

Transmission Update

June 2010

Summary

- ✓ Welcome to the Twenty-Eighth National Wind Coordinating Collaborative (NWCC) Transmission Update! Kevin Porter of Exeter Associates, Inc. led the June 15, 2010, Transmission Update conference call. As always, this written brief is being distributed after the call to conference call participants, other NWCC members and participants, and to interested NWCC observers.
- ✓ This update features a discussion of concerns being raised in the Pacific Northwest about increasing amounts of wind power being contracted for utilities from outside the region, with delivery through renewable energy credits, not necessarily with power.
- ✓ Jeff King of the Northwest Power and Conservation Council, Doug Marker of the Bonneville Power Administration, and Ken Dragoon of the Renewables Northwest Project joined the call for the discussion.

Discussion of Northwest Wind Power Development Issues

Background and Concerns

Wind in the Northwest (Washington, Oregon, Idaho, and Montana excluding the Midwest Reliability Organization) has grown from 25 MW in 1998 to a forecasted 5300 MW in-service by the end of 2010. Wind power represents the fourth largest amount of generating capacity in the region, accounting for about 16% of the region-wide peak hourly load. Only hydropower, natural gas, and coal have greater installed capacity.

Mr. King stated that roughly 70% of the Northwest's wind capacity is within the Bonneville Power Administration's (BPA's) balancing authority, thanks to existing transmission infrastructure located close to areas with good quality wind power resources. The bulk of the wind power is clustered east of the Columbia River gorge, which effectively funnels the storms from the Southwest, creating good wind conditions to the east. Pacific storm fronts tend to drive wind in this region, contributing to large and rapid wind ramping events that are associated with geographically concentrated development. Mr. King noted that BPA has one of the highest levels of penetration in terms of installed wind capacity in the United States, and it is possible that in a couple of years interconnected wind capacity may exceed minimum load in BPA.

Mr. King explained that there are several concerns stemming from wind power

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development in the Pacific Northwest, though there is not any solid analysis and documentation of the issues to date. Also, Mr. King clarified that wind development issues affect regions and market participants differently, so some concerns may actually be considered benefits depending on an entity's role in the market.

California renewable portfolio standard (RPS) policies, which the state is considering raising from 20% by 2010 to 33% by 2020, increasingly drive demand for wind power in the Northwest. Of the wind power development in the Northwest, a growing proportion is being contracted to California utilities, where the primary concern is obtaining the renewable energy credits (RECs) to meet state RPS goals. In California, energy is required to be delivered within the calendar year, and not simultaneously with the REC. Therefore, for a number of projects, the RECs are partially unbundled from the energy, though Mr. King stated that the RECs are essentially fully unbundled in terms of the effect on energy delivery. The actual wind energy enters the market in the Northwest. The Northwest is operating under hydropower constraints that, at times of high wind generation, require power to be sold under a negative price. Mr. King explained that over the last several years there have been increasing episodes of negative pricing. This has been for the sole purpose of purging the power to allow BPA to pass enough water through hydro turbines to meet minimum flow requirements and to avoid exceeding the dissolved gas requirement, which can occur when excess water is released over the spillways. This leads to the depression of wholesale market prices and is possibly increasing price volatility in the region. Mr. King stated that the price depression can be seen in a positive or negative light, depending on the market participant. A hydro-heavy utility selling surplus hydro power to the secondary market would have reduced secondary revenues, and therefore depressed and/or volatile wholesale market prices would be cause for concern. A resource-short utility primarily buying from the market may consider depressed prices to be a benefit. However, generally this has been occurring in hydro-heavy times of year, rather than peak load time periods, so any benefit produced for resource-short utilities would be minimal.

Another issue is the increasing frequency and duration of overgeneration episodes. These lead to negative pricing and increased wind curtailment, negatively impacting California. If the Northwest is impacted by an overgeneration episode and wind power is curtailed, no RECs will be generated, resulting in less RECs for California utilities to use to meet their RPS requirements.

Also of concern is the potential for costs of balancing services in the Northwest to increase as hydropower sources become exhausted. The Northwest hydro system had a surplus of balancing capability, which allowed for a significant amount of wind to be developed without the need for new thermal balancing resources. The surplus hydro balancing capability will soon be fully engaged, which means additional resources for balancing will be needed through either additional

hydroelectric resources or thermal balancing resources, both of which would create costs to the Northwest.

Mr. King stated that there is also concern that accessible wind for Northwest utilities is declining in quality but increasing in cost, with the higher quality wind being shipped to California. Mr. King pointed out, however, that there are strategies being employed to circumvent this issue (e.g. utilities developing wind in advance of their need, and selling the RECs to California only until the RECs are needed to meet the local RPS). An additional concern, however, is that some resource dispatch in the Northwest market is economically inefficient. Mr. King explained that what is considered 'inefficient' is subjective, but detailed, for example, how certain wind resources benefit from government-provided financial incentives that lower the dispatch costs to a level below other resources. This could cause resources to be taken offline, even if that resource's dispatch costs are actually lower were the incentives not provided to wind.

The RNP Perspective

Mr. Dragoon began by noting that roughly half of BPA wind power is supplied to California, and a significant portion of the rest is supplied to areas outside the BPA balancing area. Because of this, data indicating that interconnected wind capacity may soon exceed minimum load in BPA can be misleading. To the extent that generation on minimum load hours is accurately forecast, the load will remain unaffected by the surplus wind power. BPA does, however, assume additional responsibility to the degree that there is forecast error. There are a number of efforts being undertaken to manage this. BPA uses Dispatchers' Standing Order 216 when the reserves set aside for wind are exceeded due to scheduling error within that hour. In these instances, orders are sent to wind generators to limit their generation, or, if the wind power is ramping down too rapidly, schedules are cut.

Mr. Dragoon also addressed the view that the hydro system capabilities for balancing wind power are being exhausted. He noted that hydro power has its own variability to contend with and at times may not always be the best provider of regulatory services, but there are many positive initiatives taking place to address the concern of an overtaxed hydro system. One effort involves attempting to increase the ability to trade between balancing areas and within hours. There is currently an intra-hour trading pilot with trading on the half hour, though Mr. Dragoon noted that only increases to the schedules were permitted. This is useful when wind ramps up, but less so when wind ramps down. Intra-hour trading is an area that can be expanded, and interest in doing so has been expressed within the region. In addition to this option, the ability to load control has not been explored. Grant applications have been submitted to BPA regarding load control pilots. Of particular interest is the possibility of tapping into the electric water heater load that tends to come on and off at random.

Finally, Mr. Dragoon noted that he did not believe that California's requirement for energy to be delivered within the calendar year, and not simultaneously with the REC, was synonymous with an unbundled REC. Provided the energy is required to be delivered within the year and from the same market that generated the REC, it is possible to be flexible.

**The BPA
Perspective**

Mr. Marker explained that California has an RPS that requires that load-serving entities obtain 20% of their retail sales from renewable resources by the end of 2010, but there is significant political support to increase the standard to 33% by 2020. One of the debates about complying with the California RPS revolves around California's flexible rules for electricity delivery from out of state. Mr. Marker stated that the policies allow for delivery of energy matching the REC within one calendar year of the REC delivery, and also allow for flexibility on where that delivered energy can be generated. This is a concern for California, as there is a perception that utilities are satisfying their RPS requirements with RECs that do not result in incremental increases in clean energy being delivered to the state. In addition, California residents do not receive the benefits of renewable resource generation, including improved air quality and green energy job creation.

Mr. Marker noted that the wind power interconnecting to BPA's system has grown rapidly, but he cautioned that this trajectory may not continue. Currently, California is securing RECs and wind resources from the Northwest because siting wind is faster and less expensive in that region, coupled with pressure to meet the 2010 California RPS goals. California would like to produce more wind generation in-state in the future, however, making assumptions uncertain about how much the demand for Northwest wind power will be driven by California.

The California Public Utilities Commission (CPUC) is considering regulations on the rules for delivery of renewable energy generation and the use of RECs. On May 12, 2010, BPA submitted post-workshop reply comments in Rulemaking 06-02-012 and Rulemaking 08-08-009 discussing the issues being faced in the Northwest. In them, BPA urged the CPUC to limit the use of unbundled RECs, with an exception for renewable resources that are helping to meet the challenges placed on the host balancing authority in providing variable renewable energy resources. BPA also suggested limiting the timeline between energy generation and incremental delivery of the renewable resource, but did not suggest a specific time frame. Mr. Marker explained, though, that a shorter time span would be considered an improvement. BPA also reiterated to the CPUC a recommendation made by BPA in its comments on the Federal Energy Regulatory Commission's Notice Of Inquiry regarding Integration of Variable Energy Resources (Docket No. RM10-11-000), to implement a requirement that generating resources may only qualify for RECs if they filed a plan with the host balancing services for how the balancing services will be provided. BPA also asked the CPUC to support the

California utilities and the California ISO in working with BPA to increase the utilization of the existing interties for both physical delivery and balancing services. The interties between California and the Northwest are fully subscribed on a firm basis, but there is often capacity available to use on a non-firm basis, which BPA would like to explore how to utilize more. Also recommended is the creation of incentives through the REC qualification process for the development of new flexibility options to limit the need for curtailment of out-of-state variable energy resources. Finally, BPA stated that it would like to work with California to explore ways to expand the transmission capacity between the Northwest and California and explore financial incentives to improve transmission capability and balancing services.

Mr. Marker stated that while it was unusual for BPA to provide suggestions on a California docket, it was important to discuss the concerns of the Northwest and provide some broader context to the discussions occurring in California. He stated that BPA and California will need to work together, and more analysis will need to be conducted to determine the extent of some of the discussed issues.

Discussion

A caller asked Mr. Marker to expand on the idea of recognizing system benefits to the local balancing authority where renewables might be located. Mr. Marker explained that the general principle is to have recipients of the renewable energy have an interest in seeing that balancing services are properly provided and that they financially share in the provision of the balancing services toward the variable renewable energy.

A caller referenced a passage in the BPA comments to the CPUC, which reads:

“BPA suggests that in designing the renewable portfolio standards, policymakers should give greater consideration to developing mechanisms and incentives to maximize the capacity value of renewable energy resources and increased utilization of existing new transmission lines. This could include greater deployment of energy storage and contract mechanisms that reward resources with higher correlations to peak load.”

(BPA, Post-Workshop Reply Comments, R. 06-02-012 and R. 08-08-009, pg. 9)

The caller asked if BPA has proposals on the specifics of this reward system for resources with higher correlations to peak load – if they would receive extra credits, etc. Mr. Marker replied that it is highly theoretical right now, but explained that the idea is founded in the quality of RECs from different hours. RECs do not distinguish the worth of the megawatt-hours generated in terms of quality, though a MWh generated at a time of low load is not equivalent to a MWh generated at a time of high load. Of additional concern to BPA is that the RPS requirements, which are a significant driver of energy policy in the West, are being set at the state level and disregard what happens in neighboring states.

A caller asked who the Northwest looks to when raising questions at a regional level. Mr. Marker responded that the Northwest Power and Conservation Council

provides analysis of these issues, and BPA develops its resource plans to be consistent with the Council's. In the Northwest, however, the Council's plan calls for the majority of new load to be met with energy efficiency, meaning wind is not necessarily being developed to meet the Council's resource plan. The Northwest region looks to the governors concerning regional issues as well, as they will generally coordinate with each other. Mr. Marker noted, however, that the governors have been primarily working through the Western Climate Initiative which focuses on greenhouse gas goals rather than renewable energy development. BPA is also engaged with state legislatures and state PUCs, though it is highly fragmented.

A caller asked about the overall economic balance stemming from California buying RECs, given that the money being provided is driving costs down while the increased integration costs are driving them up. Mr. Marker stated that BPA aims to support renewable development and to ensure the customers are no worse off. When asked if the negative prices were a benefit for customers, Mr. Marker stated that they were not for BPA, if they are in the market. Mr. Dragoon explained that the concern was over wholesale prices significantly dropping, which could be a benefit or a detriment depending on who is involved and if it was a net buyer or a net seller into the market. BPA is a large seller of energy from the hydro system, making negative prices less desirable. Mr. Dragoon stated that the extent of the issue and its full effects are unknown and could benefit from further analysis.

A caller asked if the concerns raised in this discussion could be alleviated if more transmission capability were built into California. The caller was told that the concerns would be lessened if that were to take place. Mr. Marker pointed out that renewable energy projects and transmission can be difficult to site in California. BPA is building a 500 kV line and has three more being analyzed under the Natural Environmental Policy Act, with one of these placed in a populated area and facing public opposition.

A caller asked Mr. King if the Northwest Power and Conservation Council was doing analysis on the issues raised in this discussion. Mr. King replied that it is working on pieces of them, and is currently producing a brief paper that will describe these issues in laymen's terms for use in legislatures. There will also be an attempt to look at the negative pricing issue by forecasting development over the next ten years and examining the possible price effects. The Council has asked that this be done in the summer of 2010, and the project will likely first appear as an item on the monthly meeting agenda of the Council around August 2010.

Implications

The discussion on this call highlighted several issues common to the electric power industry: regional (and increasingly, inter-regional) power development

and markets without well-established regional institutions to work through and resolve conflicts; lack of transmission; the lack of clarity concerning the definition of what qualifies as a REC and either an ill-defined ancillary services or the presence of a thin market for ancillary services, or both. Aggravating matters are the different perspectives and positions of the various market participants, whereby different market conditions in the Northwest have varying impacts on each party.

The principals of accommodating high levels of wind energy are well established in wind integration studies: sub-hourly markets; encouraging more flexible energy generation; wind forecasting; adequate transmission; and well-developed and well-defined ancillary services. Some of these are under development in the Northwest. The question of who bears the costs of some or all of these initiatives to accommodate more wind development, should they be pursued, is unclear and contentious. The Northwest could bear additional costs in order for California utilities to meet their RPS requirements, although the Northwest incurs some benefits from wind energy development not accessible to California utilities buying RECs via increased economic development at lower (if more volatile) wholesale energy prices.

Some of these issues may lessen over time. California increasingly wants in-state development, and the economic slow-down may also put a brake on wind development in the Northwest, although perhaps only temporarily. Nevertheless, both California and the Northwest will need to continue their dialogue and consider some new, innovative, and, almost by definition, untested initiatives that will help accommodate wind power in the Northwest while minimizing the strain on the Northwest power grid.

**For more
Information**

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Bonneville Power Administration. *Post-Workshop Reply Comments of the Bonneville Power Administration*, May 12, 2010.

[http://www.bpa.gov/corporate/WindPower/docs/BPA_5-12-10-Post-WorkshopReplyComments\(2\).pdf](http://www.bpa.gov/corporate/WindPower/docs/BPA_5-12-10-Post-WorkshopReplyComments(2).pdf).