Northwest Power and Conservation Council

December 2, 2010

MEMORANDUM

TO: Council Members

FROM: Ken Dragoon

SUBJECT: Northwest Wind Integration Action Plan Status Update

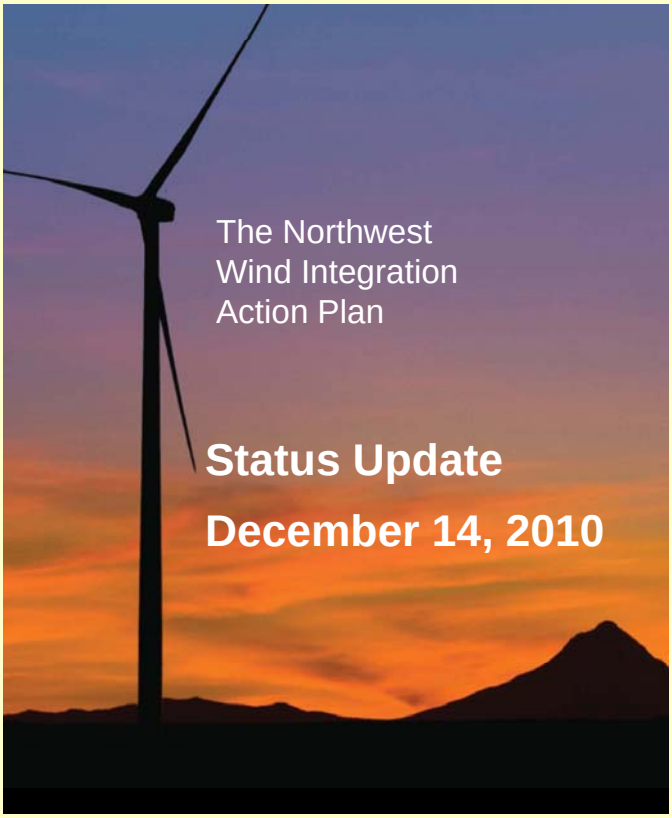
Bonneville Power Administration Vice President for Corporate Strategy Elliot Mainzer will review the status of action items under the Northwest Wind Integration Action Plan (NWIAP). Published in March 2007, NWIAP was itself an action item (8A) in the Fifth Power Plan. It was developed by regional leaders and technical staff to address concerns raised over the rapid development of wind power in the region. Chief among the concerns at that time was the ability of the power system to absorb the relatively variable and less predictable nature of wind resources. Finding no technical impediments to reaching 6,000 megawatts of wind in the region, NWIAP developed 16 actions to facilitate the economic and efficient development of wind resources.

Mr. Mainzer will review the substantial progress on action items to date and outline plans and considerations for upcoming work.

851 S.W. Sixth Avenue, Suite 1100
Portland, Oregon 97204-1348
www.nwcouncil.org

Steve Crow
Executive Director

503-222-5161
800-452-5161
Fax: 503-820-2370



Overview

- Entities participating in wind integration issues
- Understanding wind generation
- Broaden sources of balancing services (GEN-4 & 6, BPA-3 of 6th Plan)
- Reduce demand for balancing services (GEN-3 of 6th Plan)
- Transmission
- Where do we go from here?

Entities

FERC – Regulates key interstate aspects of the electric power, natural gas, oil pipeline , and hydroelectric industries.

NERC - Ensures the reliability of the North American bulk power system.

WECC - Coordinates and promotes bulk electric system reliability in the Western Interconnection.

NWPCC - Develops and maintains a regional power plan and a fish and wildlife program to balance the Northwest's environment and energy needs.

NWPP – Serves as a forum in the electrical industry for reliability and operational adequacy issues in the Northwest - houses the reserve sharing program, Operating Committee, the Transmission Planning Committee, and the Coordination Group.

Joint Initiative (Made up of ColumbiaGrid, NTTG, and West Connect) - Coordinates the development of common business practices and tools.

Understanding Characteristics of Wind Generation

- Determining the Sustained Capacity Value of Wind Generation for Capacity Adequacy
  - The Northwest Resource Adequacy Forum modified its original 15% value to 5% based on historical data review. The Forum is currently working on refinement of this estimate using improved modeling and data.
- Determining the Energy Value of Wind Generation for Resource Adequacy
  - The Northwest Resource Adequacy Forum is currently using historical annual average wind generation, which is about 30%. The Forum is currently working on refinement of this estimate using improved modeling and data.
- Estimating the Cost of Integrating Wind Generation
  - Utilities around the region have undertaken wind integration studies
    - BPA is on its third wind integration analysis for rates.
    - Puget Sound Energy refiled a wind integration analysis with FERC. (Proposal was rejected.)
    - Idaho Power is revisiting its first wind integration study originally undertaken in a QF proceeding.
    - NorthWestern Energy is finalizing its second round of wind reserve requirement analysis.
    - PacifiCorp has undertaken several analyses since 2003.
    - Avista has performed a wind integration study in a QF proceeding.
    - PGE is revisiting its first wind integration study.

Understanding Characteristics of Wind Generation (cont.)

Actions Taken to Advance Region's Ability to Forecast Wind Generation:

- USDOE funds were used to contract with 3Tier to develop:
  - a high-resolution (1 arc-minute) wind speed data set for the west over the historical 2004-2006 record, and
  - A process to simulate wind generation at roughly 30,000 potential wind sites across the region.
- BPA has installed 14 new wind measurement stations and makes the data available to the wind community.
- BPA is developing internal wind generation forecasting capabilities and will make its forecast available to the public.
- Regional utilities developed better estimates of their individual benefits of improved forecasting. BPA funded initial research on wind-ramp forecasting improvements.
- The region is exploring alternative wind integration billing determinants to better leverage market-based improvements in wind scheduling.

Broaden Sources of Balancing Services

- The WSPP group has developed two new standardized capacity products to increase liquidity in the market for capacity services.
- Ace Diversity interchange Pilot - multiple regional parties have joined ADI.
  - Some technical issues related to compliance have materialized at WECC resulting in temporary program suspension.
    - At this time BPA has not resumed participation in the ADI Pilot.
- Reliability-based Control Protocol (RBC) – Frequency based ACE Limit
  - A number of utilities, including BPA, are participating in the WECC pilot for RBC.
  - RBC results in similar benefits as the ACE Diversity interchange Pilot.

Broaden Sources of Balancing Services (cont.)

- BPA has initiated a pilot in which wind parties acquire generation imbalance from nonfederal generation sources (Customer Supplied Generation Imbalance (CSGI))
  - Iberdrola is *self-supplying* their own Generation Imbalance Service.
- BPA has initiated a pilot in which BPA is purchasing DEC reserves from a non-federal generator
  - BPA has contracted with Calpine Corporation for 75 megawatts of decremental imbalance reserves.
- BPA has teamed with a number of utilities on Demand Response pilot projects involving loads with storage capability and ability to respond as reserve dispatch units.
  - Consistent with DR-2 of the Northwest 6th Power Plan

Reduce Demand for Balancing Reserves

- The Joint Initiative (ColumbiaGrid/NTTG/West Connect) has coordinated the development of common business practices and tools. These tools include:
  - Intra-hour transmission scheduling
    - Shorter scheduling periods reduce the Balancing Reserve need
  - Intra-Hour Transaction Accelerator Platform (ITAP)
    - Platform to facilitate intra-hour sales of energy
  - Dynamic Scheduling System (DSS).
    - Platform to facilitate Dynamic Scheduling
- Several utilities are participating in intra-hour scheduling pilots, and broader implementation is scheduled for 2011.
- This is an extremely important development for the Pacific Northwest and has been a model for regional coordination as recently highlighted by FERC in its new NOPR on Variable Energy Resources.

Reduce Demand for Balancing Reserves (cont.)

- Wind parties committed in BPA's 2010-2011 rate period to schedule at, or better, than a 30 min persistence accuracy level.
- FERC's new NOPR contains requirement for 15 minute intra-hour scheduling – evaluation is needed.
- Evaluate opportunities use wind generation diversity to lower balancing reserve demand by delivering wind energy from isolated areas:
  - WECC TEPPC and ColumbiaGrid WIST have completed similar analysis to address remote versus local wind economics.
  - Additional work is needed to reconcile the results of the two studies.
- Broad regional discussion (at Power Pool, Joint Initiative and WECC) are taking place on additional potential steps in regional market design reform.

Transmission Availability for Wind Generation

- The 6th Power Plan and the ColumbiaGrid Wind Integration Study Team have evaluated the tradeoffs between wind busbar costs and transmission expansion.
- Transmission Utilization Group evaluation of utilization of COI.
- Four State Regulatory Policies
  - OPUC Commissioner John Savage convened session on this topic in 2008. It was determined that there were no fundamental regulatory barriers to the use of redispatch, non-firm or conditional firm transmission. Commercial risk aversion was the larger barrier.
- Conditional Firm Transmission Service
  - FERC now requires Conditional Firm transmission service as part of its *pro-forma* tariff.
  - BPA has made over 900 MW of CF service offers.
- BPA administered a pilot redispatch project in 2008.

Transmission Availability for Wind Generation (Cont.)

- Northwest 500-kV Transmission Projects
  - McNary-John Day is being constructed.
  - Big Eddy – Knight, Central Ferry – Lower Monumental, is being permitted as a result of BPA's Network Open Season Process.
  - The route for the I-5 is going through a significant public process.
  - BPA is studying cross-Cascades transmission reinforcement.
  - PGE is in advanced planning stages for the Cascades Crossing transmission project.

- Financing Market-driven Transmission Improvements
  - BPA Network Open Season (NOS) model was a direct response to this action item. It resulted in the full subscription, financing and construction of the West of McNary line.
  - ColumbiaGrid Wind Integration Study Team (WIST) has started a technical evaluation of system constraints on the increased use of dynamic scheduling.

Council Actions and Forums

Northwest Wind Integration Forum

- NWIF was established and meets as necessary

Northwest 6th Power Plan Council actions:

- GEN-5: Assess adequacy of system flexibility (Council via Resource Adequacy Forum)
- GEN-6: Evaluate flexibility augmentation options (Council action)

Conclusions/Discussion

- The region has made significant progress on wind energy data and analytics, development of alternatives to federal hydro for system flexibility and the creation of business practices for intra-hour scheduling. And let's not forget that the region as a whole already has over 6,000 MW of wind – this is a major accomplishment for the Northwest!

- That said, there is additional work to do to ensure that the intra-hour market functions effectively, to continue to expand access to non-federal balancing capability, to push the envelope on wind forecasting and keep an eye on longer-term market design alternatives.

- And there remain major unfinished challenges related to transmission, in particular the issue of geographic diversity, dynamic transfer, RECs, and the impact of California resource development on the Northwest.

- We have now witnessed the transition from 0 – 6,000 MW of wind in the Northwest. The next major round of development will likely require new ideas and new tools and even greater regional collaboration and coordination.