,200 megawatts of new service requests. Conditional Firm service provides transmission with the potential for a small amount of interruption if transmission becomes congested. This product has appeal for some of our customers, particularly wind generators. BPA helped develop the concept of Conditional Firm service earlier in this decade and the idea has been picked up nation-wide. We expect to make additional offers of Conditional Firm service on an interim basis in the future.

3) New transmission construction financed

After completing system engineering studies that allowed greater use of existing transmission capacity, we conducted financial analysis of the construction costs for the remaining service requests we evaluated in the Network Open Season. We are preparing to offer transmission service with four new transmission lines and one system upgrade for 3,700 megawatts, almost 2,800 of which will come from renewable, non-carbon-emitting generation. Three of these projects are about to undergo environmental analyses; but one is shovel-ready, the environmental review having been completed in 2002.

That project is a 500-kilovolt transmission line from McNary Dam to John Day Dam along the Columbia River in Washington and Oregon. With the assurance of additional borrowing authority with the Treasury that Congress has just provided, BPA is confident it can move forward with these projects. The agency has announced construction of the 79-mile, McNary-John Day line that will deliver more than 700 megawatts of wind energy across BPA's transmission system.

Implementing the Northwest Wind Integration Action Plan

In 2007, BPA and the Northwest Power and Conservation Council completed an Action Plan that confirmed that adding 6,000 megawatts of wind generation in the Northwest by 2020 is technically feasible. The unexpected speed of wind's actual development has put a priority on resolving the technical issues the Council and BPA identified to realize this goal.

In the not-quite two years since completion of the Northwest Wind Integration Action Plan, BPA and other entities in the region together have made considerable progress on most of the 16 Action Plan items, including the Network Open Season, Conditional Firm Transmission Service, and financing new transmission construction for wind and other new resources.

Status of the 16 Recommended Actions of Northwest Wind Integration Action Plan

- **Action 1 - Assess the peaking capacity value of wind power:** Through the Pacific Northwest Resource Adequacy Forum, the region reevaluated the capacity value of NW wind resources.
- **Action 2 - Refine assessments of the cost and availability of existing wind integration capability:** In the current 2010-2011 power and transmission services rate case, BPA refined its study methodology and estimates of wind integration costs.
- **Action 3 - Develop wind resource data:** BPA and the National Renewable Energy Laboratory funded development of a high resolution wind data set for Northwest wind resources.
- **Actions 4 and 5 - Develop and apply transmission planning methodologies:** ColumbiaGrid and Northern Tier Transmission group have established the Wind Integration Study Team (WIST). One of the issues the WIST is looking at is developing a planning methodology that takes into account the cost of transmission capacity and the value of delivered wind energy.
- **Action 6 - Remove regulatory barriers to more efficient use of transmission for wind and other renewable resource development:** The Northwest Wind Integration Forum convened Northwest regulators to discuss regulatory barriers to greater use of non-firm transmission service.
- **Action 7 - Greater utilization of the transmission system:** BPA implemented a re-dispatch pilot project and is in making offers totaling 1,200 megawatts of Conditional Firm Transmission Service. This re-dispatch project used non-Federal and Federal generation to relieve transmission congestion.
- **Action 8 - Planning for expansion of transmission capacity on BPA's system:** BPA completed its WECC Regional Planning Project Review process for the West of McNary and I-5 Corridor projects through ColumbiaGrid, a sub-regional transmission planning entity.
- **Action 9 - Financing expansion of transmission capacity on BPA's system:** BPA developed and implemented its first Network Open Season which resulted in moving forward on a billion dollars of new transmission investment and beginning of construction of the McNary-John Day 500 kilovolt line, which will enable at least 900 MW of new wind generation and strengthen linkages to other renewable resource areas in Idaho and

Montana. The added assurance of the additional U.S. Treasury Borrowing Authority gave us the confidence to move forward with this project and initiate planning and design for three others. The success of the Network Open Season demonstrated the utility of this new financing model for regional utilities to use.

- **Action 10 - Planning for expanded capability for delivering wind power from Montana and other isolated wind resource areas:** BPA is actively engaged in planning studies with Montana and other Northwest Parties on the Colstrip expansion which is geared towards tapping wind resources in Montana.
- **Action 11: Evaluate benefits of a regional wind forecasting network:** The Wind Integration Forum held initial discussions on a regional wind forecaster, however there was not a strong interest in testing a centralized forecasting effort. BPA's Wind Integration Team began its work on this proposal in fall 2008 and discussions are underway with the wind community on how to implement short-term persistence forecasting in order to reduce the magnitude of the increase in BPA's 2010-2011 wind integration rate.
- **Action 12: Implement ACE diversity interchange:** BPA has joined a number of other Northwest utilities in implementing the Area Control Error (ACE) Diversity Interchange, with the purpose of facilitating integration into the transmission system of more intermittent renewable resources.
- **Action 13 - Reduce barriers to marketing system flexibility:** BPA, ColumbiaGrid, Northern Tier Transmission Group (NTTG), and WestConnect - subregional transmission planning entities - have initiated the Joint Initiative, which is addressing dynamic scheduling and intra-hour schedule changes to further facilitate renewable generation integration. BPA is also working with the WIST to determine the evaluation criteria, necessary requirements, and to establish a credible, repeatable, and timely methodology to allow dynamic scheduling in BPA's network system and interties.
- **Action 14.a - Assess options for augmenting system flexibility:** The Council is preparing a resource flexibility assessment for its Sixth Power Plan. BPA's Technology Innovation R&D Program is also committed to exploring promising system flexibility options on both the supply and demand side. BPA's 2009 Draft Resource Program will address amounts and types of resources BPA will need to add to its resource supply to meet its contractual requirements, including resources that meet capacity and system flexibility needs.
- **Action 14.b - Assess tradeoffs between competing uses of system flexibility:** The Council has expanded the capability of its GENESYS system reliability model to model hourly wind project output. With hourly wind modeling capability available, the Council plans to assess the impact of increasing wind penetration on system performance.
- **Action 15 - Develop a planning framework for maximizing the value of wind energy.** The Council is working hard to factor in the many different dimensions of the wind integration question into its 6th Power Plan. The Council expects to release its draft plan in July.
- **Action 16 - Establish a Wind Integration Forum:** In April 2007, the Wind Integration Forum was chartered as an advisory committee of the Council for a two-year period. Two meetings of the Steering Committee has occurred since inception. The Core Analytical Team/Technical Work Group has met in May 2007, July 2007 and January 2008.

Implementing the 2009 Wind Integration Rate Case Settlement Agreement

BPA first established a rate for wind integration within-hour balancing services in fiscal year 2009. A settlement agreement between BPA and parties to this rate case calls for creation of the Wind Integration Team. Following is a list of specific actions discussed in the settlement agreement, as specified in the [FY2009 Wind Integration Rate Case Record of Decision](#), together with a *brief update* on work accomplished to date in each of these areas.

1. **Develop processes and procedures for managing the BPA Balancing Authority's requirements for generation inputs for reserves,**
Dispatchers Standing Order 216 is specifically designed to achieve this. During the past winter, BPA worked closely with regional stakeholders to adopt reliability protocols for wind and other variable generators to allow additional Large Generator Interconnection Agreements (LGIAs) to be signed. The protocols are to be fully defined in DSO-216. This will allow BPA to ensure reliability and to potentially mitigate capacity requirements for managing generation imbalance
2. **Identify new sources of such generation inputs.**
BPA issued a Request for Information in 2008 seeking information on potential generation inputs. Based on information from this RFI, BPA has defined the criteria and process for procuring generation inputs for wind balancing from non-Federal entities, and will initiate a pilot in October 2009. BPA is also proposing to offer a self-supply pilot in fall of 2010. Improved dynamic scheduling capabilities will be necessary in order to make use of some sources of potential generation inputs.
3. **Reduce the demand on the existing capacity of the FCRPS to provide such generation inputs.**
DSO-216 will limit demand on the FCRPS to assigned reserves. The reliability protocols limit the amount of reserves that BPA will carry, and put the responsibility of forecasting and scheduling wind generation, with sufficient accuracy to meet the standard, on the wind project owners. The level of accuracy required is being established in the 2010-11 rate case.
4. **Acquire cost-effective capacity resources to meet BPA's firm power obligations and its need for generation inputs to provide reserves."**
The Preliminary Needs Assessment in BPA's Resource Program identified capacity resources as a primary need. BPA will address types and amounts of needed capacity in its Draft Resource Program this fall.

Under the Settlement Agreement, the Wind Integration Team also is to address several general areas, including:

5. **Wind forecasting**
 - *BPA is currently sponsoring a number of research and development projects on aspects of wind forecasting.*
 - *We are developing a synthetic 20-year wind record by developing a model of wind generation based on 2006-2008 actual wind generation in the balancing authority and back-cast against actual weather records.*
 - *We are installing 16 meteorological stations on our system. This work will be complete by October 2009. Data will be available to the wind community as well as to BPA dispatchers.*

6. Reserves allocation:

BPA has developed and refined an allocation methodology for reserves which is now being used in the FY 2010-2011 Rate Case. In this rate case, BPA refined its study methodology to identify the type of each reserve needed to integrate wind generation.

7. Third-party supply of generation inputs to the BPA balancing authority

As noted above, BPA issued a Request for Information on third-party resources in 2008 and will launch pilot projects this fall.

8. Dynamic Scheduling

BPA is working with ColumbiaGrid to determine the evaluation criteria and necessary requirements to establish a credible, repeatable, and timely methodology to allow dynamic scheduling in BPA's network system and interties.

BPA is also participating in the Joint Initiative effort to develop the Dynamic Scheduling System (DSS), which is intended to be used to implement dynamic schedules between any number of BAs at any scheduling periodicity.

9. ACE (Area Control Error) diversity exchange.

BPA has joined a number of other Northwest utilities in implementing the Area Control Error Diversity Interchange

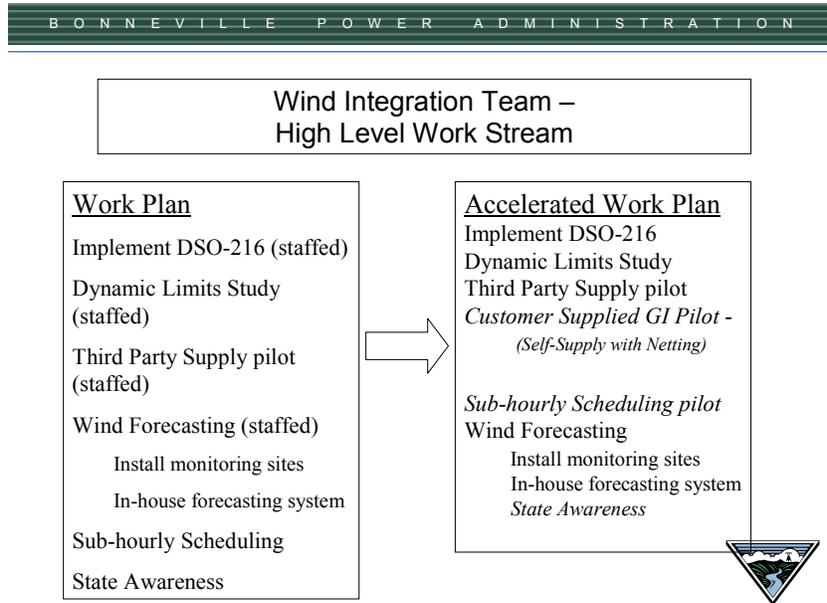
10. BPA also agreed that, in its Resource Program, it would assess the capacity of the federal system available to meet all of BPA's present and future capacity obligations.

This has been achieved in the Preliminary Needs Assessment for BPA's 2009 Resource Program, issued in March 2009. The Draft 2009 Resource Program that will be issued this fall for public review will include a Needs Assessment revised to reflect more current data and BPA's response to public comments on the preliminary draft.

11. Finally, the parties to the Settlement Agreement that own or operate wind generators in the BPA Balancing Authority Area agreed to make a good faith effort to supply certain data related to the output of their wind generators, while BPA agreed to certain confidentiality restrictions regarding the data."

Accelerated BPA Wind Work Plan Wind Integration Team Projects and Deadlines

Given the importance of wind integration to the region's utilities and national energy priorities, BPA is accelerating the work of the Wind Integration Team. We had previously identified six to seven focal areas for WIT projects. These have been refined. For those who have been following WIT activities, here is a crosswalk:



For each of the six project areas, this draft work plan lays out:

- Project description
- An assessment of expected project benefits and impacts.
- Technical requirements such as computer model and system improvements.
- Business needs such as staff training and business practice development.

Definitions of technical terms are provided in a glossary at the end of this document.

Benefit and Impact Assessment

	Bonneville Power Admin.	Customer	Region
Benefit	<ul style="list-style-type: none"> Dispatchers have a corrective control for cases where reserves have been exhausted Allows BPA to continue signing LGIA with interconnectors of variable generators Provides incentive and a transparent signal to variable generators for better forecasting by variable generators Reduces reserve obligation by providing alternative means for mitigating extreme wind variations 	<ul style="list-style-type: none"> Allows BPA to offer lower wind integration rates for 2010/2011 by reducing reserve obligation and providing alternative means of mitigating extreme wind variations Allows BPA to continue signing LGIA with interconnectors of variable generators 	<ul style="list-style-type: none"> Allows for more renewable energy production in the region and reduces CO2 Allows BPA to continue signing LGIA with interconnectors of variable generators Provides additional jobs and stimulates the region's economy Provides an avenue for further collaboration on system planning and system operations Provides an avenue for BPA to be the lead in connecting and managing vast fleet of renewable energy Mitigates potential adverse impacts of the Clean Water Act and BiOp
Impact	<ul style="list-style-type: none"> Increased workload for system operators and hydro schedulers Political pressure if and when BPA exercises limiting and curtailment Risk of violating CPS1 and CPS2 if sufficient redundancy procedures and automation operates at primary and back-up control centers 	<ul style="list-style-type: none"> Potential loss of the production tax credits when directed to limit Impacts perception of product firmness when firm power sales are curtailed Variable generation may need to be tagged as firm contingent in the future 	<ul style="list-style-type: none"> May require other balancing authorities to deploy reserves within hour integration requirements

Resource Needs - Technical

Skills	Knowledge
<ul style="list-style-type: none"> • Systems Analysis/Requirements Development • Information Technology Development and Implementation • Testing/QA 	<ul style="list-style-type: none"> • BA operations • EMS system design and operation (AGC, SCADA etc.) • Hydro Operations • EMS system design and operation (AGC, SCADA etc.) • Scheduling (e-tag, ancillary services, OATI)

Resource Needs - Business Development

Skills	Knowledge
<ul style="list-style-type: none"> • Training Development and Delivery • Policy Development • Business Practice/DSO Development • Communications (Change Management) 	<ul style="list-style-type: none"> • BA operations • Business Practices • EMS system design and operation (AGC, SCADA etc.) • Hydro Operations • Policy • Scheduling (e-tag, ancillary services, OATI)

Dynamic Limits Study

Project Lead: Brian Tuck

Milestone: 02/15/2010

Project Description

The purpose of this project is to determine the evaluation criteria, necessary requirements, and establish a credible, repeatable, and timely methodology to allow dynamic scheduling in BPA's network system and interties. This project does not identify dynamic limits of any particular generator, load nor implement dynamic scheduling. Limits on selected paths will be identified.

Assumptions:

- This project does not identify dynamic limits of any particular generator, load nor implement dynamic scheduling.

Benefit and Impact Assessment

	Bonneville Power Admin.	Customer	Region
Benefit	<ul style="list-style-type: none"> • Result of the study will enable shifting of the reserve obligations to other balancing authorities by allowing dynamic schedules • Provides a repeatable and predictable processes for evaluating dynamic scheduling requests • Identifies transmission system enhancements to support additional dynamic scheduling • Potential enhancement of the ATC calculations for hourly operations 	<ul style="list-style-type: none"> • Enables shifting of the reserve obligations to other balancing authorities (PGE, Puget, PAC) by implementing dynamic schedules • Potential enhancement of ATC calculations for hourly operations • Compliance with FERC Order 890-B (the transmission provider is obligated to provide generator imbalance service if it is able to acquire resources to do so. If the transmission provider is unable to provide or procure GI services, the transmission provider must accept the use of dynamic scheduling... (paragraph 39)). 	<ul style="list-style-type: none"> • Provide operating controls for the planned Dynamic Scheduling System (DSS) • Potential enhancement of ATC calculations for hourly operations
Impact	<ul style="list-style-type: none"> • Shifts from a pseudo-static system (movement only of load and regulation) to a fully dynamic system (movement of load, generation, schedules, etc.) • Cultural shift within our study methodologies 	<ul style="list-style-type: none"> • Study result may be more limiting than the current methodology 	<ul style="list-style-type: none"> • Study result may be more limiting than the current methodology

Resource Needs - Technical

Skills	Knowledge
<ul style="list-style-type: none"> • System Modeling (Power Flow, Transient Stability, etc.) 	<ul style="list-style-type: none"> • BA operations

Resource Needs - Business Development

Skills	Knowledge
<ul style="list-style-type: none"> • Policy Development • Business Practice/DSO Development • Communications (Change Management) 	<ul style="list-style-type: none"> • BA operations • EMS system design and operation (AGC, SCADA etc.) • Scheduling (e-tag, ancillary services, OATI) • Business Practices

Third-Party Supply Pilot - RFI Implementation

(Balancing Area Reserve Augmentation)

Project Lead: Kasi Beale

Milestones:

11/2009: Implement pilot stage 1

3/2010: Evaluate pilot stage 1, decide whether to implement stage 2 other generators (subject to dynamic limit studies)

Project Description

The team goal is to define criteria and processes for third party supply and establish a pilot project in early FY 2010 to test access to non-FCRPS generating resources for balancing reserves. In Stage 1, the pilot project will acquire and deploy additional load following and regulation capacity from two non-FCRPS generators, in exchange for a payment. The objectives of Stage 1 are to test automation systems, assess costs and assess capability to offset FCRPS reserves. During testing, we are assuming that third-party supply would not result in reduction of FCRPS capacity reserved by BPA-TS. However, in later stages, implementation of third party supply would be expected to more directly offset FCRPS reserve requirements. In Stage 2 the goal is to expand to Pilot to include additional providers, including sources outside the BPA BA. BPA will focus first on developing operational third party supply from generation sources, and then in later stages demand side sources may be tested.

Assumptions:

- The pilot process is intended to ensure BPA is ready to implement third-party supply at the start of the 2012 rate period when it is estimated additional balancing reserves may be needed.
- Third party supply differs from self supply in that the generator is responding directly to BPA's AGC signal, where in self-supply-netting the non-FCRPS generator is responding only to signals from the netted generators.
- Third party supply will help subliminate the BA's reserve obligation and self supply covers a portion of the generators imbalance obligation, offsetting the portion of the BA capacity requirement for imbalance for the netted generators.
- Potential pilot participants are limited until the dynamic study limits are established.
- BPA reserves requirements are expected to exceed the FCRPS ability in 2012.
- Cross agency team role: Coordinate implementation and evaluate pilot effectiveness of non-FCRPS resources. Meet requirements of Key Agency Target.
- Power Services Role: In coordination with cross agency team, acquire balancing resources from the RFI list and identify the required systems to integrate the balancing resources with FCRPS pool.
- Transmission Services Role: In coordination with cross agency team, implement system infrastructure requirements.
- Initiation depends on implementation of AGC changes to enable signaling and deployment of third party supply.

Benefit and Impact Assessment

	Bonneville Power Admin.	Customer	Region
Benefit	<ul style="list-style-type: none"> • Test technical and procurement process/procedures for implementing non-FCRPS balancing resources • Experience economic and operational impacts of deploying non-FCRPS resources 	<ul style="list-style-type: none"> • Participating customers will have experience with economic and operational impacts of deploying non-FCRPS supply. Customers will know the effectiveness of the service • Customers providing third party supply are likely to receive higher trade-off value against FCRPS balancing. 	<ul style="list-style-type: none"> • Potentially encourages collaborative solutions for balancing resources • May provide additional transparency of information for future integration of variable resources
Impact	<ul style="list-style-type: none"> • AGC systems would have to be extended to include non-FCRPS generators 	<p>Customers have visibility to cost of alternative sources of balancing service</p> <p>Customers have opportunity to sell balancing service to BPA</p>	

Progress to date:

- RFI issued in August '08
- 18 responses: 11 generation, 3 demand, 2 other, 2 general comments.
- Budget of \$5 million per year established in TS rates.
- PS proposal review completed December; top 5 identified.
- Project was delayed during Dec. - March due to lack of staff and focus of available staff on LGIA and rate case.
- TS limited pilot Stage 1 to two generators
- Initial evaluation criteria and process were completed in January.
- Testing use of demand response is postponed to a later stage.

Forecasting

Project Lead: Steve Barton

Milestones:

10/01/2009: Sites

01/31/2010: In-house forecasting

03/01/2010: State awareness

Project Description

The purpose of this project is to improve BPA's ability to forecast wind power generation, and to develop and deploy tools for dispatch and hydro duty schedules to achieve greater understanding and awareness of wind generation patterns and operational risks.

Deliverables for this effort are:

- Install up to 16 additional surface observation sites
- Develop in-house wind generation forecasting capabilities
- Develop and deploy a wind “dashboard” for BPA Dispatch and hydro Duty Scheduler

Assumptions:

- The information from the surface observation sites will be available to the public and also used in BPA's forecasting process.
- Ongoing maintenance on the observation sites will be funded through the Renewables budget.
- The wind generation forecast will be used for internal operations and planning. There are no plans to share the wind generation forecast with outside entities at this time.
- This effort meets requirements of both Power and Transmission Services. It is assumed that Transmission Services will “own” the process once it is fully implemented, with SOC compliant deliverables to Power Services under the prevailing SOC interpretation.
- The wind generation forecast product is expected to be a vendor-based solution (with appropriate customization) to which BPA would subscribe.

Benefit and Impact Assessment

	Bonneville Power Admin.	Customer	Region
Benefit	<ul style="list-style-type: none"> BPA is currently blind as to the expected generation from wind facilities within the BA beyond one hour. It is anticipated that our ability to intelligently set up the FCRPS resources to deploy reserves based on accurate and timely information will reduce the overall cost of those reserves, resulting in lower rates. Accurate information would allow operators to adequately assess the FCRPS reserve capability and requirements, minimizing any anticipated conflict between reserve requirements and other power and non-power requirements. Planning staff would be able to have wind generation estimates based on expected meteorological conditions rather than simple averages. This will more accurately reflect the disposition of the required hydro generation and residual load requirement. Also, expected transmission usage and potential congestion issues would be more accurately estimated, yielding a more efficient use of the transmission system 	<p>Customers will be able to utilize surface observation data to improve their schedules and reduce reserve burden on the BPA BA.</p> <p>Benefits to BPA may result in more efficient deployment of reserves, reducing the cost of such reserves, thereby reducing rates.</p>	<p>Surface observation data will be available publicly to support regional efforts and research as it pertains to wind generation.</p>
Impact	<p>Additional IT systems and displays are likely to be necessary.</p> <p>The new surface observation sites will require TMS resources to install and maintain.</p> <p>Staff resources will be required to integrate forecast information into other BPA systems (e.g. LORA, AGC, etc.)</p> <p>Some workload increase will occur to manage the forecast information and data flow.</p>	<p>Continued funding of the forecast service may have a rate impact.</p>	<p>Continued funding of the forecast service may have a rate impact.</p>

Resource Needs - Technical

Skills	Knowledge
<ul style="list-style-type: none"> • Planning (especially pilot projects) • System Modeling (Power Flow, Transient Stability etc.) • Systems Analysis/Requirements Development • Information Technology • Development and Implementation • Testing/QA 	<ul style="list-style-type: none"> • BA operations • EMS system design and operation (AGC, SCADA etc.) • Reservations (Sales, OASIS) • Scheduling (e-tag, ancillary services, OATI) • Settlements

Resource Needs - Business Development

Skills	Knowledge
<ul style="list-style-type: none"> • Policy Development • Business Practice/DSO Development • Communications (Change Management) 	<ul style="list-style-type: none"> • BA operations • EMS system design and operation (AGC, SCADA etc.) • Scheduling (e-tag, ancillary services, OATI) • Business Practices

Customer Supplied Generation Imbalance Pilot (Self-Supply with Netting)

Project Lead: Salah Kitali

Milestone: 10/01/2010

Project Description

The purpose of this project is to begin the development of systems and processes that would enable customers to self supply generation imbalance, from their own resources or contract resources, for one or more wind generators. All of the generators, customer owned and contracted, will be netted for the purposes of calculating Generation Imbalance (GI), wind limits and e-Tag curtailments. If given a limit order, the customer will have the option of which resources to limit; including thermal and contract resources. The generator owner/operator, not BPA, will deploy reserves needed for imbalance of its resources.

Assumptions:

- Customer supplied generation imbalance does not provide regulating reserves.
- DSO216 would need to be revisited for potential enhancements to accommodate customer supplied generation imbalance.
- The Joint Initiative Dynamic Scheduling System (DSS) will be implemented in BPA's AGC and base point displays to enable management of dynamic schedules in real-time (DSS will be implemented 3/2010).

Benefit and Impact Assessment

	Bonneville Power Admin.	Customer	Region
Benefit	<ul style="list-style-type: none"> • Reduces reserves held • Reduced revenue from wind integration rate 	<ul style="list-style-type: none"> • Potential lower amount paid for reserves to BPA • Provides more control for ensuring production tax credits • Mitigates impacts of DSO216 • May lower wind integration rate • May avoid failure to comply and/or international deviation penalties (especially in 2010/2011 rates schedules) 	<ul style="list-style-type: none"> • Lowers the amount of reserves needed • Potential to stimulate ancillary services market • May lower wind integration rate
Impact	<ul style="list-style-type: none"> • Significant system modifications for implementation (AGC, Scheduling, Billing) • Significant modifications to business practices and policies • BPA remains provider of last resort 	<ul style="list-style-type: none"> • May require purchase of reserves at market rate which may be higher or lower than BPA's rate • May require purchase of additional transmission rights 	

Resource Needs - Technical

Skills	Knowledge
<ul style="list-style-type: none"> • Planning (especially pilot projects) • Systems Analysis/Requirements Development • System Modeling (Power Flow, Transient Stability etc.) • Information Technology Development and Implementation • Testing/QA 	<ul style="list-style-type: none"> • BA operations • Reservations (Sales, OASIS) • Scheduling (e-tag, ancillary services, OATI) • Settlements • EMS system design and operation (AGC, SCADA etc.)

Resource Needs - Business Development

Skills	Knowledge
<ul style="list-style-type: none"> • Training Development and Delivery • Policy Development • Business Practice/DSO Development • Communications (Change Management) 	<ul style="list-style-type: none"> • BA operations • Business Practices • EMS system design and operation (AGC, SCADA etc.) • Policy • Reservations (Sales, OASIS) • Scheduling (e-tag, ancillary services, OATI) • Settlements

Sub-Hourly Scheduling Pilot

Project Lead: Troy Simpson

Milestone: 12/01/2009

Project Description

The purpose of this pilot is to begin the development of systems and processes that would enable purchasing/selling entities to acquire Wind generation (on the half hour) that would have been susceptible to limit directives that are part of the DSO216 implementation.

Assumptions:

- Pilot does not reduce BPA’s reserves obligation or provide unlimited mid-hour scheduling of resources.
- Pilot will require bi-lateral participation.
- Full implementation of sub-hourly scheduling will require establishment of an hourly ATC methodology.

Benefit and Impact Assessment

	Bonneville Power Admin.	Customer	Region
Benefit	<ul style="list-style-type: none"> • Informs BPA of potential reduction to reserve needs • Informs BPA on system and process needs • May reduce reserves deployed 	<ul style="list-style-type: none"> • Potential revenue increase • Mitigates impacts of DSO216 • Enables customers to better match their load and resource obligations within the operating hour to minimize their contribution to generation imbalance • May avoid failure to comply and/or intentional deviation penalties (especially in 2010/2011 rates schedules) 	<ul style="list-style-type: none"> • Informs potential to stimulate imbalance market and offload ancillary service market
Impact	<ul style="list-style-type: none"> • Increases scheduling and dispatcher workload (controller total and base point adjustments) • Requires modifications to business practices, scheduling procedures and bulletins • May require a new transmission product • RODS may not be adequate 	<ul style="list-style-type: none"> • Increase in scheduling workload 	

Resource Needs - Technical

Skills	Knowledge
<ul style="list-style-type: none"> • Planning (especially pilot projects) • System Modeling (Power Flow, Transient Stability etc.) • Systems Analysis/Requirements Development • Information Technology Development and Implementation • Testing/QA 	<ul style="list-style-type: none"> • BA operations • EMS system design and operation (AGC, SCADA etc.) • Reservations (Sales, OASIS) • Scheduling (e-tag, ancillary services, OATI) • Settlements • Hydro Operations

Resource Needs - Business Development

Skills	Knowledge
<ul style="list-style-type: none"> • Training Development and Delivery • Policy Development • Business Practice/DSO Development • Communications (Change Management) 	<ul style="list-style-type: none"> • BA operations • Business Practices • EMS system design and operation (AGC, SCADA etc.) • Policy • Reservations (Sales, OASIS) • Scheduling (e-tag, ancillary services, OATI) • Settlements • Hydro Operations • Business Practices

Appendix

Definition of Terms

Balancing Area Reserve Augmentation (Third-Party Supply) is the provision of Balancing Reserves from a source other than the FCRPS in exchange for BPA payment for the service. Because 3rd Party Supply is providing Balancing Reserves the resources are available to BPA to meet BA balancing needs.

Balancing Reserves include incremental and decremental generation flexibility or demand response that is connected to BPA's AGC system and is capable of responding to signals requesting Regulation Service and Within-hour Following Service in proportion to the AGC signal requirements. Balancing Reserves can be provided from BPA generation, 3rd Party Supply sources or Self Supply sources.

Dynamic Scheduling is implemented as an interchange transaction that is modified in real-time to transfer time-varying amounts of power between balancing authorities. A dynamic schedule typically does not change a balancing authority's jurisdiction; that is, the native balancing authority continues to exercise operational jurisdiction over, and provides basic balancing authority services to, the dynamically scheduled resources.

Dynamic schedules are to be accounted for as interchange schedules by the source, sink, and contract intermediary balancing authority(s), both in their respective ACE equations, and throughout all of their energy accounting processes. Requirement to incorporate into the contract intermediary balancing authority's ACE is subject to regional procedures.

Generation Imbalance is the capability to fill in the difference between the actual generation output as measured on 10 minute intervals and the scheduled output.

Load Following Service or Within-Hour Following Service can be in response to physical changes in generation and load within the hour or due to scheduling errors that result in imbalance. All Load Following must respond to 100% of the needs within the ten minute window.

Regulation Service is the capability to balance against the moment to moment movement of generators or loads on a four-second signal cycle. Currently, regulation service and within hour following service are provided from the FCRPS as a joint service as referenced in BPA's OATT as regulation and frequency response service.

Self Supply includes a party other than BPA acquiring provision of Balancing Reserves from a source other than the FCRPS. Self Supply can be in the form of either:

1. Provision of Regulation Service and/or Within-hour following Service from a source other than the FCRPS in order to avoid the capacity charge associated with Wind Integration Service. When 3rd Party Supply is providing Regulation Service and/or Within-hour following Service the resource needs to be available to the BA to meet BA balancing needs, and need to be capable of responding to signals requesting Regulation Service and Within-hour Following Service in proportion to BPA's AGC signal requirements.
2. Provision of Generation Imbalance from a source other than the FCRPS in order to avoid the capacity charge associated with Wind Integration Service. When 3rd Party Supply is providing Generation Imbalance the resource is used to fill in the difference between the actual generation output as measured on 10 minute intervals and the scheduled output, and may be deployed by the party that acquired the Generation Imbalance service.

Third Party Supply - Provision of Regulation Service and/or Within-hour following Service from a source other than the FCRPS in exchange for a payment for the service. Because 3rd Party Supply is providing Balancing Reserves the resources are available to the BA to meet BA balancing needs, and are capable of responding to signals requesting Regulation Service and Within-hour Following Service in proportion to BPA's AGC signal requirements.

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Wind Initiative Dependency Flow

