NATIONAL WIND COORDINATING COMMITTEE

RTO Update

Friday, September 5, 2003

Summary

- ✓ FERC issued Order 2003 in July, standardizing interconnection agreements and contracts for large generators (20 MW capacity and up). At the same time, FERC issued a Notice of Proposed Rulemaking (NOPR) covering the interconnection of small generators. Both issuances will affect wind development nationally and are detailed in this issue.
- ✓ In the West, each of the three transmission regions reports progress: RTO West's new work on its "Stage 3" activities; the California ISO's latest proposed tariff revisions; and WestConnect's hiring of a consultant to analyze the costs and benefits of RTO formation.
- ✓ In the Midwest, the Midwest ISO has proposed a new tariff and has adopted a new transmission plan built on assumptions of increasing wind development. Meanwhile, state regulators have progressed in building their own forum for participation in regional transmission system planning.
- ✓ In Texas, ERCOT is making progress in developing complex wind generation stability models, while another study suggests that compressed air storage could alleviate some of the wind curtailments in west Texas.

FERC

FERC Issues Large Generator Interconnection Order, Small Generator Interconnection NOPR

FERC issued Order 2003 on Standardization of Generator Interconnection Agreements and Procedures for large generators and released a Notice of Proposed Rulemaking (NOPR) on Small Generator Interconnection on July 23, 2003. Because wind developments vary in size – from single turbine installations of less than one megawatt (MW) to large wind farms of 100 MW or more – both the Order and the NOPR will affect how wind developers connect to the grid. The Order and NOPR are described more fully in the sections below.

Order 2003 – Standard Large Generator Interconnection

Order 2003 establishes standard interconnection procedures (LGIP) and a standard interconnection agreement (LGIA) for generators larger than 20 MW. It requires both the LGIP and LGIA to be incorporated into the tariffs of FERC jurisdictional utilities.

The LGIP sets forth procedures that interconnection customers and transmission providers must follow during the interconnection process, while the LGIA establishes the legal rights and obligations of each party, addresses cost and responsibility issues, and establishes a process for resolving disputes.

There are a few differences between the LGIP and LGIA as proposed in the NOPR and those adopted in Order 2003:

- **Flexibility for non-independent transmission providers, RTOs and ISOs.** The final rule applies to both independent and non-independent transmission providers, but non-independent transmission providers are required to justify any deviations from the final rule using either a "regional differences" or "consistent with or superior to" standard. It allows RTOs and ISOs even more flexibility to customize the LGIP and LGIA terms, conditions and

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pricing. RTOs and ISOs may submit LGIP and LGIA terms and conditions that meet an "independent entity variation" standard that is more flexible than the standards applicable to non-independent transmission providers.

- **Insurance and liability.** The final rule includes an article addressing insurance requirements and limiting liability for consequential damages, both of which were absent from the NOPR.
- **Clustering of transmission requests.** The final rule LGIP changes a provision affecting transmission providers who elect to study interconnection requests in clusters. It allows the transmission provider to simultaneously study all interconnection requests received within a 180-day window, rather than a 90-day window as proposed in the NOPR.
- **Pricing of network upgrades.** The final rule continues the policy of requiring non-independent transmission providers to provide transmission credits for the cost of network upgrades needed for an interconnection. The final rule clarifies that the interconnection customer should receive such credits only if its generating facility has achieved commercial operation. Transmission credits are to be paid to the interconnection customer when upgrades to an affected system are constructed and the interconnection customer has paid for them. Finally, the transmission provider may decline to award credits only for charges designed to recover out-of-pocket costs, such as the cost of line losses, associated with the delivery of the output of the generating facility.

  For independent transmission providers such as RTOs and ISOs, there is more flexibility. An RTO or ISO may propose participant funding for network upgrades and, for a transitional period not to exceed a year, a region may use participant funding as soon as the Commission and the affected states have approved an independent administrator.

FERC, Standardization of Generator Interconnection Agreements and Procedures, Docket No. RM02-000, Order No. 2003.

Small Generator Interconnection NOPR

The Small Generator Interconnection NOPR proposes the addition of standard interconnection procedures (SGIP) and a standard interconnection agreement (SGIA) for small generators to the tariffs of FERC jurisdictional utilities. In creating the NOPR, FERC relied heavily on consensus proposals developed by a small generator industry coalition. The NOPR also draws on model interconnection procedures previously developed by NARUC as well as on Order 2003 provisions for large generators.

FERC says its goal in the proposed rule is to reduce interconnection time and costs, prevent undue discrimination, preserve reliability, increase supply, lower wholesale prices, and promote development of non-polluting alternative energy sources.

Industry coalition participants had drafted two separate processes – one for generators less than 2 megawatts (MW), and another for generators 2 MW and larger. To simplify the interconnection process and eliminate duplication, FERC consolidated these two processes into a single SGIP and SGIA, the former of which contains a streamlined process for the smallest generators.

Process for High-Voltage Interconnections and Generators 10-20 MW

FERC's proposed approach determines which interconnection process to use depending on the voltage level of the proposed interconnection point and the capacity of the generator. For all high-voltage interconnections (interconnections

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to transmission facilities operating at or above 69 kV), and for low-voltage interconnections of generators between 10 and 20 MW, the interconnection process is the same as (though with shorter time lines than) the process required of large generators in Order 2003.

This process begins with a scoping meeting to review the interconnection request and identify previous relevant studies.

Next, the transmission provider would complete studies of the feasibility, system impact and facilities impact of the proposed interconnection. The purpose of the studies would be to identify any adverse system impacts that would result from the proposed interconnection.

If no adverse impacts were identified, the transmission provider would pay the cost of these studies and the transmission customer would be offered the SGIA. Alternatively, if adverse impacts were identified, then the interconnection customer would pay for the studies and would be offered the SGIA only after agreeing to pay the costs of necessary upgrades.

Process for Low-Voltage Interconnections of Generators 2-10 MW

Generators in the 2-10 MW range connecting to low-voltage transmission facilities (less than 69 kV) would be eligible for review under "expedited screening criteria." These criteria ensure the proposed interconnecting generator will not exceed certain limitations on the interconnected circuit. If the proposed interconnection passed these criteria and the transmission provider believed the interconnection to be safe, then the customer would be offered the SGIA. If not, then the process would revert to the scoping stage described for generators in the 10-20 MW class.

Process for Low-Voltage Interconnections of Generators Less than 2 MW

An even more streamlined process is proposed for generators less than 2 MW. Under the proposed "super-expedited" process, the interconnection would be automatically approved provided that the equipment the customer is proposing to interconnect to the grid is pre-certified. If equipment were not pre-certified, then additional review by the transmission provider, limited to 6 hours of study paid for by the interconnection customer, would be undertaken. If the equipment passed this review, the customer would be offered the SGIA. If it failed, the customer would revert to the "expedited screening criteria" described above.

Outstanding issues on which FERC seeks comments:

- **Wind projects with multiple interconnection points**. FERC invites comments on whether wind projects with multiple interconnection points should be evaluated as a single project or multiple projects.
- **Pre-certification of equipment.** FERC acknowledges that pre-certification of a generating technology (by a national testing laboratory) certifies the safety of the generating system itself, but not of the grid itself after its interconnection. Thus, there may still be a need to determine that the interconnection poses no adverse impact to the transmission system. FERC mentions IEEE 1547 for Interconnecting Distributed Resources with Electric Power Systems (approved June 12, 2003) as a possible pre-certification standard.
- **Queuing.** FERC proposes that each transmission provider maintain a single queue for each geographic area. Queue order would be based on the proposed date and time of project completion, and would determine the order

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of performing interconnection studies. However, FERC points out that queue position would not limit small generators from interconnecting earlier or more quickly than other projects ahead of them in the queue.

Comments on the NOPR are due in early September.

FERC, Standardization of Small Generator Interconnection Agreements and Procedures, July 24, 2003, Docket No. RM02-12-000.

More Regional Technical Conferences on SMD

In addition to the four regional technical conferences on SMD already held in Omaha, Atlanta, Boston, and Wilmington, FERC announced four additional conferences to address issues brought up in its SMD white paper.

- September 15, 2003 in Tallahassee, FL
- September 24, 2003 in Phoenix, AZ
- October 20, 2003 in New York, NY
- November 6, 2003 in San Francisco

The timing of these conferences suggests FERC does not plan to issue a final SMD rule until the end of 2003 or early 2004.

More information on upcoming technical conferences can be found at http://www.ferc.gov/industries/electric/indus-act/smd/conf-2003/white-paper.asp.

The West

RTO West Gets Back on Track

After a delay, activity among RTO West's filing utilities and Regional Representatives Group (RRG) began picking up again this summer.

In August, the filing utilities presented to the RRG a draft, high-level vision statement for RTO West, the core of which is to "unify transmission management to maintain reliability, improve efficient use of the transmission system, and provide the region's customers with access to diverse, widespread wholesale energy alternatives." Some RRG representatives expressed support while others encouraged more discussion of this statement. Many of those who offered comments shared the view that the most positive outcome would be a regionally supported plan to present to the appropriate regulatory agencies.

They stressed that early resolution of two major issues would be required to move forward together:

- The process that should be used for further RTO West development work and decision-making, and
- The scope and definition of the regional transmission problems that need to be solved on a regional basis.

On the process-related question, most representatives said that the existing RRG structure adequately represented diverse interests, but some said greater involvement by state commissions is needed. Many RRG stakeholders expressed negative views about their ability to provide input while filing utilities have the authority to make final decisions and negotiate tradeoffs. Some advocated that further work should allow all parties to negotiate for broadly supported outcomes but others warned that there need to be real incentives for all parties to reach and honor negotiated outcomes.

On the issue of RTO West scope and definition, RRG participants discussed the need the need to support appropriate development of new infrastructure as well as the need to make more effective use of existing infrastructure. Critical issues

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regarding new infrastructure include providing certainty of cost recovery in a region with multiple regulators, the need to establish clear property rights to reward appropriate infrastructure investment, and the need for equitable cost allocation for projects of regional scope. Critical issues regarding the use of existing infrastructure include how to incorporate new transmission products into regional markets and concern about managing congestion through market mechanisms.

RTO West RRG notes, available at http://www.rtowest.com/RRG_Main.htm.

CAISO Board Approves New Market Redesign

The California ISO has approved revisions to its current market design (MD02). The main elements of the original MD02 plan are still in effect, including integrated forward market (IFM), locational marginal pricing, congestion revenue rights, residual unit commitment, and market power mitigation. There are some changes, however. For example, new details that clarify and remedy certain aspects of MD02 are included, such as provisions that:

- Remedy cost aggregation problems of LMP implementation,
- Clarify the treatment of existing transmission contracts, and
- Clarify the availability payment for RUC.

Also, the available capacity (ACAP) requirement is no longer part of MD02. Instead, the California Public Utility Commission (CPUC) and California Power Authority (CPA) are working on a resource adequacy plan to provide for California's long-term power needs.

ISO Board Approves New Version of Market Redesign, California ISO press release, June 26, 2003.

WestConnect to Review Costs/Benefits of RTO

WestConnect participants and other stakeholders have hired Tabors Caramanis and Associates to complete a cost-benefit analysis of the proposed RTO. The study is to be completed by the end of the year.

Transmission Report 7/7/03-7/20/03, Energy Info Source.

The Midwest

MISO Approves Transmission Plan

The Midwest Independent System Operator's (MISO) Board of Directors unanimously approved the region's first comprehensive transmission expansion plan in June. The Midwest ISO Transmission Expansion Plan (MTEP) explored 11 regional expansion scenarios and identified $1.3 billion in grid improvements. The analysis of options identified opportunities to invest in transmission in order to enable greater use of the region's coal and wind resources. The plan identifies the 19 most congested flowgates in the Midwest and approves plans to address the majority of them. Several scenarios included an estimated 20,000 MW of potential wind and coal resources in the Dakotas, Minnesota, Illinois, Indiana and Kentucky.

Transmission Report 6/9/03-6/22/03, Energy Info Source.

MMSC now OMS – Organization of MISO States

The Midwest Multi-State Committee – the group of state regulators with oversight over utilities participating in MISO – has changed its name to the Organization of MISO States (OMS). The OMS now consists of representatives from 14 states. At its most recent meeting, OMS representatives elected a nominating committee to identify officers, adopted a funding agreement and a 2003 budget, assigned initial committee work, and adopted a job description for the position of executive director.

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OMS founder Susan Wefald of the North Dakota Public Service Commission reiterated that the purpose of OMS is not to create another layer of government at the regional level. Rather, OMS members hope that by working together they can be more effective than they would as individual states. The OMS will write position papers, circulate them among state representatives, and try to develop consensus on issues. It will then share these consensus positions, as well as describe areas of disagreement, in appropriate forums, such as FERC and MISO.

Comments of Susan Wefald, Commissioner of the North Dakota Public Service Commission, as reported in the transcript of the MISO Technical Conference with States and Market Participants, Wednesday, June 11, 2003, Omaha, Nebraska, available at http://www.ferc.gov/industries/electric/indus-act/smd/conf-2003/white-paper.asp.

MISO Files a New Tariff

The Midwest ISO filed a new tariff in late July. The proposed tariff preserves the basic structure of the existing tariff while incorporating provisions for implementation of day-ahead and real-time energy markets based on security-constrained, bid-based dispatch of generation, locational marginal pricing (LMP), and financial transmission rights (FTRs).

The proposed tariff has separate modules for each set of services offered. For example, Module B, Transmission Service, maintains the current terms and conditions of the MISO tariff and focuses on the tariff provisions for transmission service. Module C, Energy Markets, Scheduling and Congestion Management, defines the terms and conditions for day-ahead, post-day-ahead and real-time scheduling, and will contain the terms for FTRs.

Transmission Report 7/21/03-8/3/03, Energy Info Source.

Illinois and Iowa Transmission System Sales Called Off

Illinois Power's planned sale of its transmission assets to private grid company TransElect has been cancelled. The proposed $239 million agreement expired in July. Parties to the deal cited the uncertainty of federal transmission policies and a lack of support from the Illinois Public Utility Commission as reasons for the cancellation. Illinois Power says it is considering its options, which include keeping the transmission system or attempting to sell it at another time to TransElect or another party.

A similar result was reached in Iowa, when the Iowa Utilities Board announced its decision to "dismiss without prejudice" the proposal of Interstate Power & Light Company (the Iowa subsidiary of Alliant Energy) to transfer its transmission assets to the TRANSLink ITC. The IUB cited unresolved questions pertaining to regulatory jurisdiction, FERC's position on RTOs, and a stringent statutory deadline as reasons for its decision. However, the IUB encouraged the companies to refile at a later date.

Transmission Report 6/9/03-6/22/03, Energy Info Source.

Texas

ERCOT Rolls Out Wind Stability Models

ERCOT hosted a workshop in August to discuss its progress in developing wind generation stability models. The models are being developed for use in system planning and stability studies.

The modeling work was awarded to Electrotek in July 2002. Electrotek has worked with wind turbine vendors, consultants, and PTI (the company that makes the PSS/E software package, used by the majority of transmission system operators in the eastern US) to develop the stability models. Due to the variation in control technologies employed by different wind turbine manufacturers, the

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project team developed four separate models in order to accurately reflect the variation of wind technology currently deployed in Texas.

The project is now in the validation stage, in which modeled performance is being compared against actual performance of wind turbines under different scenarios. With the data gathered so far, the models generally appear to be accurate, with certain modifications necessary. Validation of the models will continue over the next several months. There is also a need to develop modeling for clusters of turbines deployed together in a larger wind plant.

When complete, the models will likely be available to other licensed users of PSS/E, and could be ported to other transmission system modeling software packages as well.

ERCOT Wind Generation Model Development Meeting #6, August 29, 2003. Workshop materials available to registered users at www.ercot.com.

Study Shows Energy Storage can Help West Texas Wind

The Lower Colorado River Authority completed in August a report on how compressed air storage technology could help alleviate wind curtailments in West Texas. The Texas State Energy Conservation Office funded the study.

The report begins with an assessment of problems facing wind generation in the McCamey area of West Texas, a prime locus of wind development activity, and concludes that the transmission system faced $21-$25 million in economic losses in 2002 alone due to the need for reactive power. Above market cost for provision of reactive support to the area totaled an additional $7 million. Thus, costs totaled approximately $30 million/year.

The next section discusses compressed air energy storage (CAES) technology and how different CAES facilities could be used to relieve the transmission system. It provides estimates of the cost to use CAES to reduce wind energy curtailments, such as heat rate and fixed and variable costs.

The study concludes that addition of a CAES plant could provide wind energy curtailment relief of over 600,000 megawatt-hours (MWh) and allow up to 400 MW more wind development in the region with minimal residual curtailment levels. However, the study notes that the ability of energy storage to remove curtailments completely is limited due to practical constraints in the storage capacity of CAES plants.

Study of Electric Transmission in Conjunction with the Use of Large Scale Energy Storage Technology for Issues facing Wind Generation in West Texas. Available from the Texas State Energy Conservation Office, contact Pam Groce at pam.groce@cpa.state.tx.us.

Other News

NWCC Developing Transmission Planning Principles

The National Wind Coordinating Committee (NWCC) is working with stakeholders to develop a set of principles for transmission planning. The principles are now in draft stage, and NWCC is seeking full approval this fall. They address transmission planning issues that affect wind power, but do not seek special treatment for wind as a specific fuel source. NWCC members believe the principles reflect mainstream views that could benefit all energy market participants. They also believe the principles are consistent with the 1992 Energy Policy Act, FERC Order 2000, and FERC's 2003 white paper on standard market design.

Contact Kevin Bryan of NWCC, kbryan@resolv.org.

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PJM Approves Transmission Projects

PJM's Board of Managers approved $147 million in transmission system upgrades as part of PJM's Regional Transmission Expansion Plan. The plan will accommodate the connection of 41 new projects adding over 5,000 MW of new capacity to the grid. The plan will, for the first time, allow a number of merchant transmission projects to connect to the grid.

Transmission Report 6/9/03-6/22/03, Energy Info Source.

AWEA: NY RPS Should Pose "No Difficulty" for Wind

The New York Independent System Operator (NY-ISO) should have "no difficulty" in integrating the amounts of new wind energy that could result from Gov. George Pataki's proposed Renewables Portfolio Standard for the state, according to AWEA policy director Jim Caldwell.

In support of this thesis, Caldwell provided to NY-ISO staff on June 20 a summary of a series of recent studies that have been carried out by major utilities in this country and in Europe on the utility integration issues resulting from adding new wind generation.

In his remarks, Caldwell drew upon the results of studies in the U.S. that have been carried out by Xcel Energy, the Bonneville Power Administration (BPA), and PacifiCorp, along with information from some representative European studies on the NORDEL Scandanavian grid, the ELTRA system in Denmark, on the Cyprus transmission system, and on Ireland and the United Kingdom.

The tentative conclusions of this body of work to date, according to Caldwell:

- The limits to adding wind generation are generally economic, not technical. The technical limits are reached at the point when wind is providing about 40% or more of the total electricity generated on the "system" on an annual basis.
- The economic costs associated with adding wind are negligible at low penetration levels (<0.2 cents/kWh), modest at medium levels (0.2-0.5 cents/kWh), and can be moderated even at relatively high levels – "the cost graph has a 'hockey stick' shape;" and
- What constitutes "low," "medium," and "high" penetration levels is variable, and primarily depends on the size of the region in question, the "tariff" or scheduling rules and cost allocation accounting method that applies to users of the transmission system, the "stiffness" of the transmission system, and the flexibility of other generation on the system.

"New York is average to above average on this scale," Caldwell said, "and it should have no difficulty reaching 15-25% penetration without major capital investment to deal with wind's variability."

He stated that the highest costs and most problems are experienced at minimum load hours, not at peak hours, with the economic limit being reached when too much wind capacity must be "curtailed," or shut down to keep generation in balance with demand, and the next reasonable transmission investment is not justifiable.

Wind Energy Weekly, AWEA, 6/30/2003.

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