



---

## MIDWEST TRANSMISSION WORKSHOP VI December 4 -5, 2006 • Bloomington, MN

### MEETING SUMMARY

This workshop brought together leaders from utilities, public utility commissions, state legislatures, transmission authorities, system operators, wind developers, NGOs, state and federal agencies, and other groups for updates on Midwest regional transmission studies and activities, discussion of policy drivers for transmission and how they relate to wind energy, and refinement of priority actions to advance transmission availability for wind power in the Midwest.

Please note that all presentations from this meeting and a number of additional materials are available online at <http://www.nationalwind.org/events/transmission/midwest/2006/default.htm>.

### WORKSHOP KICK-OFF

#### Welcome and Introductions

**Abby Arnold, RESOLVE**, introduced herself as the workshop facilitator and asked all participants to briefly introduce themselves. The final participant list is attached as Appendix A. Next Ms. Arnold walked through the workshop agenda and reviewed the meeting purpose:

- To discuss policy and market drivers for building transmission (RPS, transmission authorities, REOs, etc.) and their implications for wind energy in the region
- To provide updates on regional and state transmission activities
- To review progress to date on transmission planning for wind energy in the Midwest
- To identify priority actions for moving forward with wind energy transmission.

#### Opening Remarks

**Paul Bonavia, President of Xcel Energy's Utilities Group**, began by saying his company strives to be an environmental leader and make renewable energy work. Xcel Energy has four operating companies in eight states and works in all locations to balance its commitment to the environment with its promise to provide electricity. Xcel believes environmental stewardship is a good business practice and wind is particularly advantageous because it

- 1) Is low cost, especially with the Production Tax Credit (PTC)
- 2) Is environmentally friendly due to lack of emissions
- 3) Can be built with short lead times
- 4) Serves as a hedge against gas prices
- 5) Is supported by customers, regulators, and legislators.

Approximately 7% of Xcel's energy mix comes from renewables, with the largest share (45%) coming from coal, followed by gas/oil at 38% and nuclear at 10%. Xcel Energy is the largest U.S. retail wind provider, with about 1,200 MW installed and operating and plans to have 2,500 MW online by the end of 2007. Over 50,000 customers are enrolled for Xcel's Windsource program, where they pay a premium for wind electricity.

As Mr. Bonavia noted, Xcel Energy's service territory compliments excellent wind resources. However, he acknowledged wind is intermittent and illustrated graphically that wind is not always available at peak when it is needed. Xcel continues to participate in studies to find new ways to integrate wind and to increase confidence in operating with wind. Other challenges presented by wind energy include the need for transmission and inconsistency of public policy. Transmission access is critical for wind projects, but transmission is costly and can take a long time to build. Through CapX 2020, Xcel and other utilities like Great River Energy and Minnesota Power are getting together to address regional transmission needs. Xcel and its CapX 2020 partners are investing more than \$3 billion in new transmission and adding more than 600 miles of 345 kV lines. In terms of public policy, Mr. Bonavia noted that the boom-bust cycle created by PTC expirations is difficult for utilities using RFP processes and therefore Xcel encourages PTC extension.

Xcel also has other renewable energy sources in generating mix, including hydroelectricity, solar, and biomass. Hydropower, like wind, has transmission implications. Solar, while not a great fit for the upper Midwest, is being built in Colorado with an 8 MW plant slated to come online in 2007. Xcel built a 50MW turkey litter plant in Southern Minnesota and has 110 biomass megawatts under contract. Also, this month Xcel will announce a pilot program on using wind to generate hydrogen through electrolysis.

Mr. Bonavia mentioned some of the financial and regulatory drivers for Xcel's adoption of renewables. Renewable Development Funds, such as the one in Minnesota, have provided millions of dollars in seed money to renewable projects. Xcel acknowledges climate change as a real problem and supports a national renewable portfolio standard (RPS). From Xcel's perspective, a national RPS is preferable to a carbon tax or carbon cap and trade program because such mechanisms would push towards natural gas rather than technologies like wind, nuclear, and clean coal. Xcel is investing in clean coal by building an Integrated Gasification Combined Cycle (IGCC) plant in Colorado to prove that IGCC technology works using Powder River Basin coal and at high altitude, with successfully capture and sequester carbon a key component of their effort.

### **Background on NWCC Transmission Activities and Introduction of the Draft Priorities for Wind Energy Development and Transmission in the Midwest**

*Charlie Smith, Utility Wind Integration Group*, provided background information for new participants on the NWCC. Since its inception in 1994, NWCC's goal has been to support the development of environmentally, economically, and politically sustainable commercial markets for wind power. In this role, NWCC identifies issues that affect wind power use and then catalyzes activities and convenes forums to address these issues. NWCC encourages using collaboration and dialogue early with broad stakeholder involvement.

Transmission is one of the NWCC's main focus areas because:

- Wind is remote and needs transmission
- Wind output is variable, so transmission is not needed all the time
- Wind is new and must compete for transmission with established generators
- Project financing requires transmission certainty
- Transmission issues have the potential to derail wind development.

Encouraging efficient use and ensuring fair and balanced access to the transmission grid are central NWCC Transmission Workgroup aims. The NWCC Transmission Workgroup focuses its work in three regions, the West, Midwest, and Southwest Power Pool. Stakeholder education is a major task; NWCC holds bi-monthly Transmission Update calls on transmission issues around the country, issuing a written brief afterwards. These and all other NWCC publications are available on the collaborative's website, [www.nationalwind.org](http://www.nationalwind.org).

Mr. Smith recognized the diverse group of NWCC members who helped plan this workshop (listed in Appendix B), as well as the workshop sponsors: Energy and Environmental Research Center (EERC), Great River Energy (GRE), Midwest ISO (MISO), Minnesota Power, National Association of Regulatory Utility Commissioners (NARUC), National Association of State Energy Officials (NASEO), National Conference of State Legislatures (NCSL), Otter Tail Power Company, and Xcel Energy.

In advance of the workshop, the workshop planning committee assembled a draft list of priorities for advancing wind development and transmission in the Midwest. Mr. Smith conveyed that the draft priorities list was intended as a starting point for dialogue about regional needs and possibly a starting point for post-workshop activities. The priorities, broken down into five categories--transmission planning, cost allocation, investment, markets, and other—are as follows (also available as Appendix C):

### **Transmission Planning**

1. Develop MISO Vision Plan to optimize the amount of wind generation, such as 20% or more, across the entire MISO footprint and delivered to MISO load.
2. Proactively develop transmission solutions for interconnection and delivery to maximize the amount of wind generation and move to Certificate of Need/CPCN in the appropriate states.
3. Identify lower voltage (115 kV and below) “on ramps” needed to accompany high voltage transmission solutions.
4. Explore when and where a National Corridor designation might be appropriate and useful.
5. Review PUCs/PSCs ability to consider regional need in transmission proceedings versus in-state need only.

### **Cost Allocation**

6. Adopt appropriate mechanism at the state level to fund wind generator 50% share of Network Upgrade interconnection cost.
7. Review pros and cons of state-level mechanisms that would allow for recovery of transmission investment with and without a rate case.

### **Investment**

8. Identify and implement mechanisms that allow new investors to build transmission and recover costs.

### **Markets**

9. Continue to encourage non-market participant utilities to join MISO and facilitate resolution of transmission constraints.
10. Launch major effort to solve tariff issues and physical transmission constraints between North and South Dakota and the MISO market.

### **Other**

11. Support funding for and encourage adequate staffing levels at state agencies to handle large volume of transmission regulatory proceedings. Enhance MISO staff capability to assure full and timely MTEPs and to quickly clear the queue for transmission studies for new generation.
12. Focus additional resources on educating decision-makers, opinion leaders, and other stakeholders at the Federal and state levels on key issues for advancing Midwest wind development.

## **MIDWEST ISO REPORT**

*Clair Moeller, Midwest ISO’s Vice President of Transmission Asset Management* addressed what national interest electric transmission corridors mean to independent system operators like Midwest ISO (MISO). MISO is a nonprofit organization that manages the reliable flow of electricity across 15 states in

the U.S. and Manitoba, Canada. FERC approved MISO as the first Regional Transmission Organization (RTO) and MISO has been operational since December 15, 2001. MISO has about 100,000 miles of transmission and a million square mile footprint.

From his perspective, Mr. Moeller sees designation of national interest electric transmission corridors as Congress asking for leadership to get transmission built. Corridor designation means that DOE will support transmission projects within corridors, contributing needed political capital. Mr. Moeller said utilities have done a good job thus far of getting value out of their service territories but now more regional collaboration is needed.

Mr. Moeller identified political obstacles to transmission, including long project time horizons that exceed legislative terms, public opposition to transmission towers, and lack of a federal consensus on energy policy, making investment risky. Financial obstacles also exist, centered around cost recovery. FERC tariffs help utilities very little from a cost recovery perspective and rate freezes can bankrupt utilities. While higher fuel costs can be passed through, transmission requires rate cases that can cost more than \$1 million.

MISO is working on establishing conditions precedent to transmission investment, such as a regional tariff that tries to match who benefits with who pays, and supporting utilities in transmission-related regulatory proceedings. Mr. Moeller is seeing political consensus being built around what needs to be done to achieve MISO goals. For example, the Organization of MISO States (OMS) is helping build shared policy views among regulatory entities and the Midwest Governors are talking about making siting rules as similar as possible across states. MISO will also continue holding stakeholder forums and informing policy makers about future generation scenarios.

Another leadership role MISO is taking involves developing a better understanding of transmission's investment value proposition. This involves incorporating the costs of externalities like emissions, accounting for the security benefits of a robust transmission grid, evaluating economic development benefits like jobs creation, and enabling fulfillment of renewable energy objectives. Through these methods, MISO hopes to better articulate transmission's value.

Based on participant questions, Mr. Moeller made the following comments:

- MISO wants to avoid having infrastructure that allows some states to meet RPS goals but not get sufficient resources to other states. Cost allocation should be established ahead of time.
- MISO looked at both DC and AC lines and believes a mixture of both is needed because they each have different technological benefits and risks. An AC system is needed behind a DC system to prevent interruptions.
- Incorporating value propositions into decision making has to happen across the network. The value propositions are a relatively new tool, developed about four months ago through MISO's planning subcommittee.
- MISO believes two 765 kV lines are needed for high wind penetration levels to get energy from the windy eastern edge of MISO's footprint to load centers in the Ohio valley. The large capacity of a 765 kV line means a smaller transmission corridor is needed.
- Doing a realistic transmission study with an unrealistic queue is one of MISO's biggest struggles right now. Wind penetration levels can be projected and regional planning done, but the first in – first out queue methodology that worked before does not work as well now. The boom and bust PTC cycle augments this problem.
- Signed power purchase agreements are one way to get utilities to care more about interconnection. Having states acknowledge one another's renewable portfolio standards and work together would go a long way towards developers and utilities working cooperatively on transmission.

## STAKEHOLDER PANELS ON POLICY DRIVERS FOR WIND ENERGY TRANSMISSION

Four stakeholder panels were organized to discuss how policy drivers influence transmission planning, particularly for wind energy, from their perspectives. A summary of each panels discussion follows below.

### Utility Commission Panel

**Commissioner Gary Hanson, South Dakota Public Utilities Commission**, led off the utility commission remarks by discussing the importance of a national renewable portfolio standard (RPS). Commissioner Hanson suggested that state RPSs have climaxed to some extent and in order to achieve greater energy independence, which is a national challenge, there should be a national RPS. Transmission, in his view, has become very risky and increasingly expensive due to deregulation. Investment in transmission is declining although the need for transmission is growing.

**Commissioner Phyllis Reha, Minnesota Public Utilities Commission**, spoke next about the variety of incentives that Minnesota offers to encourage renewable energy, such as green pricing, portfolio mandates for utilities, and a community-based wind program. Minnesota's Renewable Energy Objective (REO) has translated into greater regional energy independence, lower emissions, reduced need to build more conventional generation, and economic development benefits, particularly in rural areas. Like Commissioner Hanson, Commissioner Reha believes a national RPS may be advantageous by bringing greater certainty for utilities about regulations and definitions. Right now, utilities face a climate where what counts towards the RPS in one state may not in another or other states have no RPS at all. However, she cautioned that a national RPS may not be as vigorous as what Minnesota and others already have in place at the state level.

In Commissioner Reha's view, the primary obstacle to wind is transmission. She recommended coordinating interconnection approvals with the Production Tax Credit (PTC). Greater regional coordination on transmission and generation siting is something she supports. A regional approach to renewable energy credit (REC) trading and tracking is also something Minnesota encourages; a RFP went out recently to get that project going.

**Commissioner Susan Wefald, North Dakota Public Service Commission**, said a RPS, along with additional transmission to make the grid more robust, would mean more wind development in her state. Right now, North Dakota does not have a RPS. Commissioner Wefald supports utility commission collaboration through the MISO Northwest Subgroup, which is striving to make what must be submitted for transmission planning and siting more consistent across states. One challenge she highlighted is that utilities serving more than one state with access to firm transmission in one state and not the other may not be able to have wind "count" in both states. Commissioner Wefald highlighted the economic development benefits of wind to her state, where a blade production facility is being expanded and a tower manufacturing plant is located.

**Deputy Commissioner Edward Garvey, Minnesota Department of Commerce**, is a chief policy advisor to Governor Tim Pawlenty and is spending considerable time on these issues. Gov. Pawlenty would like to achieve 25% renewables in Minnesota, but transmission is a critical constraint. In Deputy Commissioner Garvey's opinion, having a RPS or REO without transmission augments problems. He urged spending less time considering a national RPS and national interest electric transmission corridors and instead focusing on offering incentives to get transmission lines built.

**Gary Stump, Iowa Utilities Board**, said Iowa has become a wind leader without a RPS, due largely to utilities' cost recovery certainty there. In Iowa, utilities know the ratemaking principles that will apply

(return on equity, depreciation rate, etc) to the wind, coal, or gas plants before they are built. Iowa's governor set a goal of 1,000 MW of wind by 2010 and is on target to surpass that goal. In terms of meeting transmission needs, the Iowa Utilities Board must find transmission serves a public use to approve it; however, related statutes have changed so that the public is not limited to customers located in Iowa.

After their individual remarks, the panelists discussed whether wind will displace other generation. One response was that wind will not displace other generation. Another panelist was hopeful that wind would replace other, dirtier generation. A third panelist said that when wind is available, it displaces everything that costs more except base load which must be kept on-line. Panelists also talked about how Renewable Portfolio Standards and Integrated Resource Planning (IRP) are related. In Minnesota, IRP is included under RPS and the state recently doubled the amount of wind Xcel Energy is required to have in its IRP. Finally, one panelist commented on Deputy Commissioner Garvey's assertion that the focus should be on transmission and not an RPS, saying that transmission cannot be mandated without saying why it needs to be built and a RPS provides the needed justification for constructing transmission lines.

### **State Legislative Panel**

Legislators from Minnesota, South Dakota, and Nebraska spoke about the energy issues arising in their state legislatures, particularly renewable energy and associated transmission. **Senator Gary Kubly, Minnesota Legislature**, chairs the Minnesota Senate Energy Subcommittee and is seeing increasing public interest in cleaner energy. Public support from Minnesotans for reducing air pollution led the legislature to pass a law directing the three dirtiest coal plants to cut mercury emissions by 90%. Sen. Kubly predicts that similar legislation on carbon dioxide (CO<sub>2</sub>) emissions is coming, again driven by public opinion.

Public support for renewable energy is growing in Minnesota, particularly because of the economic development benefits for rural regions. The Community-Based Energy Development (C-BED) initiative is active in the state, promoting community-owned projects designed to keep financial benefits in the region and help wind projects overcome financial barriers. What the legislature does is strongly driven by public opinion, but public opinion is evolving over time and as new generation is built. Sen. Kubly urged education of the public and, as Clair Moeller from MISO mentioned, finding ways to put a price on externalities like emissions so that legislators and the public can weigh decisions based on dollar value costs.

**Representative Joel Dykstra, South Dakota Legislature**, indicated his state is in a different situation than Minnesota. South Dakota has excellent wind resources which could provide much more power than the state needs; therefore, South Dakota wants to find ways to export wind energy to load in other states. Rep. Dykstra expressed concern that South Dakota may miss the opportunity to maximize its wind resources by waiting for transmission to be built. To facilitate transmission construction, the legislature created the South Dakota Energy Infrastructure Authority (SDEIA). The SDEIA allows South Dakota to participate more in multi-state planning and leveled the playing field in terms of taxes.

South Dakota does not have a RPS, although it would have plenty of wind resources to achieve renewable targets, because state energy demand is relatively small. For South Dakota to develop its wind resources, it needs to connect with demand markets elsewhere. Rep. Dykstra said a national RPS might be one way of recognizing the value of wind resources and help to develop such resources where they occur. Locating energy-intensive industries in the state might be one way to foster greater wind energy use, but Rep. Dykstra finds more appeal in developing technologies that allow for wind energy storage. For now,

the state is focusing on making connections with customers and working collaboratively to overcome transmission hurdles.

**Senator Chris Langemeier, Nebraska Legislature**, comes from a public power state where the Nebraska Public Power District (NPPD) plays a leading role. Although Nebraska exports about 500 MW to neighboring states, from the legislature's perspective the concentration should be on serving state needs. Nebraska does not have a RPS, so NPPD has fairly free reign to do what it sees fit. However, public power does not qualify for incentives like the PTC, a significant hurdle for wind power development. Sen. Langemeier would like to see discussion at the national level about how public power can be competitive and develop wind energy.

The Nebraska Legislature recently introduced term limits and for the next legislative session, one half of the body will turn over including half of the committee chairs. This means a loss of experience and knowledge, and presents an opportunity for change and introduction of new legislation. Sen. Langemeier seeks to become the next chair of the Natural Resources Committee.

### **Transmission Authority Panel**

When the 2005 NWCC Midwest transmission workshop was held, legislatures in Kansas, North Dakota, and South Dakota were just establishing transmission authorities. At the 2006 workshop, participants received a more in-depth overview of the authorities' formation and programs.

**Commissioner Roger Johnson, North Dakota Department of Agriculture**, is one of three members of the North Dakota Industrial Commission which oversees the North Dakota Transmission Authority (NDTA). The Governor, the Attorney General, and the Agricultural Commissioner are members of the Industrial Commission. The North Dakota legislature unanimously supported creation of the NDTA through a statute effective August 1, 2005. The NDTA is a developer of last resort but does have authority to own, contract for construction, and operate transmission facilities. There is no fiscal appropriation for the NDTA; financing primarily comes from revenue bonds and NDTA may partner with others. The legislation creating the NDTA gives quite a broad legal mandate and the Authority can essentially do what it wants, including facilitating, financing, developing, and acquiring transmission.

The NDTA is still getting organized and recently put an Acting Director, Sandi Tabor, in place. Thus far the NDTA has:

- Participated in the Upper Great Plains Transmission Coalition, a consortium of wind and coal interests
- Filed comments on RECB I and the DOE National Interest Electric Transmission Corridors study
- Conducted Congressional briefings
- Started evaluating RECB II with plans to file comments with FERC.

Current priorities for the Authority are to find a permanent director, incorporating North Dakota into the CapX 2020 plan, meeting with key wind and coal stakeholders, and developing criteria for project assessment to evaluate the need for economic benefit study. North Dakota, like South Dakota, is a power exporter and wants to develop better connections to Minnesota load. In the long term, NDTA wants to increase awareness of the state's energy resources, work regionally to overcome transmission constraints, and facilitate construction of new transmission to Minnesota markets.

**Earnie Lehman, Vice Chair of the Kansas Electric Transmission Authority**, is also President and General Manager of Midwest Energy, a consumer-owned electric and natural gas utility serving central and western Kansas. The Kansas legislature established the Kansas Electric Transmission Authority (KETA) in 2005, with operations beginning in 2006. KETA's mission is "to ensure reliable operation of

the electrical transmission system, diversify and expand the Kansas economy, and facilitate consumption of Kansas energy through improvements in the state's electric transmission infrastructure.”

KETA has a seven-member board, with three members appointed by the Governor with Senate confirmation and four legislators ex officio, the chairs and ranking minority members of the Senate and House Utilities Committees. The Authority may plan, finance, construct, develop, acquire, own, and dispose of transmission facilities; maintenance and operation of facilities must be contracted out. KETA can also enter into contracts with the Kansas Development Finance Authority to issue bonds and provide project financing, recover costs through Southwest Power Pool (SPP) RTO tariffs, and do additional cost recovery through Kansas Corporation Commission assessments on retail customers. The Authority is not subject to sales or income taxes but does pay property taxes like private and cooperatively owned utilities.

SPP is KETA's most critical partner because it must approve all transmission projects. Before a project is approved, a notice is published and private entities have three months to notify KETA they will build the project or else KETA may proceed with the project. KETA has accelerated decision processes for new transmission and fostered a competitive environment for construction, so now several transmission projects are proposed in Kansas and the state has gone from limited transmission interest to competition for projects.

***Bill Even, South Dakota's State Energy Director and Director of the Governor's Office of Economic Development***, is serving as Interim Executive Director of the South Dakota Energy Infrastructure Authority (SDEIA). The South Dakota legislature created the SDEIA in 2005 to “diversify and expand the state's economy by developing in South Dakota the energy production facilities and the energy transmission facilities necessary to produce and transport energy to markets within the state and outside of the state.” The legislature appropriated a total of \$247,000 for SDEIA operations in 2006 and 2007. The Authority has a five member board, appointed by the Governor to serve six year, staggered terms.

The SDEIA may finance, construct, develop, maintain, and operate new or upgraded energy transmission facilities. The Authority may own or partially own transmission facilities but is required by law to divest ownership. SDEIA also has up to \$1 billion in revenue bonding authority, if approved by the legislature. The SDEIA is not targeted an owning transmission; rather, it is a means of providing incentives for others to develop transmission.

SDEIA's charter stipulates that it must:

- Meet with any interested owner of transmission lines in South Dakota and any interested generator and distributor of electricity to consumers in South Dakota
- Report its findings and make recommendations to the Governor, the Legislature, and the South Dakota delegation
- Evaluate state and federal laws affecting electric generation and transmission
- Identify and communicate opportunities for cooperation between owners of transmission lines in South Dakota and generators and distributors of electricity
- Assist any entity that wants to build new or upgrade existing electric transmission facilities to, from, and within South Dakota
- Assist other state transmission authorities and any federal or regional entity wanting to build new or upgrade existing transmission facilities to deliver electricity to, from, and within South Dakota

SDEIA interviewed electric industry members who saw challenges and opportunities in siting new generation and transmission facilities, as well as finding customers for energy produced for in-state and export use. Interviewees said the South Dakota government could advance the production and transmission of electricity for in-state and export markets by:

- Establishing South Dakota government as being actively interested in assisting energy development in the state
- Actively participating in the search for customers
- Considering and sponsoring innovative combinations of generation sources and loads.
- Actively addressing MISO seams issues
- Sponsoring multi-state action on transmission corridors
- Ensuring competitive rail service
- Reviewing and adjusting state tax structures

SDEIA's full report is available at <http://www.sdeia.com/reports.asp>. The same website also links to a report presenting an assessment of the practicality and feasibility of electric generation from the major energy options - coal, nuclear, and wind power –in South Dakota.

Based on attendees' questions, panelists made the following comments:

- Moving from an integrated system to the MISO control area leads to pancaking of rates, an impediment to moving wind out of South Dakota. There are a number of options for addressing this impediment, including a transmission owners agreement requiring MISO file with FERC for new tariffs.
- SDEIA wants to use its authority structure to work together with WAPA and others.
- The North Dakota legislature is indicating that they will not approve NDTA staff until a transmission project requiring staff resources arises.
- Transmission authorities are an intermediate solution; better regional planning on how to address boundaries is what is ultimately needed.

### **Utility Leaders Panel**

The four speakers on this panel talked about transmission from a utility's perspective, including the obstacles they face and transmission projects planned.

**Bob Fullerton, Western Area Power Administration (WAPA)**, led off the panel. WAPA markets 10,000 MW of hydropower to 15 states; WAPA does not have load growth responsibility, but it does purchase energy to firm up its hydro contractual commitments. Over 17,000 miles of high voltage transmission serves WAPA's territory, with renewables supported through interconnection and transmission service. 291 MW of wind are interconnected to WAPA's grid with more than 8,600 MW of additional transmission for wind requested as of the end of 2006.

WAPA has always had open access and voluntarily adopted the Open Access Transmission Tariff (OATT). WAPA has authority to build transmission to market hydroelectricity, enhance reliability, and avoid excessive wheeling charges. Its work is funded through federal appropriations and by third parties. If funding is available, WAPA is obligated to construct transmission if ATC is unavailable under our OATT. WAPA successfully partnered with private entities on the Path 15 line freeing 1,500 MW of transfer capability in California.

When it comes to building transmission, who pays for studies, staff, and construction is a major issue. Long construction timelines, new grid uses, and maintenance needed on the existing, aging system are other hurdles. EPAct 2005, Section 1222 provided some assistance by authorizing WAPA to upgrade or construct new transmission facilities if:

- Within a national interest electric transmission corridor
- Congestion is reduced
- Necessary to meet demand
- No duplication of existing or proposed facilities.

Third party financing is still permissible under the act but is capped at \$100 million through 2015, which could easily be exhausted given WAPA's large footprint. EAct 2005, Section 2605 authorizes WAPA to provide technical assistance on transmission to tribes using non-reimbursable funds not rolled into the rate base or funded by tribes. Section 2605 also requires WAPA to conduct a power allocation study by August 2007. EAct 2005, Section 203 supports renewable energy growth by requiring the federal government to purchase increasing amounts of renewable energy; WAPA serves as an agent to other federal agencies in obtaining green tags and RECs. Under Section 2606, WAPA is called upon to study the feasibility of a tribal wind demonstration project to firm Missouri River hydroelectricity, but study funds have not been appropriated. Taken collectively, these sections of EAct help establish WAPA's role and capabilities, but the organization nevertheless faces continued challenges with regard to siting, financing, and aging infrastructure.

**Will Kaul, Great River Energy (GRE)**, said his organization has been re-evaluating their stance on RPSs and has developed a new policy where GRE:

- Aggressively pursues energy conservation
- Favors a 20% RPS at the state level
- Sets a goal of getting CO2 emissions to 2000 levels by 2020
- Supports a carbon cap and trade program

In addition to being GRE's Vice President, Mr. Kaul also chairs the CapX 2020 initiative. CapX 2020 is an alliance of 11 electric cooperatives, municipals, and investor-owned utilities formed in spring 2004. The objective is to provide reliable service and meet growing electricity demand in participating utilities' service territories. Based on load growth, 8,000 MW of new generation is anticipated in CapX service territories and planners are being asked to look at 20% renewables in the generation mix.

Mr. Kaul reviewed three groups of proposed transmission projects. The first group includes four lines that are fully subscribed and represent \$1.3 billion of investment. The lines are designed to work together to ensure regional reliability and improve transfer capability for new generation resources. The three 345 kV lines will be filed together for a single certificate of need and the 230 kV line filed separately. Group II features new 345 kV lines to loop around the Twin Cities and Group III refers to remote generation outlets developed as needed when generation projects are built.

CapX has also begun modeling Community-Based Energy Development (C-BED) generation in west central Minnesota and how it fits into the grid. Currently CapX is scoping a second phase of study, which may involve doing a study similar to the CapX 2020 Vision study using C-BED generation to serve load growth. More information on CapX activities is available online at <http://www.capx2020.com/>.

A meeting participant asked Mr. Kaul about the viability of offshore wind on the Great Lakes and he indicated that the wind potential there is high but there may be competition with other uses.

**Paul Malone, Nebraska Public Power District**, showed a map of Nebraska's transmission system which is exclusively managed by public power entities like NPPD, Omaha Public Power District, Tri-State, and WAPA. Power is low cost in Nebraska but transmission rates are higher because of the low load density. Transmission is being built to serve Nebraska load, but cost allocation is a huge issue and transmission is not being built through Nebraska to solve transmission constraints, even with the system essentially fully subscribed. Solving transmission constraints requires consideration of several factors:

- Types of constraint – thermal or stability
- Transmission investments are “lumpy” - investments do not always yield a proportionate increase in available transmission capacity
- New generation owners may oppose “fixing” a constraint in order to maintain a competitive advantage.

In a public power situation, putting transmission costs in the rate base means customers pay and that can be a hard sell for places like Nebraska when transmission is intended for energy export out-of-state.

*Dehn Stevens, MidAmerican Energy Company*, informed participants that MidAmerican Energy owns and operates more wind generation than any other rate-regulated utility in the U.S. In Iowa, where Mr. Stevens is based, MidAmerican has over 300 MW of wind balancing its coal facilities and approval from the Iowa Utilities Board to add up to 545 MW of new wind generation. MidAmerican has a 99 MW wind project coming online by December 31, 2006 and another 123 MW wind facility slated to be online by November 2007. Initially the wind turbines were put in the most wind-intensive areas, but now more projects are moving south based on transmission capacity.

Some of the transmission challenges MidAmerican faces are:

- Case-by-case transmission planning results in “piecemeal” transmission development
- Transmission cannot be built as quickly as wind projects can be brought on-line
- Difficulty committing to multi-year transmission projects for “potential” wind projects
- Voltage control, although technology improvements are minimizing this concern.

Mr. Stevens described how some of the newer turbines have reactive control systems that are good at maintaining system voltage. However, if the wind is not blowing, this reactive control mechanism is lost.

MidAmerican is coming out of a transmission building cycle, having spent \$6-10 million for wind-related transmission and bolstering its ability to meet reliability. The utility supports regional planning, even for parties not in MISO like Iowa and Nebraska. MidAmerican has seams agreements describing expectations for coordination on regional planning.

#### **TRANSMISSION NEEDS FOR 20% RENEWABLES PENETRATION OF THE MINNESOTA ELECTRIC ENERGY MARKET**

*Rick Gonzalez, Excel Engineering*, described how wind generation in Minnesota initially concentrated around Buffalo Ridge, expanding to 500 MW presently at that location and more construction planned; southern parts of Minnesota further east are also seeing wind farm construction. Interconnection requests prompted construction of three new transmission lines, but there are still over 10,000 MW of interconnection requests in the MISO and WAPA interconnection queues for locations in southwest Minnesota and eastern South Dakota. Wind generation needs transmission because the most wind energy is generated off-peak (meaning output must travel farther to serve load) and in locations remote from load centers. Also, transmission helps compensate for wind’s output fluctuations by blending or “hiding” it in a larger system, thereby reducing the spinning reserve required. Even with control area consolidation, physical transmission capacity is needed to distribute wind energy throughout the control area.

Wind presents transmission challenges for several reasons:

- 1) Fluctuations in generation output cause voltage fluctuations, with the transmission system reactive consumption ultimately proportional to the sixth power of wind speed
- 2) Reactive power supply must be fast enough to keep up with wind generation output fluctuations, including trip-out of wind farms
- 3) Concentration of wind farms means that a single line fault could trigger tripping of many hundreds of MW of generation all at once.

Minnesota’s current REO calls for 10% of customer energy to come from renewable resources by 2015 and applies to all load serving entities. Qualifying resources include wind, solar, biomass, small hydroelectricity, and hydrogen (if renewables-derived). Mr. Gonzalez examined the implications of a 20% REO, which implies 5,000 – 6,000 MW more wind generation than exists today. For neighboring

states to contribute to that target, additional transmission would be required. To attain 20% renewables, wind generation must be connected to Minnesota loads and Mr. Gonzalez estimated 5,500 MW requires 6-7 new 345 kV lines. Better connections between Minnesota and the external system would also be needed to address wind's variability by blending it into the larger regional power system. To connect with load centers like Milwaukee and Chicago, 345 and/or 765 kV lines would be needed in order to:

- Achieve reasonable efficiency
- Attain good dynamic stability and voltage stability performance
- Keep installed costs at a minimum
- Minimize the number of lines required.

Finally, reactive power control is needed to implement a 20% REO. Adding shunt capacitors, series capacitors, and static VAR systems contributes to voltage control, as would wind turbines with better reactive power control capability.

Then Mr. Gonzalez noted that due to wind being the most economical renewable resource, a 20% REO would consist primarily of wind generation with much smaller amounts of biomass and solar. Although the Buffalo Ridge has the best wind resource in Minnesota, the estimated 5,000 – 6,000 MW of additional wind capacity would likely not be exclusively in Minnesota or on Buffalo Ridge. In summary, attaining the 20% REO would require several new 345 kV transmission lines within Minnesota, new 345 or 765 kV transmission to adjacent states, and additional reactive power supply.

## DAY 2

The second day began with an opportunity for workshop participants to make comments based on the presentations from Day 1:

- It is important to find a way to get pre-approval or address cost recovery up front.
- There appears to be increasing recognition that state RPSs also mean thinking about transmission.
- The focus yesterday was on building transmission to get remote generation to load, but the more critical problem is how to sustain current wind generation and looking at what we can do with existing infrastructure. Co-locating generation near load is needed.
- Community wind is important and opportunities for partnership should be embraced. Community and utility scale wind are not mutually exclusive.
- C-BED helps communities get involved with wind and use it as an economic development tool. C-BED contracts are front loaded to facilitate financing.
- Right now community and utility scale wind projects are complimentary but that may not remain the case.

## **MIDWEST TRANSMISSION STUDIES & ACTIVITIES**

Study of transmission and the influence of wind energy is vigorously pursued in the Midwest. Four speakers presented transmission studies and planning.

### **Western Area Power Administration's Dakotas Wind Transmission Study**

*Ed Weber, Western Area Power Administration (WAPA)*, described WAPA's "transmission study on the placement of 500 MW of wind energy in North Dakota and South Dakota" funded by Congress. The Dakotas are already an energy exporting region based on their coal resources, but transmission capacity is limited by both stability and thermal loading. Engaging in its study of placing 500 MW of wind power in the Dakotas, WAPA wanted to build on prior work and publish results usable by utilities and industry.

The study's four primary tasks were:

- 1) Analyze non-firm transmission potential relative to new wind generation
- 2) Assess potential of transmission technologies relative to new wind generation

- 3) Study interconnection of new wind generation
- 4) Study the delivery to market of new wind generation.

For the first task, looking at non-firm transmission potential, WAPA looked at the possibility of delivering wind energy through long-term, non-firm access with curtailment during critical periods. Three key transmission corridors were studied, comparing committed versus actual usage across each corridor using historical data and modeling projections. The study used wind profiles to examine what wind is doing as load is moving up and down throughout Western's service area

The results showed one corridor, the Watertown-to-Granite Falls 230 kV line is not stability limited. Stability limits do prevent movement of power across interfaces in the other two corridors. Using Gridview Analysis for 2003, WAPA found the North Dakota Export Boundary (NDEX) corridor was limiting for a small number of hours in both low and high hydro situations. The Ft. Thompson and Watertown interfaces were not limiting in either case. These results indicate non-firm transmission is available at most sites most of the time.

The second task involved evaluation of new technologies as alternatives for improving the transmission system, including static var compensation, series compensation, phase shifting, dynamic line ratings, and reconductoring with new conductors. Transmission enhancements identified for steady state improvements included:

- Adding conventional series capacitors
- Adding phase-shifting transformers
- Re-conductoring transmission lines
- Dynamic transmission line ratings.

Dynamic line ratings and reconductoring showed the most promise as non-wire solutions. Some of the newer conductors can have tremendous heating and cooling without changing physical characteristics, reducing sagging and withstanding more ice loading.

Task 3 looked at interconnection issues. WAPA used public comments, maps, interconnection queues, and wind projects to evaluate seven wind generation zones for interconnection. In all seven areas, WAPA looked at the impacts of new wind generation at four levels—50 MW, 150 MW, 250 MW, and 500 MW—through steady state power flow analysis, constrained interface analysis, short circuit analysis, and dynamic stability analysis. Only one site was found to be limited—Mission at 250 MW. Otherwise, all interconnection issues could be addressed.

For the final task, WAPA performed aggregate delivery studies on the four most favorable interconnection zones identified in Task 3. WAPA developed several delivery scenarios for new wind power based on markets inside and outside the Dakotas, analyzing transfer capability and regional stability performance. No stability problems were found for local faults at any of the seven sites. Together, Tasks 3 and 4 showed that limits in the non-firm capacity must be solved with system additions such as series compensation.

EPAct 2005 required WAPA to do other studies but funding is still being sought. The Dakotas study cost almost \$0.5 million and finding money for new studies is difficult while WAPA is under continuing resolution, waiting for a fiscal year 2007 appropriation from Congress. WAPA is scoping a new study of tribal wind development for integration and firming. More information on WAPA's Dakota wind study can be found on the web at <http://www.wapa.gov/ugp/study/dakotaswind/>.

Mr. Weber made the following responses to participant questions:

- WAPA has not been approached by developers wanting to use long-term non-firm and does not encourage it because when constraints arise at flowgates, non-firm transmission is cut first. In the

Midwest, constraints arise frequently when moving generation so long-term non-firm would not be a good business decision because it could be interrupted any time congestion occurs in the Region.

- Huge wind power growth is possible in the Dakotas, but transmission must be built to make that happen. WAPA plans to be one of the transmission builders.

### **Minnesota Wind Integration Study**

**Ken Wolf, Minnesota Public Utilities Commission**, explained that the Minnesota legislature, in May 2005, set a requirement for the Minnesota PUC to study impacts on reliability and costs associated with increasing wind capacity to 20% of the state's retail electric energy sales by 2020. The PUC directed all Minnesota utilities to participate in the study, use the study results to estimate impacts on rates, and incorporate study findings into IRPs and REO reports.

The wind integration study cost about \$700,000, so the PUC wanted to ensure buy-in from the scientific community. The PUC assembled a broad stakeholder group comprised of utilities, MISO, MAPP, Minnesota Chamber of Commerce, environmental groups, AWEA, UWIG, NREL, and others to develop the study scope based upon an extensive literature search, insights from recent studies, and stakeholder input. Through a competitive bidding process, EnerNex/WindLogics were selected to conduct the study with a Technical Review Committee of regional and national experts on wind generation and power systems analysis on hand to guide and review the study. MISO actively participated in the study by supplying power system data and models, contributing technical expertise, and assisting with power system modeling; MISO's involvement was critical to the project's success.

Expanding on its charge, the integration study ultimately evaluated impacts on reliability and costs associated with increasing wind capacity to 15%, 20%, and 25% of Minnesota retail electric energy sales by 2020. Projected to 2020, 20% of retail sales requires approximately 4,500 MW of total wind generation. Some of the elements contributing to the study design included building upon prior wind integration studies, coordinating with other regional activities, and making the study technically rigorous. All utilities with Minnesota retail electric sales participated, representing eight balancing authorities.

As Minnesota Wind Integration Study co-author **Matt Schuerger, Energy Systems Consulting Services** described, WindLogics helped characterize the wind resource and ensure modeling accuracy. 152 proxy tower (wind plant) locations were used, modeling wind speed, air density, power density, and energy production. The results showed significant benefits from geographic diversity of wind power sites, including

- Reduced time when little or no power is produced
- Increased production in 20-80% capacity factor range
- Reduced frequency of large hourly ramp rates.

The study evaluated reliability impacts using Effective Load Carrying Capability (ELCC), a common reliability measure. Looking at regional capabilities with and without wind generation while maintaining a fixed reliability level, the results showed significant inter-annual variability. The study recommended looking at more than three years of data to increase confidence.

Operating cost impacts were also analyzed to determine how they are affected by accommodating the wind generation while maintaining power system security and reliability. The study finds that using wind energy to meet 15 – 25% of Minnesota's projected 2020 energy demand (3500 – 5700 MW of wind) means:

- An increase of 12 – 20 MW of regulating capacity
- No increase in contingency reserves
- An increase of 5 – 12 MW in five minute variability

- Incremental operating reserve costs of \$0.11/MWh of wind generation (20% wind case). The total wind integration operating cost ranges from a low of \$2.11 (15% wind case) to a high of \$4.41 per MWh (25% wind case) of wind generation delivered to Minnesota utilities.

In summary, the Minnesota wind integration study found the addition of wind generation to supply up to 25% of Minnesota's retail electric energy sales can be reliably accommodated by the electric power system. Total integration operating cost is less than \$4.50 per MWh of wind generation. The four leading factors influencing the study results are:

- A geographically diverse wind scenario
- The large MISO energy market
- Functional consolidation of balancing authorities
- Sufficient transmission.

The wind integration study results were presented to the Minnesota PUC in mid-December and are available online at [http://www.puc.state.mn.us/news\\_events/index.htm#electric](http://www.puc.state.mn.us/news_events/index.htm#electric).

Based on audience questions, Mr. Schuerger offered the following:

- The integration study was designed to pull in various solutions, including consolidation of balancing authorities. The technical experts assisting the study recommended pulling consolidation of balancing authorities into the base case. More focus was put on operating impacts than transmission expansion planning.

### **MISO and West Regional Study Group Transmission System Studies**

*Dale Osborn, Midwest ISO*, addressed why a robust transmission system is needed and how it is accomplished. Mr. Osborn said large uncertainties exist in today's market, such as:

- Where loads are going to go
- Transmission availability under open access
- Transmission construction times
- Emission constraints, e.g. carbon tax
- Fuel price volatility
- Future generation mix.

Over the last 3 years, MISO saw a huge drop in natural gas as a portion of its fuel mix, going from 89% gas in 2003 to 18% gas in 2006. Coal replaced the largest share of the gas, increasing from 7% to 67% and wind also grew from 4% to 17%.

MISO studies future generation scenarios looking 10 – 20 years out with the scenarios selected through a stakeholder advisory committee process. The purpose of MISO's exploratory studies is not to design a transmission system but rather figure out what challenges exist and how to deal with them. Traditionally capacity studies were done to evaluate the ability to transmit energy without overloading lines; for wind energy, MISO is doing economic studies rather than reliability studies. The exploratory studies provide information to help guide political and regulatory decisions but are not binding.

MISO is comprised of three regions—West, Central, and East. The western studies were put together into one big study, the West Regional Study Group (RSG), with 6,689 MW of generation in the MISO queue. A 10% wind energy scenario for this region calls for 2,948 MW of wind to serve area load. As state legislatures in the West region decide on wind energy penetration levels for a certain year, then MISO will study the coordination of transmission in the West RSG, reevaluate transmission expansions, and provide information about the amount of wind energy that can be accommodated.

The MISO Transmission Expansion Plan (MTEP) Draft Vision Study looks at 16,000 MW of wind energy across the MISO footprint, which represents 20% renewable energy for Minnesota and 10%

renewable energy in other MISO states. MISO used a top-down study approach, where the end result was used to figure out what is needed, with 2016 as the study year. Mapping energy flows, MISO could see that energy wants to flow east towards load centers but runs into constraints, so they overlaid a high voltage 765 kV grid (a 345 kV system was not considered adequate for the generation that needs to go into eastern MISO). The result is market flow west to east and lower Location Marginal Pricing (LMP) for all areas. The economic results in 2016 reveal essentially a break-even situation but considerable displacement of coal and associated CO<sub>2</sub> and SO<sub>x</sub>.

Mr. Osborn concluded by saying a RPS or other tool is needed to keep wind development going until market solutions are put in place. He also suggested that shifting to a “user pays” system may facilitate greater transmission availability. Such a system has not been used, but computer technology now makes it possible to know who is using what and charge them accordingly. Future vision study by MISO may include increasing the wind penetration level to 20% across its entire footprint and extending the study to other RTOs in coordination with DOE.

Mr. Osborn noted in response to questions:

- About one-quarter of MISO’s energy goes east into New Jersey and New York because of the load volume there.
- MISO ran three scenarios:
  - No wind (or as an economic resource) and wind was not chosen
  - 10% wind, which increased costs about 4%
  - Environmental Plan (where CO<sub>2</sub> emissions cost \$27/ton) which shut down coal but did not increase wind, instead increasing nuclear and natural gas.
- Natural gas is setting the marginal price on the market. Wind penetrations will not be achieved unless gas gets above \$60.

Afterwards, meeting participants suggested that MISO should look at a range of CO<sub>2</sub> prices, which might prompt more wind displacing coal.

### **Regional Siting Cooperation: The OMS Northwest Project**

**Bill Smith, Organization of MISO States (OMS)**, explained that OMS is comprised of state regulatory agencies within the MISO footprint that handle siting processes and needs determination for all generation resources, including wind. OMS formed three years ago, providing guidance to MISO policy decisions and developing regional transmission cost allocation policies to reduce impediments to expansion. The organization has eight workgroups on different subjects, including a Transmission Planning and Siting Workgroup with a Northwest Subgroup comprised of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin. The OMS Northwest Subgroup’s purpose is to:

- Understand the transmission permitting and siting processes of the five states
- Explore ways the states can work with each other and coordinate activities on transmission line permit applications that cross state lines
- Coordinate all affected states where a transmission line may be proposed.

The Northwest Subgroup prepared a multi-state listing of authorities to coordinate siting procedures with the member states. The subgroup also prepares multi-state comparisons of state standards for certifying and permitting transmission lines. The siting process comparison matrixes are available at <http://www.misostates.org/WG7TransPlanWIPLIST.htm>. Future activities for the subgroup include:

- Comparing schedules for processing of an application
- Looking at two state combinations, e.g. Minnesota and North Dakota, to identify opportunities to coordinate and changes needed to enhance coordination
- Preparing a multi-state listing of hearing and decision requirements and practices.

OMS hopes its side-by-side comparison matrixes inspire other states to adopt similar means of coordinating siting processes. The intent is not to identify “wrong” methods but rather to encourage greater coordination. Through its work, the OMS Northwest Subgroup has seen increased public understanding of siting processes, better communication among commissions and staff, and more support for cross-border coordination on siting issues.

## FEDERAL TRANSMISSION STUDIES & ACTIVITIES

**David Meyer, Department of Energy (DOE)<sup>1</sup>:** DOE’s Office of Electricity Delivery and Energy Reliability is charged with “[leading] national efforts to modernize the electric grid, enhance security and reliability of the energy infrastructure, and facilitate recovery from disruptions to energy supply.” The Energy Policy EPAct 2005 gave the Office of Electricity three new responsibilities:

- 1) Issuing a national transmission congestion study by August 8, 2006 and every three years thereafter;
- 2) The Secretary of Energy may, on the basis of the congestion study and comments thereon, designate selected geographic areas as *national interest electric transmission corridors* (“National Corridors”); and
- 3) Under certain conditions, developers of proposed transmission projects in National Corridors may apply to FERC for a construction permit, which may include limited eminent domain authority.

DOE published its first congestion study after reviewing over 50 existing regional-scale studies on transmission congestion and expansion, and conducting interconnection-wide modeling of the Eastern and Western Interconnects (excluding ERCOT). Based on the results of this work, DOE identified three classes of congestion areas:

- *Critical Congestion Areas:* These are areas where it is critically important to remedy existing or growing congestion problems because the current and projected effects of congestion are severe.
- *Congestion Areas of Concern:* Areas where a large-scale congestion problem exists or may be emerging but more information and analysis appear to be needed to determine the magnitude of the problem and possible solutions.
- *Conditional Congestion Areas:* Areas where there is some transmission congestion at present, but congestion on a much larger scale would result if large amounts of new generation resources were to be developed without simultaneous development of associated transmission capacity.

In DOE’s first congestion study (released in August 2006), it identified two critical congestion areas: the large metropolitan area from greater New York City south along the Atlantic Seaboard to the northern Virginia area south and west of Washington, DC; and southern California from Los Angeles to San Diego. Customers in these two critical congestion areas are paying high electricity prices because transmission congestion prevents their electricity providers from obtaining supplies from cheaper sources, and some of them are also facing diminishing reliability. Congestion areas of concern include New England, the area between Seattle and Portland, the area around Phoenix and Tucson, and the San Francisco Bay area. There are at least eight conditional congestion areas, located in regions of the country where coal, natural gas, or renewable resources are comparatively abundant, or regions where there is growing interest in the development of new nuclear generating capacity. Development of new generation in substantial quantities in these areas without accompanying transmission would create congestion problems.

---

<sup>1</sup> Mr. Meyer prefaced his remarks saying that he was giving his own views on this subject and that his statements should not be understood as representing the official views of the Department of Energy.

DOE received more than 400 comments on the congestion study. The comment period closed on October 10th, but comment review is ongoing and Mr. Meyer indicated late comments might still be considered. The congestion study, comments, and related materials are online at [http://www.oe.energy.gov/epa\\_sec1221.htm](http://www.oe.energy.gov/epa_sec1221.htm).

DOE is considering how to bound National Corridors. The corridors must be large enough to give siting authorities ample latitude to make their decisions, without making them unnecessarily large. DOE does not have siting authority – that remains primarily a state responsibility. In addition to making recommendations to the Secretary concerning the designation of National Corridors, DOE's Office of Electricity envisions other next steps, including:

- Publication of annual reports on progress and changes identified in congestion areas;
- Publication of the next congestion study (August 2009)
- Work with others on ways to maximize the value of the congestion studies.

Mr. Meyer offered the following comments in response to questions:

- The eastern critical congestion area covers large parts PJM and the New York ISO, and a smaller part of ISO-New England. With so large and complex an area, a single solution to its congestion problems is unlikely; a combination of wire and non-wire solutions will probably be needed.
- The nation's high-voltage transmission networks may evolve to become the functional equivalent of the interstate highway system, but the number of National Corridors needed is not clear. More integrated analysis across the Eastern Interconnect is needed to get a sense of what additional transmission capacity would be most beneficial inter-regionally. Whether a National Corridor would be appropriate in a given area will be determined case-by-case.
- The Energy Policy Act of 2005 gave DOE a schedule for the congestion studies, but it did not set any dates for corridor designations. DOE plans to designate corridors on an as-needed, as-appropriate basis.

#### **KEYNOTE ADDRESS**

*Commissioner Suedeen Kelly, Federal Energy Regulatory Commission (FERC)*, reflected on the fast growth of wind and its attractiveness as a steady-priced commodity. She noted that 24 states and the District of Columbia have Renewable Portfolio Standards (RPSs), all of which include wind energy. Commissioner Kelly suggested need exists to tap into the U.S.'s wind potential while acknowledging the challenge of getting wind energy to load. She encouraged more regional planning and applauded the Midwest for setting up CapX to accomplish the long-term, collaborative transmission planning that fosters greater wind delivery. The U.S. is even approaching renewable energy integration on the world scene, where Commissioner Kelly recently participated in an IEA meeting on building transmission and developing interconnection policies that suit renewables.

FERC has taken initial steps for integrating renewables into the grid with rules on standard interconnection for intermittent generation and a proposed rule on imbalance penalties. Commissioner Kelly is working on getting more comprehensive support for integrating renewables at FERC. The new commissioners have expressed interest in and support of renewables. From her perspective, access to regional markets is key for wind and FERC encouraged regionalization through Orders 888 and 2000.

FERC has helped intermittent resources like wind participate in Locational Marginal Pricing and its interconnection rule eliminates the need for reactive power when not necessary. Recently FERC addressed adequate transmission structure with advanced prudence review of infrastructure, accelerated depreciation, and deferred cost recovery. EP Act 2005 also granted FERC transmission siting authority under certain circumstances. In the last week, FERC issued its final rule where FERC siting authority is

triggered when states either do not have authority, cannot evaluate unique aspects, or the state has withheld action for over a year. FERC does not really want to site lines but will act if needed.

Through its Open Access Transmission Tariff (OATT), FERC made long distance transmission more practical and possible; however, FERC is revisiting whether the OATT is meeting today's needs. FERC issued a OATT NOPR in summer 2007 and Commissioner Kelly urged workshop participants to write her if they are supportive of the NOPR's elements, such as:

- More flexible transmission pricing
- Making more of the existing infrastructure available to wind power
- Adding hourly firm service to current service offerings.

She recognized that since wind energy must be transferred long distances, it is important to get Available Transmission Capacity (ATC) right so wind is not curtailed or higher than expected charges are encountered. The FERC OATT reform NOPR recognizes that ATC policy may be discriminating against wind; the NOPR calls for standards for contract path or flowgate and improved coordination and information exchange. Amending the OATT will also open up transmission planning on local and regional scales, incorporating eight required transmission planning principles. The NOPR also seeks comments on whether study on grid enhancement and cost allocation is needed. The commissioner reiterated that public participation really matters because FERC rules must be adopted on the basis of the record.

Another recent FERC initiative is accepting MISO's proposal on cost recovery methodology. The commissioners asked MISO to file an informational report in one year on how their cost recovery method is working. Commissioner Kelly applauded the Midwest for its innovation in bringing power to consumers, particularly MISO for its vision and Xcel Energy for being a renewable energy leader; other regions, she said, can learn from the Midwest.

## **BREAKOUT GROUPS ON MIDWEST PRIORITIES**

After hearing the updates on regional and national transmission studies and activities, workshop participants broke out into cross-stakeholder groups of 10 – 20 participants. Each breakout group was asked to discuss the list of 12 top priorities for advancing wind development and transmission in the Midwest (priorities list available as Appendix C). The NWCC workshop planning committee created the priorities list as a draft, looking for input and reactions from the workshop participants based on their personal experiences and what was learned during the workshop. Breakout groups met for 90 minutes, adjourned to lunch and Commissioner Kelly's keynote address, then reconvened to share reports from each breakout group. A reporter from each group provided an overview of his group's discussion as outlined below.

*Below are the original draft priorities by number with breakout group comments listed as italicized bullet points below each priority:*

### **Top Priorities for Advancing Wind Development and Transmission in the Midwest**

#### **Transmission Planning**

1. Develop MISO Vision Plan to optimize the amount of wind generation, such as 20% or more, across the entire MISO footprint and delivered to MISO load.
  - *This priority should be reworded to expand beyond MISO to PJM.*

- *Clarify the goal with a particular target, include PJM, and focus on tools and sensitivity analysis.*
  - *Urge transmission planners to pursue vision plans that include dispersed generation.*
  - *For 20% wind energy, renewable energy areas would need to be designated and a cost recovery mechanism established*
  
- 2. *Proactively develop transmission solutions for interconnection and delivery to maximize the amount of wind generation and move to Certificate of Need/CPCN in the appropriate states.*
  - *States generally want to see a need before agreeing to new transmission open system. State RPS policies can also be an effective forcing mechanism to stimulate transmission, although costs must be recovered and further activity is required.*
  - *Reword the priority to clarify that states have authority at levels below MISO, i.e. below 100 kV. Keep in mind that mandates tend to override planning and strategy. Recognize that Minnesota is a unique case with both supply and demand. Credit trading needs to be done on a regional basis.*
  - *Consider how to use existing infrastructure and keep things moving forward.*
  
- 3. *Identify lower voltage (115 kV and below) “on ramps” needed to accompany high voltage transmission solutions.*
  - *There was a lot of support for this priority. Group members expressed interest in amending the priority to strengthen local participation in sitting and more public involvement. Members suggested changing the wording to “Identify, via public stakeholder processes, new and improved lower voltage (115 kV and below) ‘on ramps’ needed to accompany high voltage transmissions solutions.”*
  - *MISO must take the lead on its Vision Plan while states and utilities take the lead on identifying lower voltage “on ramps” as referred to in this priority.*
  - *Since no single high voltage option is clear, local low voltage sources must be meshed into high voltage lines.*
  - *What can be done with the existing system*
    - *Work is being done to get study regions aligned and matching better, such as expanding westward to non-MISO regions.*
    - *Reconductering is another example of improving the current system*
    - *Focusing on wind as an energy source and not worrying about its capacity aspects in studies*
    - *Working on community involvement, e.g. C-BED*
  - *Make sure on-ramps are available for a wide range of projects*
  
- 4. *Explore when and where a National Corridor designation might be appropriate and useful.*
  - *This priority is tied to a national RPS that assumes the goal is 20% for everyone, not a national average.*
  - *Need to consider the states’ rights implications.*
  - *This priority already being addressed by several groups.*
  
- 5. *Review PUCs/PSCs ability to consider regional need in transmission proceedings versus in-state need only.*
  - *There was widespread agreement that regional need should be tackled, but the specifics are very hard to put into practice and therefore national corridors may be an effective backstop.*
  - *State-specific legislation is a challenge. Legislators should follow the lead of task forces seeking compatibility.*
  - *Regional transmission need is already incorporated by states in response to EPAct 2005.*

## Cost Allocation

6. Adopt appropriate mechanism at the state level to fund wind generator 50% share of Network Upgrade interconnection cost.
  - *Members were uncertain what kind of mechanisms the list drafters had in mind for funding network upgrade interconnection costs. They also wondered if this would affect the PTC because the PTC can be offset by state-level grants or tax credits; they urged caution with this approach.*
  - *Discussed landowner compensation for lines that is lease based, perhaps a throughput payment, rather than a one-time payment.*
7. Review pros and cons of state-level mechanisms that would allow for recovery of transmission investment with and without a rate case.
  - *Members supported this priority.*
  - *Urged caution in this area and not moving too far beyond the rate case process.*
  - *Reword priority changing “would allow” to “allow” since states largely do allow for recovery.*

## Investment

8. Identify and implement mechanisms that allow new investors to build transmission and recover costs.
  - *The terminology “new investors” gave one group pause; investors are not the problem, cost recovery and permitting at the problem. The group was skeptical about whether pursuing this priority would be useful.*
  - *Tax credits generally are useable only deep pockets with high tax liability.*

## Markets

9. Continue to encourage non-market participant utilities to join MISO and facilitate resolution of transmission constraints.
  - *This priority difficult to achieve; suggested amending it to include utilities not in MISO while retaining MISO utilities. Also recommended finding out why non-MISO members are not joining MISO to see if those reasons can be overcome.*
  - *MISO pricing is problematic. MISO may want to consider variable levels of participation.*
  - *There will hardly be any wind power in the Dakotas until WAPA and Basin Electric join MISO.*
  - *Market access is not well understood by wind developers, but it is unclear whether that is because it is too difficult or is being overlooked*
  - *Look for ways for non-MISO participants to join MISO or cooperate with MISO and other non-MISO utilities and balancing authorities*
10. Launch major effort to solve tariff issues and physical transmission constraints between North and South Dakota and the MISO market.
  - *Emphatic support for this priority while acknowledging it is difficult to tackle.*
  - *Consider this a high priority.*
  - *This priority got a good response and activities on this topic are already getting underway.*

## Other

11. Support funding for and encourage adequate staffing levels at state agencies to handle large volume of transmission regulatory proceedings. Enhance MISO staff capability to assure full and timely MTEPs and to quickly clear the queue for transmission studies for new generation.
  - *Group members had many comment about this priority and felt it covered to two separate topics. Skepticism was expressed about staffing being the issue, instead urging streamlining of permitting by combining parallel tracks or doing permitting in conjunction with other states.*
  - *Increased resources and staffing needed not just at MISO; transmission owners also have a lack of resources and staff to do study work*
  
12. Focus additional resources on educating decision-makers, opinion leaders, and other stakeholders at the Federal and state levels on key issues for advancing Midwest wind development.
  - *It was not clear in this priority who needs to be educated, who is the target.*
  - *Education is needed at all levels.*
  - *Priority 12 should be considered as a higher priority.*

Some groups had feedback that did not correspond to a certain draft priority. Those comments are:

- Need to look at the queue to improve speed and priority; educate queue users on how to submit in groups and regions.
- Encourage looking at ways to work around transmission problems, including efficiency and non-wires solutions.
- Deadlines are needed for the priorities; think about timeframes and which ones are legislative, regulatory, etc.
- Recommend strengthening OMS's role and getting the Midwest governors more involved.
- Urge more wind industry support for transmission expansion.
- Want to see OATT reform and mandating of regional planning.
- Tribes should be included in stakeholder processes.
- As developing transmission, wind and other renewables need to remember other generators in the market may take advantage of new transmission

In a few of the breakouts, groups designated short, mid, and long term priorities or top priorities as follows:

- Priorities 3 and 5 were labeled short term; 4, 9, and 10 mid-term; the MISO Vision Plan a long-term target.
- Two key areas that emerged as most significant
  - Cost allocation
  - Regional planning
    - Do load review to understand the needs
    - Coordinate local needs and step up to regional and national levels
    - Create common goals and structure among the three levels of planning (local, regional, national)
    - Define regional cells and plan around those units
    - A national mandate requires national planning
- The priorities quite interrelated, so there could not be identification of a single priority
- Identified Priorities 2, 3, 6, and 10 as top priorities
- All the priorities are important

After the breakout group reports, participants made the following comments:

- There seem to be misconceptions about MISO cost recovery, perhaps briefs or other means are needed to get information out about what is happening.
- The ISO/RTO Council has proposed taking MISO's Vision Plan and expand it to other RTOs.
- Strengthening the role and charter of OMS is a good idea.

Facilitator Abby Arnold thanked everyone for their active involvement in the workshop. The breakout feedback will be shared with the workshop planning committee and next steps developed to keep Midwest transmission activities moving forward.

APPENDIX A: FINAL PARTICIPANT LIST



**NATIONAL WIND COORDINATING COMMITTEE  
MIDWEST TRANSMISSION WORKSHOP VI**

**December 4 – 5, 2006**

**Ramada Mall of America  
Bloomington, MN**

*Final Participant List*

Bobby Adjemian  
Transmission Business Director  
FPL Energy  
700 Universe Boulevard  
Juno Beach, FL 33408  
561-575-2516  
Bobby\_K\_Adjemian@fpl.com

Mark Ahlstrom  
CEO  
WindLogics Inc.  
1217 Bandana Blvd. N.  
Saint Paul, MN 55108  
651-556-4262  
mark@windlogics.com

Jared Alholinna  
Transmission Planning Engineer  
Great River Energy  
17845 Hwy 10  
Elk River, MN 55330  
763-241-5797  
jalholinna@grenergy.com

Salva Andiappan  
sr.andiappan@mappcor.org

Brian Antonich  
Small Wind Program Analyst  
Windustry  
2105 First Ave South  
Minneapolis, MN 55404  
612-870-3465  
brian@windustry.org

Annette Bair  
Rural Minnesota Energy Board  
C/O SRDC, 2401 Broadway Ave  
Slayton, MN 56172  
507-836-8547  
phydev@swrdc.org

Tim Bartel  
Minnkota Power  
tbartel@minnkota.com

Travis Becker  
Prairie Wind Solutions  
651-210-0929  
travis@prairiewindsolutions.com

Ian Benson  
612-330-6949  
ian.r.benson@xcelenergy.com

Michelle Bissonnette  
Vice President  
HDR  
6190 Golden Hills Drive  
Minneapolis, MN 55416  
763-598-2023  
michelle.bissonnette@hdrinc.com

William Black  
Government Relation Representative  
Minnesota Municipal Utilities  
Association  
3025 Harbor Lane North, Suite 400  
Plymouth, MN 55447  
763-551-1230  
bblack@mmua.org

**APPENDIX A: FINAL PARTICIPANT LIST**

Paul Blackburn  
Senior Program Analyst  
Windustry  
2105 First Ave South  
Minneapolis, MN 55404  
612-870-3461  
paulblackburn@windustry.org

Keith Bogut  
Exec Budget Officer  
MN Dept of Finance  
400 Centennial Bldg, 658 Cedar St.  
St. Paul, MN 55155  
keith.bogut@state.mn.us

Paul Bonavia  
President, Utilities Group  
Xcel Energy Inc.  
414 Nicollet Mall, 5th Floor  
Minneapolis, MN 55401  
612-215-4635  
mark.a.tarnowski@xcelenergy.com

Bret Borth  
Associate Principal  
Braun Intertec  
11001 Hampshire Ave. S.  
Bloomington, MN 55372  
952-995-2434  
bborth@braunintertec.com

Tom Brause  
VP Administration  
Otter Tail Power  
215 S Cascade St  
Fergus Falls, MN 56537  
tbrause@otpc.com

Mike Bull  
Assistant Commissioner  
MN Dept. of Commerce  
85 7th Place East, Suite 500  
St. Paul, MN 55101  
651-282-5011  
mike.bull@state.mn.us

Jim Burg  
Mayor of Wessington Springs, South  
Dakota  
Box 347  
Wessington Springs, SD 57382  
605-539-1780  
burg\_jim@yahoo.com

Greg Chamberlain  
Director, Transmission Portfolio  
Delivery  
Xcel Energy  
414 Nicollet Mall, MP-8  
Minneapolis, MN 55401  
612-337-2158  
greg.p.chamberlain@xcelenergy.com

Steve Clemmer  
Research Director  
Union of Concerned Scientists  
2 Brattle Square, 6th Floor  
Cambridge, MA 0  
617-547-5552  
sclemmer@ucsusa.org

Randy Corbin  
Senior Policy Advisor  
Ohio Consumers' Counsel  
10 W. Broad Street, Suite 1800  
Columbus, OH 43215  
614-466-8574  
corbin@occ.state.oh.us

George Crocker  
Executive Director  
North American Water Office  
P.O. Box 174  
Lake Elmo, MN 55042  
651-770-3861  
gwillc@nawo.org

**APPENDIX A: FINAL PARTICIPANT LIST**

David Cullum  
Team Leader  
American Transmission Co.  
2489 Rinden Road  
Cottage Grove, WI 53527  
608-877-7608  
dcullum@atcllc.com

James Dahlberg  
Representative  
International Brotherhood of Electrical  
Workers  
8174 Cass Avenue  
Darien, IL 60561  
218-341-9350  
James\_Dahlberg@ibew.org

Lisa Daniels  
Executive Director  
Windustry  
2105 First Ave South  
Minneapolis, MN 55404  
612-870-3462  
lisadaniels@windustry.org

David Danz  
Tribal Planner  
Grand Portage Band of Chippewa  
P.O. Box 428  
Grand Portage, MN 55605  
218-475-2277  
dave.danz@gmail.com

Edgar DeMeo  
President  
Renewable Energy Consulting Services,  
Inc.  
2791 Emerson Street  
Palo Alto, CA 94306  
650-327-3090  
edemeo@earthlink.net

Wayne Dilling  
Sr. Design Phase Manager  
M. A. Mortenson Co  
700 Meadow Lane North  
Minneapolis, MN 55422  
763-287-5280  
wayne.dilling@mortenson.com

Carl Dombek  
Mgr., External Communications  
Midwest ISO  
701 City Center Drive  
Carmel, IN 46032  
317-249-5205  
cdombek@midwestiso.org  
Tom Drake  
Drake Enterprises

John Dunlop  
Technical Representative  
American Wind Energy Association  
448 Morgan Avenue South, Suite 300  
Minneapolis, MN 55405  
612-377-3270  
JDunlop@AWEA.org

Joel Dykstra  
Representative  
S.D. House of Representatives  
900 Angel Lane  
Canton, SD 57013  
605-764-6399  
jdykstra1@iw.net

Jim Edwards  
AGM-Operations  
East River Electric Power Cooperative,  
Inc.  
PO Box 227  
Madison, SD 57042  
605-256-4536  
jedwards@eastriver.coop

**APPENDIX A: FINAL PARTICIPANT LIST**

Mark Eilers  
Manager  
GE Energy  
2201 France Ave South  
Minneapolis, MN 55416  
952-922-0798  
mark.eilers@ge.com

Bob Eleff  
Legislative Analyst  
Research Dept./MN House of  
Representatives  
House Research Department, 600 State  
Office Building  
St. Paul, MN 55155  
651-296-8961  
bob.eleff@house.mn

William Even  
Director  
SD Dept. of Tourism & State  
Development  
GOED Capitol Lake Plaza, 711 E. Wells  
Ave.  
Pierre, SD 0  
605-773-3301  
Bill.even@state.sd.us

Robert Fischer  
Business Manager  
IBEW Local 426  
3509 South Norton  
Sioux Falls, SD 57105  
605-336-0370  
lteworkers@qwest.net

Bob Fullerton  
Power Marketing Advisor  
Western Area Power Administration  
12155 West Alameda Parkway, P.O.  
Box 281213  
Lakewood, CO 0  
720-962-7079  
fullerto@wapa.gov

Edward Garvey  
Deputy Commissioner, Energy &  
Telecommunications Division  
MN Dept. of Commerce  
85 7th Place East, Suite 500  
St. Paul, MN 55101  
651-296-9325  
edward.garvey@state.mn.us

David Glenn  
PPM Energy, Inc  
Portland, OR 97209  
503-796-7040  
dave.glenn@ppmenergy.com

Rick Gonzalez  
Excel Engineering  
500 73rd Avenue NE, Suite 119  
Minneapolis, MN 55432  
763-571-5008  
rick@exceleng.net

Wilson Gonzalez  
Sr. Regulatory Analyst  
Ohio Consumers' Counsel  
10 W. Broad Street, Suite 1800  
Columbus, OH 43215  
614-466-8574  
Gonzalez@occ.state.oh.us

John Gostovich  
Consultant  
PO Box 205  
Hudson, WI 54016  
805-448-3870  
gostovich@mac.com

Robert Gramlich  
Policy Registration  
American Wind Energy Association  
1101 14th St. NW  
Washington, DC 20005  
202-383-2500  
rgramlich@awea.org

**APPENDIX A: FINAL PARTICIPANT LIST**

Stan Gray  
Director, Transmission  
RES Americas  
1 SW Columbia St, Ste 460  
Portland, OR 97258  
503-219-9000  
stan.gray@res-americas.com

Paul Greenhagen  
Principal  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344  
952-906-7429  
paul.greenhagen@westwoodps.com

Shalini Gupta  
Senior Energy Associate  
Izaak Walton League  
1619 Dayton Avenue, #202  
St. Paul, MN 55104  
sgupta@iwla.org

Jeff Haase  
Planner Principal  
MN Dept. of Commerce  
85 7th Place East, Ste 500  
St. Paul, MN 55101  
651-297-5648  
jeffrey.haase@state.mn.us

Rick Haglund  
Project Surveyor  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344  
952-697-5704  
rick.haglund@westwoodps.com

Tony Hainault  
Air Quality & Energy Analyst  
Hennepin County Dept. of  
Environmental Services  
417 North 5th St, Suite 200  
Minneapolis, MN 55401  
612-348-3059  
tony.hainault@co.hennepin.mn.us

Rick Halet  
Xcel Energy  
414 Nicollet Mall  
Mpls, MN 55401  
612-330-7780  
richard.m.halet@xcelenergy.com

Cindy Hammarlund  
Transmission Marketing Manager  
Minnesota Power  
30 W. Superior Street  
Duluth, MN 55802  
218-723-3970  
chammarlund@mnpower.com

Mark Hannifan  
Sr. Project Manager  
Burns & McDonnell  
9400 Ward Parkway  
Kansas City, MO 64114  
816-823-7102  
mhannifan@burnsmcd.com

Eric Hansen  
V.P. Environmental Engineering  
Pinnacle Engineering  
11541 95th Avenue North  
Maple Grove, MN 55369  
763-315-4501  
cnelson@pineng.com

**APPENDIX A: FINAL PARTICIPANT LIST**

Gary Hanson  
Commissioner  
SD PUC  
500 East Capitol Avenue  
Pierre, SD 57501  
605-773-3201  
Gary.Hanson@state.sd.us

Larry Hartman  
Planning Director  
MN Dept. of Commerce  
85 7th Place East, Suite 500  
St. Paul, MN 55101  
651-296-5089  
larry.hartman@state.mn.us

Mike Jacobs  
Deputy Policy Director  
AWEA  
Washington, DC 20005  
978-852-4674  
mjacobs@awea.org

Doug Jaeger  
VP, Transmission  
Xcel Energy  
414 Nicollet Mall, MP 8  
Minneapolis, MN 55401  
612-330-7608  
Doug.Jaeger@xcelenergy.com

Roger Johnson  
Agriculture Commissioner  
North Dakota Dept. of Agriculture  
600 East Boulevard Ave., Dept. 602  
Bismarck, ND 58505  
701-328-4754  
rojohno@nd.gov

Paul Johnson  
Project Leader  
Minnesota Power  
30 W. Superior St  
Duluth, MN 55802  
218-722-5642  
pjohnson@mnpower.com

David Jones  
British Petroleum  
David.Jones9@bp.com

Stephen Jones  
Director, Midwest Region  
enXco  
10 Second Street NE, Suite 107  
Minneapolis, MN  
612-746-0770  
stevej@enxco.com

Dan Juhl  
CEO  
DanMar & Associates  
996 190th Ave  
Woodstock, MN 56186  
507-777-4310  
djuhl@woodstocktel.net

Will Kaul  
Vice President  
Great River Energy  
P.O. Box 800  
Elk River, MN 55330  
wkaul@greenergy.com

Sudeen Kelly  
Commissioner  
Federal Energy Regulatory Commission  
888 First Street, NE  
Washington, DC 20426  
202-502-6501  
sudeen.kelly@ferc.gov

**APPENDIX A: FINAL PARTICIPANT LIST**

Gary Kubly  
MN State Senator  
Minnesota Senate  
125 Aadland Circle  
Granite Falls, MN 56241  
651-296-5094  
sen.gary.kubly@senate.mn

Thomas Lewis  
Director  
Res-Americas  
12 South Sixth Street, Suite 930  
Minneapolis, MN 55401  
612-746-4065  
tom.lewis@res-americas.com

Chris Langemeier  
Senator, District 23  
Nebraska Legislature  
Room 1523, State Capitol  
Lincoln, NE 68509  
402-471-2719  
clangemeier@unicam.state.ne.us

Mark Lindquist  
Energy Policy Specialist  
The Minnesota Project  
1026 North Washington  
New Ulm, MN 56073  
507-354-4780  
mlindquist@mnproject.org

Earnie Lehman  
Vice Chair  
Kansas Electric Transmission Authority  
PO Box 898  
Hays, KS 67601  
785-625-1400  
elehman@mwenergy.com

John Lockhart  
Principal Transmission Consultant  
Xcel Energy  
414 Nicollet Mall - MP 8  
Minneapolis, MN 55401  
612-330-7921  
john.w.lockhart-jr@xcelenergy.com

Ronald Lehr  
Attorney  
AWEA  
4950 Sanford Circle West  
Englewood, CO 80113  
303-504-0940  
rlehr@msn.com

Mark Lucas  
Vice President  
Brighton Development  
614 N 1st Street, #100  
Minneapolis, MN 55401  
612-215-8603  
mlucas@brightondevelopment.com

Jack Levi  
Partner  
Wind Energy Developers, LLC  
One Financial Plaza, 120 South 6th St,  
Suite 2490  
Minneapolis, MN 55402  
612-338-1774  
jack@windenergydevelopers.com

Angela Maiko  
Transmission Planning Engineer  
Great River Energy  
17845 East Highway 10  
Elk River, MN 55330  
Elk River, Minnesota 55330  
763-241-2300  
amaiko@greenergy.com

**APPENDIX A: FINAL PARTICIPANT LIST**

William Malcolm  
Mgr - St Reg Affairs  
MISO  
701 City Center Dr  
Carmel, IN 46032  
317-409-3674  
bmalcolm@midwestiso.org

Paul Malone  
Regulatory, Planning & Contracts  
Manager  
Nebraska Public Power District  
1215 West Highway 34, P.O. Box 608  
York, NE 68467  
402-362-7273  
pjmalon@nppd.com  
Emily Merrill  
Macalester College  
emerrill@macalester.edu

David Meyer  
Senior Advisor  
U.S. Department of Energy  
1000 Independence Ave SW  
Washington, DC 20585  
202-586-3118  
david.meyer@hq.doe.gov

Mike Michaud  
Consultant  
Matrix Energy Systems  
802 North Pine Creek Road  
Maiden Rock, WI 54750  
651-380-3522  
mmichaud@hbc.com

Clair Moeller  
VP, Trans. Asset Mgmt.  
Midwest ISO  
1125 Energy Park Drive  
St. Paul, MN 0  
651-632-8441  
cmoeller@midwestiso.org

Jesse Morin  
Prairie Wind Solutions  
612-743-9655  
jesse@prairiewindsolutions.com

Derek Mosolf  
Mgr Cust Accts  
Midwest ISO  
1125 Energy Park Drive  
Saint Paul, MN 55108  
651-632-8496  
dmosolf@midwestiso.org

Craig Murphy  
Consultant  
res-americas  
12 South Sixth Street, Suite 930  
Minneapolis, MN 55401  
715-523-9798  
craig.murphy@res-americas.com

Don Neumeyer  
Engineer  
Public Service Commission of  
Wisconsin  
610 N. Whitney Way, P.O.Box 7854  
Madison, WI 0  
608-267-9304  
don.neumeyer@psc.state.wi.us

Dale Osborn  
Transmission Technical Director  
Midwest ISO  
701 City Center Drive  
Carmel, IN 46031  
317-697-4774  
dosborn@midwestiso.org

Brian Parsons  
NREL  
1617 Cole Boulevard, MS3811  
Golden, CO 80401  
303-384-6958  
brian\_parsons@nrel.gov

**APPENDIX A: FINAL PARTICIPANT LIST**

Patrick Pelstring  
Partner  
Wind Energy Developers, LLC  
1107 Hazeltine Blvd, Suite 118  
Chaska, MN 55318  
952-361-5445  
patrick@windenergydevelopers.com

Steve Peluso  
Consultant  
Wind on the Wires  
1619 Dayton Avenue, #203  
St. Paul, MN 55104  
651-644-3400  
lbrewster@windonthewires.org

Jeff Peters  
Director, Marketing and Development  
Missouri River Energy Services  
3724 W Avera Dr, PO Box 88920  
Sioux Falls, SD 0  
605-338-4042  
jpeters@mrenergy.com

Charnel Petersen  
Technical Analyst  
Sisseton-Wahpeton Oyate Planning &  
Development Dep  
PO Box 717  
Agency Village, SD 57262  
605-698-4972  
charnel.petersen@swst.us

Erla Petursdottir  
Avant Energy Services  
200 South Sixth St, Suite 300  
Minneapolis, MN 55402  
612-252-6512  
erla.petursdottir@avantenergy.com

Gordon Pietsch  
Director, Transmission Planning &  
Operations  
Great River Energy  
17845 East Highway 10, PO Box 800  
Elk River, MN 0  
763-241-2235  
gpietsch@GREnergy.com

Deborah Pile  
Supervisor, Energy Facility Permitting  
MN Dept. of Commerce  
85 7th Place East, Suite 500  
St. Paul, MN 55101  
651-297-2375  
deborah.pile@state.mn.us

Bruce Poole  
Consultant  
Fresh Energy  
301 W. Main St.  
Spring Grove, MN 55974  
507-458-0512  
brucepoole@springgrove.coop

Kevin Porter  
Senior Analyst  
Exeter Associates Inc.  
5565 Sterrett Place, Suite 310  
Columbia, MD 21044  
410-992-7500  
porter@exeterassociates.com

Mark Rathbun  
Great River Energy  
17845 East Highway 10  
Elk River, MN 55309  
763-241-2447  
mrathbun@greenergy.com

**APPENDIX A: FINAL PARTICIPANT LIST**

Ron Rebenitsch  
Mgr of Member Marketing  
Basin Electric Power Cooperative  
1717 East Interstate Ave  
Bismarck, ND 58503  
701-255-5120  
ronreb@bepc.com

Michael Reese  
Director - Renewable Energy  
University of Minnesota West Central  
Research and Outreach Center  
46352 State Hwy 329  
Morris, MN 56267  
320-589-1711  
reesem@morris.umn.edu

Phyllis Reha  
Commissioner  
Minnesota Public Utilities Commission  
121 7th Place East, Suite 350  
Saint Paul, MN 0  
651-201-2240  
phyllis.reha@state.mn.us

Brad Roos  
Gen Mgr  
Marshall Municipal Utilities  
113 South 4th St.  
Marshall, Minnesota 56258  
507-537-7005  
bradr@marshallutilities.com

Scott Russell  
Freelance writer  
2536 35th Ave. S.  
Minneapolis, MN 55406  
612-724-3026  
scottrussell@usfamily.net

Matthew Sakurada  
Business Developer  
BP Alternative Energy  
130 N. Steele Street Suite A  
Sanford, NC 27330  
919-770-9329  
matthew.sakurada@bp.com

Dave Savage  
Business Developer  
WindLogics Inc.  
1217 Bandana Blvd. N.  
St. Paul, MN 55108  
651-556-4253  
daves@windlogics.com

Dean Schiro  
Transmission Analyst  
Xcel Energy  
250 Marquette Ave, Suite 720  
Minneapolis, MN 55401  
612-330-2886  
dean.e.schiro@xcelenergy.com

Meg Schissel  
Project Manager  
Midwest Wind Energy Finance  
12 South 6th Street, Suite 211  
Minneapolis, MN 55402  
612-332-0607  
meg@mwwind.com

Matt Schuerger  
Technical Consultant  
Energy Systems Consulting Services  
1619 Dayton Avenue, #203  
St. Paul, MN 55104  
651-644-3400  
lbrewster@windonthewires.org

**APPENDIX A: FINAL PARTICIPANT LIST**

Bill Schumacher  
Treasurer  
Intertribal COUP  
117 W. Pipestone Ave  
Flanders, SD 57028  
605-864-0585  
billschumacher1@yahoo.com

Tim Seck  
Manager, Midwest Renewables  
PPM Energy, Inc  
2221 Riverwood Place  
St. Paul, MN 55104  
651-917-9285  
timothy.seck@ppmenergy.com

Gregory Shafranski  
IBEW Int'l. Rep.  
IBEW  
17145 Davenport St. N.E.  
Ham Lake, MN 55304  
612-280-0186  
Greg\_Shafranski@ibew.org

Stephen Sherner  
Principal  
Sherner Power Consulting  
6890 Fitch Ave.  
Lake Nebagamon, WI 54849  
715-374-3286  
ssherner@centurytel.net

Chris Shugart  
Babcock and Brown  
1600 Smith Street, Suite 4025  
Houston, TX 77002  
713-571-8900  
chris.shugart@babcockbrown.com

Glen Skarbakka  
Mgr. Resource Planning  
Great River Energy  
PO Box 800  
Elk River, MN 55330  
763-241-5775  
[gskarbakka@grenergy.com](mailto:gskarbakka@grenergy.com)

Charlie Smith  
Utility Wind Integration Group  
Reston, VA 20191  
703-860-5160  
charlie@uwig.org

William Smith  
Executive Director  
Organization of MISO States  
100 Court Avenue, Suite 218  
Des Moines, IA 50309  
515-243-0742  
bill@misostates.org

Beth Soholt  
Director  
Wind on the Wires  
1619 Dayton Avenue, #203  
St. Paul, MN 55104  
651-644-3400  
bsoholt>windonthewires.org

Jason Standing  
Transmission Planning  
Xcel Energy  
414 Nicollet Mall  
Minneapolis, MN 55124  
612-330-7768  
jason.t.standing@xcelenergy.com

Duane Steen  
Director, New Generation  
Development  
Montana - Dakota Utilities Co.  
400 N 4th St  
Bismarck, ND 58501  
701-222-7804  
duane.steen@mdu.com

Bob Stephens  
National Segment Director  
Areva T&D  
5469 W. Geddes Ave  
Littleton, CO 80128  
303-903-8539  
[Robert.Stephens@areva-td.com](mailto:Robert.Stephens@areva-td.com)

**APPENDIX A: FINAL PARTICIPANT LIST**

Dehn Stevens  
Supervisor - Electric System Planning  
MidAmerican Energy Company  
106 East Second Street  
Davenport, IA 52801  
563-333-8138  
dastevens@midamerican.com

Brad Stevens  
Research Manager  
Energy & Environmental Research  
Center  
15 North 23rd Street  
Grand Forks, ND 58202  
701-777-5293  
bstevens@undeerc.org

Philip Stoffregen  
Attorney  
BrownWinick  
666 Grand Avenue, Suite 2000  
Des Moines, IA 50309  
515-242-2415  
pes@brownwinick.com

Andrea Stomberg  
Vice President, Electric Supply  
Montana-Dakota Utilities Co.  
400 North 4th Street  
Bismarck, ND 58501  
701-222-7752  
andrea.stomberg@mdu.com

Allan Stork  
Representative  
IBEW  
1910 S. Broadway  
Rochester, MN 55904  
507-261-4555  
al@ibewlocal343.org

Gary Stump  
Deputy General Counsel  
Iowa Utilities Board  
350 Maple Street  
Des Moines, IA 50319  
515-281-4606  
gary.stump@iub.state.ia.us

George Sweezy  
Supervising Engineer  
Minnesota Power  
30 W. Superior St.  
Duluth, MN 55802  
218-722-2641  
gsweezy@mnpower.com

Lisa Szot  
Transmission Mgr  
BP Alternative Energy  
700 Louisiana St, 33rd floor  
Houston, TX 77002  
713-354-2166  
lisa.szot@bp.com

Todd Tadych  
Transmission Planning Engineer  
American Transmission Company, LLC  
2489 Rinden Road  
Cottage Grove, WI 53527  
608-877-7619  
ttadych@atcllc.com

Aaron Tippie  
Wind Energy Service Manager  
Westwood Professional Services  
7699 Anagram Drive  
Eden Prairie, MN 55344  
952-906-7464  
aaron.tippie@westwoodps.com

**APPENDIX A: FINAL PARTICIPANT LIST**

Terry Torgerson  
Planning Engineer  
Dairyland Power Cooperative  
PO Box 817  
La Crosse, WI 0  
608-787-1403  
tlt@dairynet.com

Robert Vosberg  
Manager, Technical Support  
Alliant Energy  
1000 Main Street  
Dubuque, IA 52001  
563-584-7345  
robertvosberg@alliantenergy.com

John Wachtler  
Environmental Engineer  
Barr Engineering Company  
4700 West 77th St  
Minneapolis, MN 55435  
952-832-2600  
jwachtler@barr.com

Edward Weber  
Transmission System Planning Manager  
Western Area Power Administration  
P.O. Box 35800  
Billings, MT 0  
406-247-7433  
weber@wapa.gov

Susan Wefald  
Commissioner  
ND Public Service Commission  
Bismarck, ND 58504  
701-328-4497  
swefald@nd.gov

Steve Wegman  
Analyst  
South Dakota Public Utilities  
Commission  
500 East Capitol  
Pierre, SD 57501  
605-773-5797  
steve.wegman@state.sd.us

Jim Wilcox  
Xcel Energy  
Sioux Falls, SD 0  
605-339-8200  
james.c.wilcox@xcelenergy.com

Thomas Wind  
Wind Utility Consulting  
412 S. Locust St.  
Jefferson, IA 50129  
515-386-3405  
suewind@netins.net

Ken Wolf  
Manager Facilities Permitting  
MN Public Utilities Commission  
121 7th Place East  
St. Paul, MN 55101  
651-201-2257  
ken.wolf@state.mn.us

**APPENDIX A: FINAL PARTICIPANT LIST**

**RESOLVE Staff**

Abby Arnold  
Vice President  
RESOLVE  
1255 23rd St., NW, Suite 275  
Washington, DC 20037  
202-965-6211  
aarnold@resolv.org

Katie Kalinowski  
Outreach Coordinator  
RESOLVE  
1255 23rd St NW, Suite 275  
Washington, DC 20010  
202-965-6383  
kkalinowski@resolv.org

Jason Peller  
Executive Assistant  
RESOLVE  
1255 23rd St., NW, Suite 275  
Washington, DC 20037  
202-965-6387  
jpeller@resolv.org

**APPENDIX B: 2006 NWCC MIDWEST TRANSMISSION WORKSHOP PLANNING COMMITTEE**

Jeff Anthony

Jim Burg, Mayor of Wessington Springs, SD

Jenn DeCesaro, Clean Energy States Alliance

Ed DeMeo, Renewable Energy Consulting Services

Rob Gramlich, American Wind Energy Association

Gary Hanson, South Dakota Public Utilities Commission

Mike Jacobs, American Wind Energy Association

Miles Keogh, National Association of Regulatory Utility Commissioners

Ron Lehr, American Wind Energy Association

Ellen Lutz, U.S. Department of Energy

Laura Miner, U.S. Department of Energy

Dale Osborn, Midwest ISO

Brian Parsons, National Renewable Energy Laboratory

Gordon Pietsch, Great River Energy

Kevin Porter, Exeter Associates

David Schroeder, Project Risk Ltd

Matt Schuerger, Energy Systems Consulting Services

Charlie Smith, Utility Wind Integration Group

Bill Smith, Organization of MISO States

Beth Soholt, Wind on the Wires

Brad Stevens, Energy and Environmental Research Center

Ed Weber, Western Area Power Administration

Susan Wefald, North Dakota Public Utilities Commission

Steve Wegman, South Dakota Public Utilities Commission

## **APPENDIX C: DRAFT MIDWEST PRIORITIES**

### **Top Priorities for Advancing Wind Development and Transmission in the Midwest**

#### **Transmission Planning**

13. Develop MISO Vision Plan to optimize the amount of wind generation, such as 20% or more, across the entire MISO footprint and delivered to MISO load.
14. Proactively develop transmission solutions for interconnection and delivery to maximize the amount of wind generation and move to Certificate of Need/CPCN in the appropriate states.
15. Identify lower voltage (115 kV and below) “on ramps” needed to accompany high voltage transmission solutions.
16. Explore when and where a National Corridor designation might be appropriate and useful.
17. Review PUCs/PSCs ability to consider regional need in transmission proceedings versus in-state need only.

#### **Cost Allocation**

18. Adopt appropriate mechanism at the state level to fund wind generator 50% share of Network Upgrade interconnection cost.
19. Review pros and cons of state-level mechanisms that would allow for recovery of transmission investment with and without a rate case.

#### **Investment**

20. Identify and implement mechanisms that allow new investors to build transmission and recover costs.

#### **Markets**

21. Continue to encourage non-market participant utilities to join MISO and facilitate resolution of transmission constraints.
22. Launch major effort to solve tariff issues and physical transmission constraints between North and South Dakota and the MISO market.

#### **Other**

23. Support funding for and encourage adequate staffing levels at state agencies to handle large volume of transmission regulatory proceedings. Enhance MISO staff capability to assure full and timely MTEPs and to quickly clear the queue for transmission studies for new generation.
24. Focus additional resources on educating decision-makers, opinion leaders, and other stakeholders at the Federal and state levels on key issues for advancing Midwest wind development.