

Transmission Update

December 2008

Summary

- ✓ Welcome to the Twentieth National Wind Coordinating Collaborative (NWCC) Transmission Update! Kevin Porter of Exeter Associates, Inc. led the December 12, 2008, Transmission Update conference call. As always, this written brief is being distributed after the call to conference call participants, other NWCC members and participants, and to interested NWCC observers.
- ✓ This update features the Upper Midwest Transmission Development Initiative, a Governor-sponsored regional transmission planning effort encompassing Wisconsin, Minnesota, Iowa, and North and South Dakota; and the North American Reliability Corporation's (NERC) Integration of Variable Generation Task Force, which has just recently issued its draft report.
- ✓ Edward Garvey, acting as a consultant for the Midwest ISO, was on the call to talk about the Upper Midwest Transmission Development Initiative, and Mark Lauby from NERC gave an update on activities of the Variable Generation Task Force.

Upper Midwest Transmission Development Initiative

Background

On Thursday, September 18, 2008, the Governors of Iowa, Minnesota, North Dakota, South Dakota, and Wisconsin announced the creation of the Upper Midwest Transmission Development Initiative (UMTDI). According to a letter sent to stakeholders, the UMTDI member states seek to accomplish two major tasks:

- Establish a plan that will guide and encourage the construction of interstate transmission lines to serve the upper Midwest region's commitment to cost-effective renewable generation while maintaining reliability.
- Develop an equitable cost-sharing methodology for new transmission facilities.

UMTDI will coordinate efforts among entities involved in transmission issues, including state regulators, transmission companies, electric utilities, independent power producers, and other key stakeholders. A 10-person Executive Team, comprised of a state utility regulator and a representative of the governor's office

from each of the member states, oversees UMTDI. The first stakeholder meeting was held November 7, 2008.

First Steps

Edward Garvey, former Director of the Minnesota Office of Energy Security and Deputy Commissioner in the Minnesota Department of Commerce, is currently acting as a consultant to the Midwest ISO and representing them on the UMTDI. Mr. Garvey said the idea to form UMTDI arose from a realization that regulators are engaged with transmission development but politicians are not. This inspired Mr. Garvey and his counterparts in other state governments to suggest a regional level task force to their respective governors. That recommendation resulted in the creation of the UMTDI, which set forth the goals of enhancing regional electric grid reliability, reducing transmission congestion, and improving access to the transmission grid for renewable energy.

In addition to the Executive Team, UMTDI is supported by Midwest ISO staff and the Organization of MISO States. In October, the UMTDI team sent out an open letter to stakeholders containing a series of questions including:

- Where are the best renewable energy resources?
- How do we get the renewable energy resources developed?
- How do we design the grid to best access renewable energy resources?
- What will be the cost and how should it be allocated?

Mr. Garvey said that comments were filed in November and the Executive Team is in the process of reviewing the comments and will then be formulating next steps for the UMTDI. The Executive Team hopes to have a plan out in the next few weeks and will be setting up working groups to tackle specific issues. Two groups that have already been created focus on transmission cost allocation and engineering.

Mr. Garvey noted that the UMTDI will face some difficult issues. For example, the Midwest ISO is also doing a regional transmission study, one that includes Illinois, which is not a member of UMTDI. Additionally, transmission development is relatively easy on a conceptual level but quickly becomes complicated once the analysis gets more detailed. By the first quarter of 2009, the UMTDI will formulate a plan on where the transmission might go, what it might cost, and how those costs might be shared. With the assistance of the Midwest ISO, the UMTDI hopes to run scenario models by mid-2009 and get an idea of where and who the beneficiaries of new transmission would be if new transmission is built. Mr. Garvey noted that another issue the group is grappling with is exporting wind power out of their region and who would pay for the necessary transmission. Iowa and North and South Dakota have huge wind resources but very little load, and these states would like to develop their wind power for export to other regions that have higher electricity demand.

Discussion

A caller asked if the UMTDI was only focused on renewable energy development or if they were considering the needs of other energy resources as well. Mr. Garvey said that most agree that renewable energy is the primary impetus. However, he noted that the grid is ‘color blind’ with respect to generation resource type, and all the states involved had other energy resources that would benefit from the development of new transmission.

A caller noted that the “seams” issue between the Midwest ISO and the Mid-America Power Pool is unresolved and asked whether the UMTDI team will address it. Mr. Garvey said they were aware of this but have chosen to consider that issue later. UMTDI has a full agenda with defining and measuring transmission costs, identifying the potential beneficiaries, and then devising a transmission cost allocation scheme. As the process moves forward, all of these issues will need to be addressed.

A caller asked if the UMTDI would eventually include other states such as Illinois. Mr. Garvey said that the five states currently involved in the UMTDI have a long history of regional cooperation, and even with that history, it was challenging enough to get agreement amongst them. Including other states was not something they were considering at present, but that could change in the future.

A caller noted that if the states in UMTDI were looking to move large amounts of power out of the Midwest, they would need to go even further than Illinois toward deregulated electricity markets in the East. Mr. Garvey said this is an active area of discussion in the region and within UMTDI. Mr. Garvey said some in the Midwest were interested in sizing the transmission system to meet RPS requirements in the Midwest but no more. He noted that others are saying they want big transmission lines developed as the economic opportunities for exporting renewable power are substantial. Mr. Garvey said that part of the work of UMTDI is to try to reconcile these views.

A caller said that lately there has been discussion about creating a national interstate high-voltage backbone transmission system, and the caller wanted to know if the UMTDI team was thinking about how their plans would fit with the potential backbone transmission system. Mr. Garvey said this was a critical question and the UMTDI would have to carefully define their goals with respect to:

- Where the renewables are and where the power is going;
- How to promote economic development;
- Should they size transmission for local needs or for export to other regions; and
- Who pays and how to share the costs.

Mr. Garvey said there had been and will continue to be significant discussion on these issues and added that a situation where the benefits accrue to one region of

the country at the expense of ratepayers in another is not acceptable. A caller asked if energy efficiency was a component in the UMTDI as an alternative to new transmission construction. Mr. Garvey said efficiency had come up in two ways. The UMTDI team was considering methods for reducing transmission line losses and they have had discussions about energy efficiency but determined that it was not in their mission. The UMTDI member states have renewable energy portfolio requirements or goals they wish to meet and the UMTDI would focus on those goals. He noted that all of the member states did also have energy efficiency goals and programs in place.

A caller wanted to know what would happen if the UMTDI came up with a set of recommendations on transmission cost allocation – would these be taken to the Midwest ISO for action? Mr. Garvey said this was still uncertain but the UMTDI team was identifying potential transmission cost allocation options and would decide what to do once they actually arrive at that point.

NERC Integration of Variable Generation Task Force

Background The Integration of Variable Generation Task Force (IVGTF) was formed in early 2008 and released a work plan and time line in March 2008. The stated purpose of the IVGTF was to prepare:

- 1) A concepts document that includes the philosophical and technical considerations for integrating variable resources, and
- 2) Recommendations for practices and requirements, including reliability standards that cover the planning, operations planning, and real-time operating timeframes.

The IVGTF issued its draft report, *Accommodating High Levels of Variable Generation*, on November 17, 2008.

Update Mark Lauby from NERC gave an update on the progress of the IVGTF and provided a summary of the draft report. Mr. Lauby began by noting the IVGTF is focused on “variable generation” and did not emphasize any particular resource. The IVGTF arose out of the realization that variable resources needed different bulk power system planning and operational methods. The IVGTF was tasked with identifying any gaps in existing standards and new reliability standards as needed to integrate large amounts of variable generation into grid operations and planning.

The IVGTF had six guiding principles:

1. Bulk power system reliability must be maintained.

2. All generation must contribute to system reliability.
3. Standards must be fair, transparent, and performance-based.
4. Planners and operators must understand the challenges of integrating variable generation on a large scale.
5. Variable generation must be integrated into planning and operations.
6. New planning and operating tool requirements are described in terms of bulk power system reliability performance.

Mr. Lauby noted that the NERC 2008 Long-Term Reliability Assessment found that wind resources are one of the predominant generating resources proposed for development over the next 10 years. NERC estimates up to 140,000 MW of wind generation have been proposed for installation during that time. Mr. Lauby also noted that regional entities have different estimates for the capacity value of wind at peak demand, with values ranging from 8.7 percent to 26 percent, depending on the method used to estimate the capacity value. Mr. Lauby reflected that the industry needs to gain more experience with estimating the capacity values of wind power and its operational characteristics.

Mr. Lauby indicated that NERC is also currently working on a reference manual for system planners on how to integrate variable generation. Variable generation is new technology, and planners and operators need to adapt and start doing things differently. Some necessary changes include the following:

- Use consistent methods for calculating the energy and capacity value of wind. The results may differ from region to region, but the method should be the same.
- Use probabilistic expansion analysis where additional scenarios are examined.
- Emphasize design flexibility during resource and transmission planning to include consideration of off-peak hours instead of basing everything on the traditional notion of peak load. Additional issues include trying to make existing units more flexible while being consistent with environmental requirements, and ensuring that new generating units are more flexible in terms of operations.
- System designs must consider variable distributed resources.
- Plug-in hybrids, HEVs, storage and demand response provide additional resource flexibility and need to be considered in system planning.
- Better power flow and stability models need to be developed for variable generation.

Mr. Lauby said a reference manual for grid operators was also being developed as grid operators will need to change their procedures to accommodate large amounts of variable generation. For example, grid operators may need to start incorporating variable energy forecasting into routine operations rather than as an add-on. Larger

balancing areas may also be required, as well as enhanced grid codes for voltage and frequency ride-through, reactive and real power control, and frequency and inertia response for variable generation. Mr. Lauby asserted balancing authorities must have communications with and control of variable generation resources to maintain reliable operation of the grid.

The NERC Planning and NERC Operating committees are in the midst of reviewing the draft IVGTF summary report and will provide comments by January 30, 2009. Both committees are expected to approve the enhanced IVGTF summary report by March 2009. At that time, NERC will form IVGTF planning and operation subgroups. Separately, Mr. Lauby said the reference manual on variable generation will be issued as soon as possible.

Mr. Lauby said the IVGTF has a three-year plan to publish the reports, review existing reliability standards, create any new reliability standards, and to coordinate with industry to implement the IVGTF recommendations and reliability standards that arise from the IVGTF. He concluded by attesting that NERC supports a transmission superhighway that could transmit variable generation from areas that have variable generation resources to areas that need it.

Discussion

A caller asked if NERC would be leading the effort to persuade resource planners to consider adding additional generating resource flexibility. Mr. Lauby said NERC would be issuing the reference manual on how to do this but cannot legally recommend construction of any specific generation. NERC is limited to providing reliability standards with respect to resulting bulk power system performance.

A caller wanted to know what most surprised him during this process. Mr. Lauby said three things struck him:

1. Many people have expressed concerns over whether large amounts of variable generation can reliably be integrated into the grid. However, when NERC brought industry representatives together, there was a general realization that, with changes to bulk power system planning and operations, integration of large amounts of variable generation can be achieved.
2. Mr. Lauby said he was impressed by the role that demand response can play in providing ancillary services. He noted it has been called the “dance partner” to wind and can support its integration into the grid.
3. He was also surprised at the level of interest in creating the reference manuals so the industry can move ahead with integrating variable generation.

Implications

The UMTDI is a promising regional collaborative aimed at addressing the need for new transmission to access renewable energy resources, as it involves not only regulators and industry participants who are quite familiar with the issues surrounding transmission planning and expansion but also the governors in the Midwest who would like to see more renewable energy development in order to meet clean energy and economic development goals. Yet even with a small number of states, differences over how much transmission is needed, whether transmission planning and development should be focused in-region versus exporting renewable energy generation out of the region, and how to pay for transmission are emerging. The success of the UMTDI will obviously depend on how those issues are resolved, and whether new “wires in the air” are built that can access the region’s high-quality wind resources.

The NERC Integration of Variable Generation Task Force report is an impressive and voluminous report documenting considerations to plan and operate bulk power systems with large amounts of variable generation into the North American bulk power grid. As NERC progresses towards finalizing the document, the challenges for NERC and the electric industry as a whole are to work towards incorporating the report’s recommendations into grid operations and planning, and, if required, enhance existing standards and develop new ones that continue to maintain grid reliability while ensuring that the benefits of variable generation are realized.

For more Information

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Organization of MISO States – Upper Midwest Transmission Development Initiative
<http://www.misostates.org/UMTDIList.htm>

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IVGTF Documents
<http://www.nerc.com/filez/ivgtf.html>

PowerPoint presentation used during call: 12/05/08, Integration of Variable Generation Task Force Preliminary Conclusions and Actions

IVTGF Draft Report
http://www.nerc.com/docs/pc/ivgtf/IVGTF_Reporta_17Nov08.pdf

NERC 2008 Long-Term Reliability Assessment
<http://www.nerc.com/files/LTRA2008.pdf>