

# Transmission Update

April 2005

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## Summary

- ✓ Welcome to the second *NWCC Transmission Update*! Kevin Porter of Exeter Associates led the April 26, 2005 Transmission Update Conference Call, which featured expert speakers providing their insights into key transmission issues affecting wind energy, with an opportunity for discussion and questions. In contrast with past *RTO Updates*, this brief is being distributed following the call to conference call participants, other NWCC members and participants, and to interested NWCC observers.
- ✓ This edition focuses on a new kind of organization being created to facilitate transmission that affects wind energy: **State Infrastructure Authorities** in Wyoming, Kansas, and North Dakota. In addition, the April Transmission Update features an update on economic transmission planning in the Southwest Power Pool, including planning for 2500 MW of nameplate wind capacity, and a report from the April 2005 Utility Wind Interest Group annual meeting.
- ✓ During its 2004 session, the Wyoming legislature created an infrastructure authority to facilitate the construction of electric transmission lines and other infrastructure. Several state legislatures (New Mexico, Idaho, Kansas, Montana, North Dakota, South Dakota, and Utah) were considering or have approved similar legislation creating transmission infrastructure authorities. In April 2005, legislation was passed to create infrastructure authorities in North Dakota, Kansas, Idaho, and South Dakota to support investments in transmission upgrades or expansion.
- ✓ The **Southwest Power Pool has entered a second phase of transmission planning**. The first phase looked at reliability and network upgrades to the transmission system in SPP, while the second phase looks at economic upgrades to the system. For Kansas and Oklahoma, three plans were studied, two of which, the “Box Plan” and the “X-Plan”, could result in new transmission being extended to the western half of SPP, where there are some attractive wind resources.
- ✓ The **Utility Wind Interest Group (UWIG) annual meeting** was held in Minneapolis, MN from April 11-13, followed by a workshop co-hosted by AWEA on April 14-15, 2005, on interconnection.

## **Transmission Infrastructure Authorities**

### **The Wyoming Infrastructure Authority**

In its 2004 session, the Wyoming Legislature created the Wyoming Infrastructure Authority (WYIA) to improve Wyoming's electric transmission infrastructure and to facilitate the export of electricity from Wyoming generated from wind and coal. Because there is no personal or corporate income tax in Wyoming, the WYIA seeks to catalyze coal and wind energy development to improve the tax base, while diversifying the economy by bringing high-paying jobs to the state.

The WYIA is authorized to participate in planning, financing, constructing, developing, acquiring, maintaining and operating electric transmission facilities and supporting infrastructure. The board is made up of 5 members appointed by the Governor, and the members must have a background in electric transmission, utility regulation, and energy facility development. Reflecting a regional outlook, three of the members are currently from Wyoming, and two are from elsewhere in the West.

The WYIA only acts to fill a void unfilled by market participants. To avoid interfering with the market, the WYIA must first publish a public notice describing the WYIA's interest in a potential transmission project, and provide 30 days for any market participants to act. The WYIA can move forward if no market participant responds within 30 days, or after 180 days if a market participant takes on the transmission project but does not move forward.

The WYIA is not subject to regulation by the Wyoming Public Service Commission (PSC). Rather than being a state agency, it is considered a "State Instrumentality", an important distinction because it possesses bonding authority, and can therefore issue bonds without pledging the full credit and faith of the State of Wyoming, as is constitutionally required of bonds issued by the state. For projects owned by others, the WYIA has a bonding cap of \$1 billion. If the project is owned and operated by the WYIA, however, there is no cap on its bonding authority.

In its first year, the WYIA had an initial budget of \$250,000. Next year's budget, covering July 2005 to July 2006, is for \$6.6 million. Of this, \$1 million is devoted to setting up the WYIA's programs and operational expenses; the rest is devoted for feasibility studies, permitting and siting costs, and engaging potential private industry partners that could eventually reimburse the WYIA's expenditures.

To date, the WYIA board has been engaged in educating itself about transmission, determining what its activities and role will be and building a staff. Steve Waddington, formerly of PacifiCorp, was recently named as the Executive Director. The WYIA has also engaged with partners in a small \$40 million transmission project and explored transmission routing recommendations from the first phase of the Rocky Mountain Area Transmission Study (RMATS). The WYIA board is also considering whether it can financially support the largely ad hoc and volunteer-driven RMATs initiative.

The April 4, 2005 announcement of the Frontier Line will accelerate activity at the WYIA. Governor Schwarzenegger of California, Governor Guinn of Nevada, Governor Huntsman of Utah and Governor Freudenthal of Wyoming have agreed to work together to support the development of this planned interstate high-voltage transmission line originating in Wyoming, traveling through Idaho, and having terminal connections in Utah, Nevada and California. The Frontier Line could facilitate the development of up to 6,000 MW of coal and 6,000 MW of wind power.

A number of challenges remain for the WYIA:

- The WYIA and the electric power industry need to engage Wall Street. The financial community pays little attention to transmission as a potential investment, and it will be important to bring together the relevant players to take transmission plans to Wall Street.
- The WYIA is brand new with no track record. The WYIA will need to show success with the first rounds of bond issuances. However, the WYIA has a number of points in its favor: the WYIA has strong support from the governor and state legislature, and its bonding authority and success in obtaining funding from the legislature for operations give it a lot of flexibility. Other states with a newly enacted transmission infrastructure authority, such as Idaho, did not receive funding from the legislature. These states may face greater challenges in getting started and in identifying funding sources.
- The ability to offer tax-exempt bonds is another challenge. The bonds issued by the WYIA would be exempt from both state and federal taxes, but this has proven to be a thorny issue. Without an RTO, it becomes more difficult to get federal tax-exempt status.
- A final challenge lies in the approval process for permits & siting of new transmission lines. A myriad of federal and state agencies are involved when new transmission lines are proposed.

**More information on the Wyoming Infrastructure Authority can be obtained at <http://www.wyia.info>.**

#### **Wyoming Statutory Authority**

<http://www.wyia.info/Docs/article3.htm>

<http://www.wyia.info/Docs/article4.htm>

#### **Wyoming Bylaws**

<http://www.wyia.info/Docs/Bylaws.pdf>

#### **Information on the Frontier Line can be found at**

<http://psc.state.wy.us/htdocs/subregional/Frontierline040105.pdf>

**Thanks to Jim Tarpey of Holland & Hart and the WYIA for leading the discussion on this topic.** Jim can be reached at 303-290-1634; [jtarp@hollandhart.com](mailto:jtarp@hollandhart.com)

### **North Dakota Transmission Authority**

Like Wyoming, North Dakota passed legislation authorizing the creation of the North Dakota Transmission Authority (NDTA) to promote investments in new transmission lines in North Dakota. Passage of the legislation had strong support, passing unanimously in the legislature, and Governor John Hoeven signed the legislation on Friday, April 22, 2005. Rather than creating a new organization, the new Authority is established as a new role for the existing North Dakota Industrial Commission.

As a state entity operated by the North Dakota Industrial Commission, the NDTA would help the state meet the transmission challenges. The NDTA would:

- Provide low-cost financing for new transmission projects
- Partner with investors and engage in joint projects, providing access to public sector financing not available otherwise
- Work on right-of-way development for transmission projects; and

- o Build, operate, or lease all or part of a transmission system if others are unable to do so.

The language creating the NDTA was adapted from the legislature language that created the WYIA. Unlike the WYIA, the NDTA can only do electric transmission lines, not pipelines or other energy development. Also, the bonding authority of the NDTA is limited to \$800 million. The NDTA is intended to become active in projects only as a last resort when other transmission providers are unable to respond to a need identified by the NDTA. Like the WYIA, the NDTA's activities will be exempt from oversight by the Public Service Commission, except for line routing and a consultative role for the PSC in setting rates to ensure cost recovery for the NDTA's investments. New lines funded by the authority would receive a 5-year exemption from state & local property taxes as well.

Because the NDTA is being established as part of an existing agency, there is no appropriation specific to the authority outside of the existing agency money. It was an intentional move not to seek an appropriation until a more specific mission can be defined. In the future, there may be an effort to acquire an appropriation from the legislature.

The NDTA has a common issue with the WYIA: it is a long distance from the wind resources to markets where electricity is consumed, and there is little internal demand because of low population. Another challenge is that NDTA's role is being determined relative to what its jurisdiction is, and what responsibilities fall on MISO. Also, like in Wyoming, achieving federal tax-exempt status can be tricky. Finally, the Midwest ISO (MISO) bisects the state, and the NDTA will have to work with MISO, and members and non-members of MISO, in planning and developing transmission in North Dakota.

For more information,

<http://renewableenergyaccess.com/rea/news/story?id=27790>

<http://www.caprep.com/0405060.htm>

<http://www.hoevergovernor.com/news/detailsnew.asp?newsID=145>

#### **North Dakota Legislation**

<http://www.state.nd.us/lr/assembly/59-2005/bill-text/FRAB0300.pdf>

**Thanks to Glen Skarbakka for leading the discussion on this topic. Glen can be reached at [gskarba@ieee.org](mailto:gskarba@ieee.org).**

#### **The Kansas Infrastructure Authority**

Another new transmission infrastructure is in Kansas, where Governor Kathleen Sebelius signed legislation on April 18<sup>th</sup> creating the Kansas Electric Transmission Authority (KETA). As with Wyoming and North Dakota, authorizing the creation of the KETA is aimed at improving the economy of the state by facilitating new transmission to access wind energy resources in the state.

Kansas is estimated to have the third best wind energy resource in the nation, after North Dakota and Texas, but to date the only major development is FPL Energy's 112 MW Montezuma development in Gray County in Southwest Kansas. The Flint Hills in the eastern half of Kansas have a good wind resource and access to transmission, but wind projects there are controversial for siting and wildlife reasons. Better wind resources exist in the western part of the state, but there is less transmission capacity available. A large number of additional wind facilities are planned statewide, and Kansas is considering a number of initiatives to encourage wind energy development.

In March 2004, discussions began about the need to create a transmission infrastructure

authority, potentially modeled on the Kansas Turnpike Authority that has bonding authority to fund highway improvements. The idea was dropped when the chair of the Kansas Senate Utilities Committee, Stan Clark, passed away. It was subsequently taken back up and state legislators, working with the utilities, designed the legislation.

Because it is so recent, no appointments, staff, or budget have been identified for the KETA yet. The KETA's proposed structure has 7 members; 4 of whom would be chairs of state legislature committees on utilities (2 elected representatives from each party) and the other 3 appointed by the governor.

Since Kansas is located in the Southwest Power Pool (SPP), the SPP would be responsible for identifying transmission needs. If utilities are unable to step forward to meet the need identified by SPP, then like Wyoming, the KETA can publish a public notice expressing its interest in financing or building a transmission line, and provide 90 days for a market participant to respond. The KETA can proceed if no market participant responds, or can proceed if a market participant responds but does not move forward after 180 days. The KETA works with the Kansas Development Finance Authority to issue revenue bonds. The transmission supported by the KETA does not have to be within Kansas if the majority of the construction or upgrade costs are for facilities in Kansas, or if the Kansas Corporation Commission determines that the parties of the transmission line located outside Kansas will improve the reliability and security of Kansas, or will contribute to the economic benefit of Kansas.

Supporters of the legislation, such as the Sierra Club, recognize that the KETA could stimulate new transmission that in turn would support new coal-fired generation, but see the opportunity to build transmission for new wind as a separate issue from the coal-fired generation issue.

#### **For More Information**

Charles Benjamin / Jim Ploger. Jim can be reached at 785-271-3349, [j.ploger@kcc.state.ks.us](mailto:j.ploger@kcc.state.ks.us).

#### **Kansas Legislation**

<http://www.kslegislature.org/bills/2006/2263.pdf>

#### **Infrastructure Authorities: Conclusions**

Several potential hurdles to transmission infrastructures have already been cited, from having to engage Wall Street; being a new institution that has to win the confidence of legislators, utilities and market participants; and the uncertainty of the tax treatment of any bonds issued by the transmission infrastructure authority. New transmission infrastructure authorities that do not have operating funds may have an additional challenge of launching a new organization without funding. Nevertheless, a major concern with building new transmission is raising the large amounts of capital and ensuring cost recovery of those investments. Transmission infrastructure authorities offer a promising avenue for addressing these concerns.

## Economic Transmission Planning in SPP

### **The Kansas/Panhandle Expansion Plan**

The Southwest Power Pool has been engaged in reliability and economic transmission planning as part of its new status as an RTO, and one of its latest ventures is the Kansas/Panhandle Expansion plan that is considering whether to extend transmission to parts of Kansas, Oklahoma and northern Texas that have good wind resources. As such, the SPP staff has used the Kansas/Panhandle expansion planning process to move up the learning curve of how to do economic analysis planning.

In the first part of the planning process, load flow analyses were conducted to identify system contingencies, projects and potential costs. The second part used modeling tools to determine unit commitment and dispatch, and to model different flowgates simultaneously. This data was used to determine the effect of additions from must-run and economic facilities without overloading key facilities and points on the system. “Economic” components of the model are generators that are not in the base plan for reliability and contingencies. The economic components go beyond those necessary for preventing outages and low voltage.

A February 2005 workshop was held in Amarillo, Texas to explore transmission additions that would be necessary in parts of Kansas, Oklahoma, and Texas, to incorporate up to 2500 MW of wind and the 600 MW Sand Sage coal-fired unit near Garden City, Kansas. The 2500 MW of wind refers to the nameplate capacity of wind, with modeling based on an assumed 20% effective capacity in the summer months; and 80% in the spring months. At this meeting, needs for the model were identified by SPP staff, transmission owners, and other stakeholders in SPP region. The modeling looked at reductions in dispatch costs from these projects in SPP and for companies whose service territory extends outside SPP.

The SPP staff designed three scenarios:

- Plan A (“The X-Plan”): This plan calls for an X of 345 kV lines that crosses the region.
- Plan B (“The Box Plan”): This plan calls for two north-south and two east-west transmission corridors of 345 kV lines that would form a rectangular shape in the region.
- Plan C: This plan focuses more on transmission extension in the east of the SPP service territory.

These plans were studied in two phases. The first phase was a power transfer analysis, i.e., how much power can go from one end of system to other in order to identify potential bottlenecks and upgrades. The second phase was an economic analysis to determine the benefits of the transmission upgrades to load and to generators. The plans were then ranked and prioritized based on their respective benefits.

SPP’s economic modeling also assumed that any units displaced would be outside SPP; this more conservative approach does not call for some of the loadings canceling each other out in SPP. The planning process identified a number of facilities that will need to be upgraded by 2008 as for reliability reasons. After looking at transfer capabilities, SPP determined that Plan C needed too many low-voltage fixes, and it was discarded, leaving Plan A (the X-Plan) and Plan B (the Box Plan) as viable alternatives.

- Plan A (The X-Plan) would require a \$419 million investment for the new 345 kV lines but would cost \$459 million including other upgrades that would be required

- Plan B (The Box Plan) would require \$410 million for the 345 kV lines but would cost \$477 million, including associated upgrades elsewhere.

In addition, all transmission expansion plans would require \$35 million beyond those costs in upgrades to the transmission grid in SPP.

Following this initial analysis, SPP reviewed the plans and incorporated more sensitivities in a second modeling run. Even with the new sensitivities included, there were no large differences from the first round's outcomes. The SPP staff also explored extending different legs of the plans at different times and to explore scenarios where some of the proposed facilities are not added (either wind or the Sand Sage).

The results of the first phase of analysis showed that with the addition of resources without implementation of either the Box Plan or the X-Plan, transmission capacity for a little generation output would be gained initially, but large-scale transmission would have to be built to access the large amounts of wind and coal capacity discussed in the scenarios. With upgrades, the X-Plan ended up being favored, as it cost less and also crossed more wind development areas than The Box Plan.

For the second phase, SPP incorporated wind data from the University of West Texas to create wind profiles that were plugged into a model and used to determine dispatch profiles in different hourly and seasonal peaks. SPP ran a number of scenarios, including and excluding wind and the Sand Sage coal plant. The results demonstrated that if the wind generation did not materialize in the west, neither the X-Plan or the Box Plan would be cost effective. If the Sand Sage coal unit comes online, that would pay for the first leg of the X-Plan. Overall, it appeared that the X-Plan had greater production cost savings.

SPP completed a report on the first phase in May 2004 and is now working on a separate report concerning the comparative economics of the X-Plan and the Box Plan. That report is due out later in 2005.

In general, the type of analysis and planning that SPP has done illustrates the value wind can have in reducing energy costs across the region. A key question is whether this analysis will translate into any action. Funding for economic upgrades is done on a voluntary basis in SPP, meaning a transmission owner or group of transmission owners must agree to bear the costs. This may mean that most of the economic benefits from an economic transmission upgrade may have to be somewhat localized and not broadly dispersed across a region for a transmission owner to be motivated enough to finance the new transmission.

**Thanks to Bruce Walkup of the Southwest Power Pool for leading this discussion.**

**For More Information**

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[http://www.spp.org/Publications/3.Workshop\\_II\\_Kansas-Panhandle\\_Expansion\\_rev3.pdf](http://www.spp.org/Publications/3.Workshop_II_Kansas-Panhandle_Expansion_rev3.pdf)

## Utility Wind Interest Group Annual Meeting

The Utility Wind Interest Group (UWIG) held its annual meeting in Minneapolis, MN from April 11 – 13, 2005. The meeting explored key issues related to deployment of wind energy across the US, including presentations and discussion on utility control area and transmission system operation, and large-scale (transmission-connected) and small-scale (distribution-connected) wind turbine installation experiences.

The UWIG website has the agendas and presentations from the meeting, <http://www.uwig.org/annualmeet05mn.html>. Three major areas that came up at the meeting included:

- During the UWIG User Group meetings, participants called for continued improvements of models for load flow analysis.
- One of the most successful sessions was titled “So you want to be a balancing authority”. In this session, the North American Electric Reliability Council reported on how a number of transmission areas are moving over to become balancing authorities. This session, the Midwest provided insights into becoming a balancing authority and into how this will affect wind.
- There was also significant discussion of new low-voltage ride-through requirements in upcoming regulations, and the turbine manufacturers provided information about how their technology will meet these challenges.

On April 14- 15, the UWIG meetings were followed by a joint workshop with AWEA on wind interconnection and integration. The workshop examined the results of recent operating impact analysis studies, and explored the methodologies used. These studies included the California RPS-inspired work, the GE high penetration study for New York State, and the high wind penetration scenario for the Xcel-North system supported by the Minnesota Department of Commerce and Xcel Energy. This session also discussed capacity evaluation methods from around the country, as well as the experience with wind in Europe. Finally, a wind-hydro Integration session explored the opportunities in this arena.

**More information is available at <http://www.uwig.org/>**

Or contact: Charlie Smith of the Utility Wind Interest Group, (703) 860-5160  
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## Next Update: June 14, 2005

**The next NWCC Transmission Update will be held on June 14, 2005, at 1 pm Eastern.**

Please email Kevin ([porter@exeterassociates.com](mailto:porter@exeterassociates.com)) or Miles Keogh ([mkeogh@resolv.org](mailto:mkeogh@resolv.org)) with any suggestions for topics or ways to improve the call.

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