

Transmission Update

December 2005 / January 2006

Summary

- ✓ Welcome to the Sixth NWCC Transmission Update! Kevin Porter of Exeter Associates led the December 13, 2005, Transmission Update Conference Call, which featured expert speakers providing their insights on issues affecting wind energy, with an opportunity for discussion and questions. As always, this written brief is being distributed after the call to conference call participants, other NWCC members and participants, and to interested NWCC observers.
- ✓ This update focuses on wind and transmission activities in the upper Midwest. The three issues covered in this brief are:
 - Midwest ISO (MISO) Transmission Expansion Plan
 - Western Area Power Administration (WAPA) Dakotas wind study
 - Midwest transmission activities: Minnesota, the Dakotas, and Regional Expansion and Criteria Benefits Task Force (RECB)
- ✓ Dale Osborn, Lead Transmission Expansion Planning Engineer for MISO, started the call with a review of transmission plans for wind and other energy sources in MISO's territory, including efforts to coordinate and develop a single regional transmission plan.
- ✓ Matt Schuerger of Energy Systems Consulting LLC and Beth Soholt from Wind on the Wires provided a review of recent transmission studies in the Midwest. Mr. Schuerger discussed the findings of a wind power and transmission study in the Dakotas conducted by the Western Area Power Administration (WAPA). Ms. Soholt detailed various transmission activities happening in Minnesota and the Dakotas. She also provided an update on RECB, the Regional Expansion and Criteria Benefits Task Force.
- ✓ The next Transmission Update call will be February 21, 2006, at 1 pm Eastern. Please mark your calendars!

Midwest ISO (MISO) Transmission Expansion Plan

Background MISO was the first RTO in the country. One of MISO's fundamental responsibilities is to coordinate and execute planning to ensure that transmission is built to meet reliability needs, and to identify regionally beneficial projects that are not required for reliability but may provide economic benefits to the region.

MISO is undertaking a new regional transmission plan, known as the Midwest Transmission Expansion Plan 2006, or MTEP '06. As with previous MTEP plans, MISO will work with utilities, state regulatory agencies and energy developers, among other entities to develop MTEP '06. The MTEP '06 study scope includes the following items: 1) a 2011 planning horizon; 2) analysis of effectiveness from a technical standpoint of planned and proposed transmission projects; 3) identification of opportunities for more efficient generator dispatch by removing transmission constraints; and 4) identification of commercially (economically) beneficial regional transmission expansion projects, and other items. MISO plans to complete MTEP '06 by the summer and adopt it in October 2006.

Perspectives of the MISO MISO intends to combine individual transmission plans in the Midwest Reliability Organization (MRO) area (which includes Wisconsin, Iowa, Minnesota, South Dakota, and North Dakota) into MTEP '06. A primary goal of MISO is to resolve issues connected to CapX. CapX is a project that aims to create a joint vision of required transmission infrastructure investments needed to meet growth in demand for electricity in Minnesota and the surrounding region, while creating an environment that allows these projects to be developed in a timely and efficient manner, consistent with the public interest. CapX incorporates the results of MISO's earlier Northwest Exploratory Study that assessed the transmission necessary to incorporate 1,500 MW of wind and 500 MW of coal in North Dakota and South Dakota, and from the unfinished southern Minnesota-Iowa-Wisconsin study that determined the transmission necessary to incorporate 3,500 MW of wind.

A separate transmission study focuses on Illinois and Indiana. Illinois has over 1,000 MW of wind in the interconnection queue and Indiana has identified a wind area around Lafayette, in the north central part of the state. The study's goal is to estimate how much transmission is needed for 1,000 MW of wind and 5,000 MW of coal. MISO is also studying what transmission is needed to transmit 3,000 MW of generation from western to eastern Michigan. One option is to link it south to generation in Illinois and Indiana.

MISO is also studying what transmission is needed to transmit 2,000 MW of power from western to eastern Michigan with an HVDC transmission line. An alternative being studied is to move the western Michigan line terminal south to be able to provide access to lower cost generation in Illinois and Indiana. The rating of the HVDC line from Indiana would probably be increased to what the transmission system could tolerate in case the HDVC line is out of service, or the maximum economically supportable, whichever is less.

MISO is also undertaking a "Vision Plan" that considers how much transmission is needed to support a 10% renewable energy target across the Midwest. One scenario is to tap renewable resources in North and South Dakota, Iowa and Minnesota, while another scenario is to consider what renewable resources are available in each state. The Vision

Plan is still at a very early stage but is designed to provide information for policy work. The Vision Plan would provide information such as the amount of transmission, the costs and benefits of the added transmission, the expected revenues to generators and the CO2 reductions that could be realized, and the effect of geographical diversity for greater use of wind energy.

MISO is also looking at existing substations in wind-rich areas to determine if there is available transmission capacity to accept wind energy. The concept is that there may be sites with adequate wind resources that are located close to existing substations with available capacity or only need lower voltage transmission lines that could be developed in a shorter period of time, instead of selecting sites with excellent wind resources that cannot be developed for at least seven years because of the need to build a major transmission line

MISO is also assisting in Minnesota's statewide wind integration study, a study required by the Minnesota Omnibus Energy Law that the Minnesota State Legislature passed in May 2005. The statute dictates that the study examine the impacts of 20% wind by 2020 and that all utilities participate in the study. Among other things, MISO will provide input data and economic modeling. The study will be completed by November 30, 2006, upon which utilities are to incorporate the study's findings into their integrated resource plans.

For More Information

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CapX 2020 website, <http://www.capx2020.com/>

Midwest Independent System Operator website, <http://www.midwestiso.org/>

Midwest Reliability Organization website, <http://www.midwestreliability.org/>

Western Area Power Administration (WAPA) Dakotas Wind Transmission Study

Background Congressional legislation provided funding to WAPA to study the effects of placing 500 MW of wind energy in North and South Dakota. The final report is available at <http://www.wapa.gov/ugp/study/DakotasWind/>.

Study components & findings The Dakotas wind transmission study focused on 4 key tasks:

- Task 1: Potential availability of non-firm transmission on existing lines
- Task 2: Interconnection of wind
- Task 3: Delivery of wind
- Task 4: Advanced transmission technologies

The study began in early 2005. ABB was the principle contractor, while AWS

Truwind did the wind modeling. All four tasks focused on seven sites – four in South Dakota, three in North Dakota – that were selected with public input. ABB developed a technical study scope for up to 500 MW of wind at the seven sites. The report does not investigate what would happen in the event of increasing transmission beyond the 500 MW.

For Task 1, three transmission interfaces were considered: the North Dakota Export Boundary (NDEX), Ft. Thompson, and Watertown. WAPA provided actual hourly power flows for 2003 for all three transmission interfaces. ABB simulated hourly wind generation with the power flows on the transmission interfaces using GridView, ABB's power simulation tool. Because 2003 was considered to be a low-hydro year, ABB also did simulations with 1997 data during a high-hydro year. Five of the seven sites had available non-firm transmission even under a high-hydro scenario. Ultimately, ABB found that there was room for non-firm transmission across all three interfaces for all but a handful of hours.

In Tasks 3 and 4, ABB looked at interconnections to the bulk power system and transfer capability. ABB conducted some power flow analysis on 230-kV and higher transmission lines at six of the seven sites, and 115-kV and higher at the seventh site. The analysis included stability issues and whether the transmission interfaces are constrained. While there are some limitations on firm transmission, some new wind projects could be interconnected. Task 2 dealt with topics like reconductoring lines and adding static VAR compensators.

The report should be viewed with some caveats. The interconnection and delivery analysis (Tasks 3 and 4) did not include impacts on the lower voltage system. The non-firm transmission analysis (Task 1) could be impacted as other generation and transmission projects are installed.

Some on the conference call wondered whether the report could lay the groundwork for a flexible-firm transmission tariff. A call participant pointed out that WAPA amended its transmission tariff to allow for long-term, non-firm transmission service on a case-by-case basis. WAPA appears to be waiting for someone to come with a proposal that will change operations through business practices rather than tariff reform. A potential example is for a wind developer to partner with an interested WAPA customer to jointly approach WAPA. In contrast, the Bonneville Power Administration (BPA) proposed a generic conditional firm transmission service to its tariff, although BPA has shelved its proposal for now.

**For more
Information**

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Dakotas Wind Study, <http://www.wapa.gov/ugp/study/DakotasWind/>.

Midwest Transmission Activities: Minnesota, the Dakotas, & the Regional Expansion and Criteria Benefits Task Force (RECB)

Minnesota

An application for transmission connected to the proposed Big Stone II plant in South Dakota was filed at the Minnesota PUC. In addition to delivering the output of Big Stone II, the application also calls for additional transmission to deliver between 800 and 1,000 MW of wind to the Twin Cities. A decision is not expected until Fall 2006.

Xcel Energy is in the midst of a transmission study that focuses on the development of a 345-kV line from southwest Minnesota to the Twin Cities. This study builds upon the SW Minnesota Study in 2001 for the first 825 MW of wind and upon the recently completed Buffalo Ridge Incremental Generation Outlet Study (BRIGO, June 2005) for an additional 300-400 MW. The BRIGO study consists of a second Nobles – Fenton 115-kV line, a Lake Yankton – Marshall 115-kV line, and several reconductors & rebuilds. Thus, the baseline for this new study is approximately 1,200 MW of wind with the possibility of increasing it to 2,000 MW, with the additional facilities being analyzed. The study is on a fast track with a scheduled completion and regulatory filings in the first quarter of 2006.

The Big Stone II transmission filing, BRIGO, and the Buffalo Ridge 345-kV transmission study are also all part of CapX. The sponsors of CapX have included these and other transmission projects as part of their “Group 1” projects that will be filed with the Minnesota PUC over the next 12 months. As noted earlier, the transmission facilities needed for Big Stone II have already been filed. The complete list is as follows:

- Transmission upgrades needed for the new Big Stone II coal generating plant
- Incremental outlet capacity in the Buffalo Ridge area – most likely 2 new 115-kV lines
- Buffalo Ridge to Metro area (Twin Cities) 345-kV line for additional wind power outlet
- Boswell – Wilton 230-kV line (Bemidji area)
- Fargo – Alexandria – Benton County 345-kV line
- Prairie Island – Rochester – LaCrosse 345-kV line

South Dakota

Xcel Energy recently filed an application with the South Dakota PUC for the South Dakota portion of the four transmission lines on Buffalo Ridge in southwest Minnesota that will transmit 825 MW of wind. The Minnesota PUC approved the Minnesota portion in 2003. The South Dakota application was delayed until it was determined where the transmission lines would enter South Dakota from Minnesota.

North Dakota

In North Dakota, PPM Energy and FPL Energy both have proposed wind projects that require transmission upgrades. FPL Energy began construction on its 49.5 MW Wilton Wind Energy Center in Burleigh County. The output from the 33 1.5 MW wind turbines will be sold to Basin Electric Power Cooperative. The project also includes a 4.4 mile transmission line that will connect to an existing transmission

line owned by WAPA. Central Power Electric Cooperative, a Basin Electric member system headquartered in Minot will construct, own and operate this interconnection line.

PPM Energy has received approval of the location of a new 9 mile, 230-kV transmission line that is associated with its Rugby Wind Farm. The \$2.75 million transmission line will connect a substation about a mile east of Rugby to another station that is to be built eight miles north of Rugby. The new power line will parallel an existing Xcel Energy transmission line.

**Regional
Expansion and
Criteria Benefits
Task Force
(RECB)**

MISO's Regional Expansion and Criteria Benefits Task Force (RECB) has been working on a cost allocation methodology for new transmission upgrades. On October 7, 2005, MISO filed a RECB tariff with FERC, proposing a new methodology for allocating the costs of transmission upgrades. Under FERC Order 2003 and 2003-A, the generator pays 100% of the costs up front but is reimbursed by the transmission provider for 100%, although RTOs have the flexibility to propose different cost allocation methodologies, subject to FERC approval. Under RECB, MISO has proposed a 50-50 cost share between the broader MISO market and the generator for new generator upgrades. More specifically, for transmission lines rated at 345-kV or higher, 20% of MISO's 50% share is allocated to all transmission users on a postage stamp basis, and the remainder is allocated on a subregional basis as determined by a power flow analysis. For transmission lines rated below 345-kV, MISO's 50% share is allocated on a zonal basis.

Wind on the Wires (WOW) protested MISO's filing at FERC on October 28, 2005. WOW believes that the 50-50 cost share creates a barrier to new generators, and MISO has not proved that its proposal to depart from the cost allocation methodology in Order 2003 and Order 2003-A is reasonable. FERC's options are to approve what MISO filed, dismiss MISO's filing, or to set a hearing.

How to pay for new transmission is an issue that bedevils the electric power industry. Xcel put the 345-kV lines that will carry 825 MW of wind in SW Minnesota into rates, while the RECB proposal proposes to split transmission investment costs between generators and transmission customers. Until some form of RECB is put into place, the utilities that comprise CapX will propose cost recovery mechanisms as each proposal for new transmission is put forward.

**For more
Information**

Beth Soholt, Wind on the Wires, bsoholt@windonthewires.org

Regional Expansion and Criteria Benefits Task Force (RECB),
<http://www.midwestmarket.org/page/Expansion+Planning>.

Wind on the Wires, <http://www.windonthewires.org>.

Next Update: February 21, 2006

The next NWCC Transmission Update will be held on February 21, 2006, at 1 pm Eastern.

Please email Kevin Porter (porter@exeterassociates.com) with any suggestions for topics on how to improve the call.