

National Wind Coordinating Committee Southwest Power Pool Wind & Transmission Workshop Little Rock, Arkansas October 25-26, 2004

Meeting Summary

Introductions

After introductions of all participants, *Abby Arnold*, *RESOLVE*, reviewed the purpose of the meeting and the agenda. The purpose of the workshop was to engage SPP-region stakeholders in a discussion of regional electrical transmission planning and operating procedures, wind power's benefits and challenges, and the relationship between wind and transmission.

NWCC Background

Ed DeMeo, Renewable Energy Consulting provided a briefing on the background of the NWCC, including its history, vision, and current activities. He noted that the vision of the NWCC is to help create and support commercial wind-power markets that are environmentally, economically and politically sustainable. This is achieved through an overall focus on high quality information of use to all sectors, including those responsible for policy development. Since its founding in 1994, the NWCC has provided forums for dialogue among stakeholders on issues of transmission, siting, wildlife, credit trading, and economic development. Since 2000, NWCC has held workshops in key regions to foster dialogue that encourages proactive transmission planning that recognizes longer term trends and likely wind development. He pointed out that a June 2004 discussion of wind activity in the SPP region led to this workshop. The critical intended result for this workshop is the same as for all NWCC activities: increased understanding by all.

SPP Background, Operations, and Status

Bruce Rew, Southwest Power Pool provided insight into the background of the SPP, including its history, the status of its development into a regional transmission organization, and a description of some of the key issues faced in the region. Founded in 1941, SPP is the transmission grid operator for eight states, and is made up of 48 members that include investor-owned utilities, cooperatives, municipals, state and federal agencies, and independent power marketers. SPP's 1991 Vision Statement set the direction for the organization's principles, actions and programs. FERC granted SPP status as a Regional Transmission Organization in October 2004. SPP is entering into a joint operating agreement with the Midwest Independent System Operator (MISO) that should be enacted in December 2004.

Jody Holland, Southwest Power Pool, described transmission planning and operation in the SPP system. SPP's planning cycle begins by identifying system problems and developing contingency plans for conditions ranging from Category A (no system operation problems) to Category D (Catastrophic Failure), with Category B attempting to simulate real-world conditions. Over a two year cycle, SPP performs reliability and economic upgrade plans. For reliability planning, SPP evaluates 5- and 10-year scenarios for Category A and B conditions in its system planning. Stakeholders and Transmission Owners provide input to solving system problems. The final Phase I report is to be completed by March 1st, 2005. Phase I will be

presented at the SPP Planning Summit III planned for December 1st in Tulsa, OK. At the summit, SPP will present the results of its reliability assessment. SPP is recommending almost \$500,000,000 in projects required to meet reliability criteria for the period 2005-2010.

In terms of Economic Planning (Phase II of SPP's planning cycle), the criteria for economic expansion are being developed by SPP staff. Projects considered in this phase may replace recommended reliability-based solutions - further analyses will ensure that the best solution is implemented in the load footprint in question. One project under consideration is the Kansas/Panhandle Expansion (also called the X-Plan.) This transmission expansion would serve the approximately 600 MW Sand Sage coal-fired plant and 2,500MW of wind farms. Another economic expansion being considered is the Lincoln-Circle 230 kV project to address a critical flowgate. This project, along with the Kansas / Panhandle Expansion, is undergoing economic modeling and analysis. Initial results indicate that the project will provide substantial benefits to SPP generators and loads. Another project in the planning stage is the South Louisiana Joint Expansion study being undertaken with Entergy, CLECO & LAFA as part of CLECO installation of the Wells 500/230kV substation.

Jody Holland also provided information about the types of transmission services in SPP, including point to point and network-integrated service, with firm and non-firm contracts for delivery. In this system, generators providing firm and point-to-point service are designated as network resources, others need to sell their energy in the spot market. SPP is implementing markets in 3 phases:

- Phase 1, Energy Imbalance Markets, go live in October 2005.
- Phase 2 is a market for congestion management services
- Phase 3 is a capacity ancillary services market.

Capacity credit plays a role in the allocation of base-funded and participant-funded transmission costs. In order to determine capacity credit for wind generation, SPP devised a formula for the region using a statistical method that tries to match reliability of the NERC-GADS Fossil Units. Based on the availability of older small gas turbines, an 85th percentile wind output value was proposed by the Generation Working Group. For five to ten years, wind capacity is determined by the top 10% of load hours, during which wind output is ranked and the 85th percentile output value is selected. In other words, wind plant output equals or exceeds this value 85% of the time during the period selected. This method provides a capacity value of 3 to 8% of nameplate rating of wind generation for turbines proposed in the region.

Wind in the SPP Region

After a break, *Mike Sloan, The Wind Coalition*, gave a presentation on the potential for wind power development in the SPP region, as well as some of the challenges involved. While wind presents a challenge to systems that are trying to integrate it as a generation supply, it also provides fuel diversity, environmental, and cost advantages. Locating transmission for wind is critical because the production cost is linked to wind speed, limiting the geographic area that it can exploit. Elevated terrain raises costs, flatter terrain with good wind resources are ideal, and Mike Sloan used maps to illustrate how the SPP has areas like this in abundance, providing some of the best wind energy resources in the country. Mike Sloan noted that because of the instability of fuel prices, wind power could be an ideal solution for displacing plants with high fuel costs. With

70% of current interconnection requests coming from wind power projects, he said that wind could expect up to 15% penetration in this system with the appropriate policy support.

With regards to existing planning issues in the region, he felt that the proposed X-Plan was technically excellent for wind, but that funding issues remain critical obstacles. Noting that transmission expansion provides system benefits, rather than benefits exclusively to wind projects, he suggested that there was a case to be made for basefunding the expansions, and reducing the participant funded portion that would be borne by the wind projects served. To compete, wind needs a system that is fair (that doesn't discriminate against wind versus other generation types), forward-looking, and functional (meaning that it takes into account project financing and risk, among other real-world variables). Noting that a timing lag exists between the time when wind projects move toward getting financing and being constructed, and the time required for constructing the necessary transmission, Mike Sloan commented that the SPP's current funding mechanisms won't work for wind, and that developers will not be able to develop the tremendous wind energy potential of the region.

Transmission Planning / Funding Proposals

Bruce Rew, Southwest Power Pool, discussed the SPP's proposals for transmission funding mechanisms, in order to stimulate discussion on the potential impact of these proposals for wind power development in the region. In the current proposal from the SPP's Cost Allocation Working Group, there are four funding categories.

- Base-funded projects are for network service, firm point-to-point and reliability projects.
- Economic Upgrades are for projects that allow load-serving entities to purchase new supplies of energy at a lower cost.
- Required Upgrades are for meeting increased requirements of transmission customers
- Generation Interconnections are for meeting required upgrades from generator requests.

The Cost Allocation Working Group's top priority has been the base-funded plan upgrades, while a working draft for economic upgrades has been developed. The key issues facing the base-funded projects are whether to allow changes in designated network resources, allocation of costs locally vs. regionally, method of zone allocation, and the differences between how existing and planned resources are treated. In the CAWG plan, costs are allocated 1/3 regionally and 2/3 zonally, based on a megawatt-mile benefit algorithm, and reviewed every few years. Designated network resources in this plan need to meet timeline, capacity, and safe harbor funding criteria or apply for a waiver. The SPP is looking at 4 options for modifying this proposal to determine who is charged for the upgrades.

Kevin Porter, Exeter Associates, followed this discussion with a presentation about the transmission planning and market-operation experience from other regions. FERC Order 888 calls for the adoption of pro-forma tariff structures that require energy imbalance ancillary services that ensure that generators remain within 1.5% of their delivery commitments, facing lower payments for overprovision and an adder if they under-

provide. In some cases, the penalties for deviation can exceed the value of the wind energy provided, in spite of the fact that wind power deviates for reasons of wind resource availability instead of the market manipulation that Order 888 was intended to prevent. The best a wind generator could do is to sell its output to an entity that can blend the wind energy into a larger diversified portfolio and hence hedge any energy imbalance costs.

Kevin Porter noted that unless wind can get status as a network resource, it faces difficult challenges. Other areas of the country have used alternatives:

- In NYISO, there is a 500 MW carve-out for wind power
- PJM settles deviations with wind generators at real-time prices
- California uses forecasting with settling based on an average set on a monthly basis to even out over- and under-provision.
- MISO proposes to use another system in which intermittent resources are not subject to uninstructed deviation penalties caused by the intermittent nature or characteristic of the resource.

FERC has stated in Order 2000 that RTOs have 3 years to assume ultimate responsibility for transmission expansion. Cost recovery methods include total socialization, participant-funded (depending on the definition of this term) and "But-For" funding, in which the generator pays for upgrades, "but for" those otherwise required by the system. The total socialization is largely employed in ERCOT, while the "But-For" system is used in PJM.

Theoretically, transmission planners can look at congestion and system constraints and create zonal pricing to address these issues; PJM has created a one year window for actors to fix constraints with demand side, demand response, and transmission expansion strategies. The benefits are assigned on a production cost savings basis. MISO calculates benefits from expansion using the changes in production cost resulting from the expansion. If there are other social benefits, as from satisfying a state renewable portfolio standard, MISO will work to accommodate these. The criteria for determining costs in MISO are applied based on the kW rating of the transmission line in question.

Kevin Porter noted that the group had been particularly interested in the Southwest Minnesota transmission line. The costs of this line were fully socialized. He described the results as being successful because two needs were met: the capacity of undersized transmission was increased, and wind power could be transmitted to meet the need of a load area.

Transmission funding remains a hot topic in transmission planning, with cost recovery strategies being the key issue.

The group decided to continue with a discussion of the key issues raised with transmission planning in the SPP that relate to wind power, and to continue the agenda on the next day.

DAY TWO: TUESDAY, OCTOBER 26

Ensuring Equitable Treatment of Wind in the SPP Region

The following morning, the group reconvened and *Brian Parsons*, *National Renewable Energy Lab* led a discussion on ensuring equitable treatment of wind and conventional generation with respect to transmission access, transmission additions and upgrades, market design and operation, the potential role that the RSC can play, and the impacts for the SPP region from these issues.

Brian Parsons said that it might be useful to address the timing issues for wind power and the transmission-cost-allocation issues as being interrelated. In terms of transmission services access, he pointed out that with 5000-6000 MW of wind power in the SPP queue, particularly in constrained areas it might be beneficial to group these projects into a joint study to help speed them through the queue. (Bruce Rew added that SPP plans to use this strategy).

The group discussed the options for longer-term, partially interruptible service options for lines within the SPP. Since reliability is the first priority of the SPP, this may be something that is added later, but the main focus is on the limits set by the peak. Within SPP's existing options (PTP, firm, non-firm) there may be some dynamic scheduling options.

The group discussed ways to use existing transmission in ways that provide greater effectiveness in the use of those lines, particularly through a flexible-firm transmission product for wind generation.

Issues to take to the RSC

The group also brainstormed ten issues that they would use as discussion points with the RSC. These included:

- SPP has an exceptional wind resource that can produce energy for less than gas, but is severely constrained by inadequate information about available transmission capacity in locations where wind has the most potential, and rigid rules governing its use.
- There is a current schedule disparity between new transmission lines and wind project schedules the same problem exists for other energy resources as well as those who want to build transmission.
- There is a need to develop a cost/benefit ratio necessary for public policy issues asking what the value of the public benefits are, relative to cost recovery.
- There are fixes in the short-term that can address wind power and other energy needs and transmission capacity rating issues.
- Wind power will achieve greater penetration in markets that recognize the uniqueness of wind as a resource.
- The method for determining capacity value is an issue. A low wind capacity value results in a low transmission cost allocation to the base funded project, yet a transmission reservation is still required for the full nameplate value. There were

concerns among the group that the methodology is flawed and differentiated from other methods used in other parts of the country.

- Interstate commerce issues prevent easy permitting when projects extend across state boundaries. The process of permitting multi-state projects could be better accomplished by harnessing the RSC to this purpose, creating a common standard or one-stop resource for permitting.
- Transparency remains a perceived problem for developers who need to
 understand transmission system opportunities, needs, and constraints, and while
 consultants exist who can provide this information, developers expressed
 concerns that there are often significant delays in providing timely services to
 developers in this area.
- There remain questions about the cost benefit ratio of projects, in as much as there could be more clarity on the threshold for approving projects based on this ratio.
- The size of transmission improvements should be put into perspective. For example, if there is \$500 million assigned to a reliability upgrade portfolio, and \$400 million assigned to Kansas / Panhandle economic upgrades, these overlap such that the costs will be in the range of \$600 700 million instead of \$900 million. In addition, the impact of the recommended additions on the average residential bill would be about 50¢ per month.

The group discussed these issues and moved to a Regional State Committee Meeting Session with the NWCC.

NWCC SESSION AT THE SPP REGIONAL STATE COMMITTEE MEETING

This session was intended for the NWCC Members and other organizations to engage the RSC in a discussion of regional electrical transmission planning and operating procedures, wind power's benefits and challenges, and the relationship between wind and transmission.

Introductions and NWCC Background

Chairman Denise Bode of the Oklahoma Corporation Commission led the welcome and introductions for the RSC members, NWCC and other participants. Ed DeMeo, Renewable Energy Consulting gave his presentation on the NWCC background, including its vision, function, and transmission work highlights. Ed noted that the NWCC is a collaborative among state and federal agencies and regulators, conservation and consumer advocates, electric utilities, load-serving entities, electric power producers, windpower developers, marketers and manufacturers, and other key stakeholders. He emphasized that NWCC's primary aim is to provide a forum for open discussion of key issues from all relevant perspectives, and that NWCC is not an advocacy organization.

Wind Power and the RSC

Mike Sloan, The Wind Coalition, gave a brief presentation on the Wind Power Status and Benefits Summary. Mike Sloan described wind development in the region, including specific

markets in and outside SPP, noting a planned 946 MW of wind energy additions proposed for 2005 in the region. He asserted that wind can help customers face their biggest near-term risk: high natural gas costs, and stipulated that wind can reduce electric bills by reducing natural gas costs. He pointed to several customer surveys in Texas in the late 1990s that showed a high level of interest in and willingness to pay for renewable energy. However, for wind energy to penetrate the SPP's markets, the transmission funding policy infrastructure must be forwardlooking, fair (such that wind & fossil fueled plants have the same opportunities), and realistically finance-able for wind projects. In this respect, Mike Sloan argued that the CAWG's proposal would not work for wind, since it creates obvious roadblocks to financing SPP wind deals. For example, if a deal is dependent on a new transmission line, the developer must commit to the project many years in advance, and the go-ahead depends on actions of many others. In the case of the X-Plan, 20 wind projects would need to move forward at once. Mike Sloan also asserted that the Cost Allocation Working Group plan contemplates point-to-point firm service with voluntary participation in economic upgrades. These conditions do not lend themselves to investor confidence. Consequently, he put forth a Wind Coalition perspective on an alternative to the CAWG transmission funding policy, that under base-funded projects, a fuel diversity waiver could be established to develop an opportunity for wind power to play a role that enables wind energy to compete with other energy sources in the region. He suggested that SPP allow flexibility for states that need transmission to support generation decisions and that a coalition of states should have rights to initiate multi-state projects.

Windpower Benefits and Challenges

Ed DeMeo, Renewable Energy Consulting, provided an overview of the benefits of wind power in the region, including the actual and projected benefits that come from fuel supply diversification, competitive electricity supply alternatives, electricity price stabilization, economic development, job creation, and the environmental benefits of electricity generation that avoids the emission of air pollutants. He emphasized that wind energy costs are competitive today with the fuel cost alone from gas-fired power plants, indicating that wind can reduce energy costs to consumers even without considering environmental benefits.

Charlie Smith, of the Utility Wind Interest Group and chairman of the NWCC Transmission Working Group, described some wind power expansion challenges, including system integration issues and status; the interconnection process; generation-load balance; ancillary service costs; capacity accreditation (system planning) and capacity payments (market operation). He commented that there exists a need to increase awareness of wind in the transmission sector, and to ensure wind is treated fairly in transmission planning.

He argued that transmission is critical for wind because wind is remote. It is a challenge because wind is intermittent and doesn't need transmission all the time. Because it is new, wind must compete for transmission with established generators. Since project financing requires transmission certainty, transmission issues have the potential to derail wind development. Charlie reviewed the impacts of developments in the national transmission scene, including FERC Order 2000 and Order 2003A (including the Large Generator Interconnection Rule and the AWEA Grid Code).

Charlie stated that wind is different because we normally schedule firm generation to meet a variable load, but with wind we need to schedule variable generation to meet a variable load. In this respect, wind behaves more like load than generation (the origin of the concept of "negative load"). Charlie discussed modeling methods used for capacity accreditation, including the data intense but highly objective ELCC Method and some simplified methods that are less expensive to implement, less data intensive, but can be subjective.

Charlie commented on the evolution of wind turbine technology and its improving system-interface characteristics, and on the ancillary-service costs. The costs of technology for improved system-interface characteristics are decreasing, and the costs of ancillary services are low to moderate.

Transmission Challenges for Wind

Tom Sloan, Kansas State Representative, discussed the transmission issues facing projects planned in the SPP region. He noted that vital projects must be moved forward, asking whether larger projects can find traction if small projects cannot. He noted that voluntary cost sharing for economic upgrades would make many wind and non-wind related transmission projects unviable. He also suggested that the RSC should encourage the SPP staff to identify best practices from other states with regard to cost allocation and capacity accreditation. In the interim, rather than deciding on a flawed capacity valuation method, delay deciding until more study can be accomplished.

He pointed to other factors requiring attention, including state preferences, utility company needs, transmission-dependent and municipal system needs, and the contribution of wind and other renewables to system reliability.

Tom Sloan recommended that the ELCC or Loss Of Load Expectation methods be used to establish wind farm capacity credit. He also recommended that mandatory zonal cost recovery be created for out-of-state utilities receiving benefits from in-state transmission projects. He offered a public policy / utility CEO partnership as a solution to advancing preferences for base-funded projects. Finally, he recommended that commissioners permit cost recovery for utilities developing transmission route options to reduce regulatory uncertainty and speed implementation.

Group discussion

The group turned to a discussion of the views presented by the NWCC, the Wind Coalition and others present at the RSC meeting, led by *Denise Bode, Oklahoma Corporation Commission*.

The discussion session began with an RSC member commissioner asking if the capacity accreditation method proposed by SPP is flawed, what is a preferable method?

Brian Parsons of NREL described a number of simplified methods that he believed were more transparent, more realistic, and more understandable than the proposed SPP model. In essence, other areas use the same approach for determining capacity credit, but SPP uses an 85% confidence level for wind generation based on the availability of older gas fired plants, compared with the 50% confidence level in more widespread use This number seems arbitrary to those who have performed similar studies. Brian Parsons noted that if the methods used elsewhere were not lining up with performance that is seen after greater penetration is achieved by wind, then the method could be revisited. Charlie

Smith noted that the ELCC method is the most broadly accepted and that simplified models such as that proposed by the SPP should be benchmarked against this more complex and complete methodology.

SPP members said that while other methods are accepted in other areas, SPP would determine the method that works best for itself. Brian Parsons pointed out that transmission-planning methods used by MISO supplement analyses that show congestion reduction, LMP reductions, and cost effects and benefits for the region from increased wind power implementation. Commissioner Sandra Hochstetter of the RSC asked SPP staff about the similarity of their megawatt-mile model to AEP's production cost model; the staff responded that it had large differences, and was intended to only measure flow and usage, not the costs and benefits of that usage.

Representatives of the Oklahoma Municipal Power Authority, a transmission-dependent utility noted that if the methodology is delayed, that so too will the funding that is much-needed for building transmission. Mike Sloan argued that in his opinion, these rules would not allow much transmission to be built.

Asked what his objective for a fair SPP policy are, Mike Sloan said that states should be allowed flexibility to keep from being blocked by SPP rules for desired renewable-supporting transmission projects; a number of commenters noted that the RSC plays this function.

An RSC member Commissioner asked, hypothetically, if a state wanted to make public policy whose implementation required costs to be allocated, whether these would be socialized or uplifted to that particular state. After some debate, Mike Sloan said that he felt that to the extent that the same is offered to transmission to support fossil-fueled generation, the costs for wind-supporting transmission should be socialized. Wayne Walker of the Wind Coalition commented that this adds the needed certainty for wind power projects to obtain financing and proceed.

The NWCC session ended and discussions continued one-on-one at lunch. The RSC meeting continued with its agenda that afternoon.