

**UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION**

**Interconnection for Wind Energy
and Other Alternative Technologies**

Docket No. RM05-4-000

**COMMENTS OF THE
NEW YORK INDEPENDENT SYSTEM OPERATOR, INC.
IN RESPONSE TO
NOTICE OF PROPOSED RULEMAKING**

Pursuant to Rule 213 of the Federal Energy Regulatory Commission's ("Commission") Rules of Practice and Procedure, the New York Independent System Operator, Inc. ("NYISO") submits these Comments in response to the Commission's January 24, 2005 Notice of Proposed Rulemaking ("NOPR") in the above referenced proceeding.

The Commission's Order No. 2003¹ adopted standard procedures for the interconnection of large generation facilities ("LGIP") and a standard large generator interconnection agreement ("LGIA"). Subsequently determining on rehearing in Order No. 2003-A² that certain provisions of these standard procedures and the agreement may not be applicable to non-synchronous technologies such as wind-powered generation, the Commission included a blank Appendix G (Requirements of Generators Relying on Non-

¹ Standardization of Generator Interconnection Agreements and Procedures, Order No. 2003, 104 FERC ¶ 61,103 (July 24, 2003).

² Standardization of Generator Interconnection Agreements and Procedures, Order On Rehearing, No. 2003-A, 106 FERC ¶ 61,120 (March 5, 2004).

Synchronous Technologies) to the LGIA as a placeholder for the inclusion of requirements specific to these technologies.

The Commission's NOPR now proposes standards for Appendix G that would be applicable to the interconnection of large wind generating plants, which are defined as those with an output rated at 20 MW or higher at the point of interconnection. The Commission notes that the technical requirements proposed for Appendix G are not intended to be the sole interconnection requirements for wind plants and emphasizes that such plants will still be subject to the other standard interconnection procedures and requirements adopted by the Commission in Order No. 2003.

1. Comments

Introduction

The NYISO supports the Commission's determination that non-synchronous generating technologies may require some specific interconnection standards in addition to those provided for in the LGIP and the LGIA. The NYISO also supports the Commission's objective of adopting final technical requirements for the interconnection of wind plants that will accommodate these and other non-synchronous technologies while still ensuring the continued reliability and safety of transmission grid operations.

Addressing the specific provisions of the Commission's proposed Appendix G in more detail below, the NYISO urges the Commission to require all new large wind generating facilities to demonstrate low-voltage ride-through capabilities and to have a specified level of supervisory control and data acquisition capability, as well as the capability to curtail power output on directions from the Reliability Coordinator. The

Commission should also adopt performance standards for large wind generating facilities that would require them to operate within a specified power factor range and regulate voltage at the point of interconnection. These requirements were also recommended in Phase I of an ongoing study in New York sponsored by both the NYISO and the New York State Energy Research and Development Authority, entitled: The Effects Of Integrating Wind Power On Transmission System Planning, Reliability, and Operations (New York Wind Study). Phase II of the New York Wind Study, which has been released in draft form, is evaluating the operational impacts of wind generation on the New York transmission system.

The NYISO also suggests that the final Appendix G should be applicable to other non-synchronous technologies such as tidal power. Finally the NYISO strongly urges to the Commission to permit Transmission Providers to justify variations from the final Appendix G, including the capability of establish more stringent requirements if transmission system security and reliability would be otherwise jeopardized.

Low Voltage Ride-Through Standard

As the Commission describes in the NOPR, the advent of larger aggregated wind plants will result in a greater penetration on a Transmission Provider's system in certain areas, which, in turn, could result in significant stability problems on the system if such facilities become unavailable during a low-voltage excursion. The Commission correctly notes that, under such circumstances, Transmission Providers will require these larger wind facilities to be able to remain on-line for reliability purposes during low-voltage occurrences.

Accordingly, the Commission is proposing to require large wind plants seeking to

interconnect to the grid to demonstrate a capability to “ride through” a low-voltage occurrence by remaining on-line during voltage disturbances up to the time periods and associated voltage levels set forth in Figure 1 of the proposed Appendix G. The NYISO supports the need for these facilities to demonstrate the ability to remain on-line through a low-voltage situation. In fact, the Phase II Report of the New York Wind Study recommends that low-voltage ride-through capabilities should be required of large wind facilities and suggests that low-voltage ride-through standard in the proposed Appendix G should be adopted as a minimum performance expectation.

The Phase II recommendations underline the NYISO’s concern, however, that the inclusion of a specific curve in Appendix G without a clear indication that this is a minimum performance requirement for low-voltage ride through capabilities may cause the curve to become, by default, the performance maximum. To ensure that there is no disincentive for advancing low-voltage performance technologies or improving specific large wind facility operating practices, the NYISO urges the Commission to emphasize in its final rule that the performance standard in the proposed Appendix G should be considered a minimum performance expectation. In turn, Transmission Providers should have the flexibility to vary from this standard and require higher expectations for low-voltage ride-through performance if either the particular location or the design of a large wind facility requires a higher standard to ensure transmission system security.

Supervisory Control and Data Acquisition (SCADA) Capability

The Commission correctly notes that larger wind generation facilities and their possible impacts on transmission system operations may require Transmission Providers to insist on remote supervisory control and data acquisition (“SCADA”) capabilities for

these installations. The Commission, therefore, proposes to require large wind plants to possess SCADA capability as a condition for interconnection. The proposed language for Appendix G would allow the Transmission Provider and the wind plant Interconnection Customer to determine what SCADA information is essential for a proposed wind plant, taking into account area- and project-specific factors such as plant size, characteristics, and location, the relative importance of maintaining generation resource adequacy and transmission system reliability in the area of the grid at the facility's location. The NYISO supports the need for SCADA at these facilities and further supports the Commission's proposal to allow the Transmission Provider and the Interconnection Customer to fashion SCADA requirements that are specific to each project and location.

Examples of SCADA information that should be available on a continuous and instantaneous basis from large wind farms should include, but not be limited to, Real Power, Reactive Power, and Voltage Level at the interconnection point, the number of available machines, and the prevailing wind speed and direction at the facility's location. Prevailing wind direction and speed would be particularly useful for the purposes of forecasting and the potential requirements for energy imbalance services for these facilities.

The NYISO also suggests that, for the purposes of reliability, large wind plants should have the ability to receive dispatch security signals to reduce generation output. SCADA requirements for large wind plants should also provide the means for the facility operator to regulate output voltage levels upon directions from the Reliability Coordinator or Transmission Operator. In support, the NYISO notes that the capability

to curtail power on command is recommended in Phase II of the New York Wind Study as a general interconnection requirement for large wind facilities.

Power Factor Design Criteria (Reactive Power)

As a result of their large sizes, large wind plants may be required to operate within a specified power factor range in order to assist in balancing reactive power needs for the transmission system. Accordingly, the Commission is proposing to require that wind plants maintain a power factor with the range of 0.95 leading to 0.95 lagging as is required by Order No. 2003, with performance measurements to be taken at the high voltage side of the substation transformer.

While it supports the need for, and the Commission's proposal to include, a required power factor range in Appendix G, the NYISO urges the Commission to consider the proposed power factor design to be a minimum requirement, rather than the maximum expectation. Additionally, rather than requiring large wind facilities to operate within a power factor range, the NYISO urges the Commission to require the wind farm to maintain (regulate to) a voltage schedule within a power factor capability in the range of 0.95 leading and 0.95 lagging, which is another interconnection requirement that is recommended in Phase II of the New York Wind Study.

The Wind Study specifically opined that requiring the use of the voltage regulation mode within the power factor capability range would work more effectively for wind facilities. The Study further recommends that required voltage levels should be measured at the point of interconnection.

The NYISO also recommends that, consistent with considerations of design requirements and good utility practice, the large wind farm, in aggregate, should not

depend on the transmission system interconnection for the facility's excitation power. Instead, the facility should be required to have sufficient reserve capacitive resources on site in the form of excitation system and automatic voltage regulation equipment to ensure that it would be capable of operating within this design criteria at all times.

Although the Commission proposes to require large wind plants to have the capability to provide sufficient dynamic voltage support as a condition for interconnection, as opposed to a power system stabilizer ("PSS") and automatic voltage support at the generator excitation system level, the NYISO would note that the use of induction generator technology precludes the application of a PSS altogether. Developing technology may allow for other control applications such as "slip control" that may be able to provide some form of "near-transient" voltage or power regulation response in the future. For the time being, the final Appendix G should allow the Transmission Provider or Reliability Coordinator to specify a greater range of reactive control capability, as would be required for a synchronous generator.

Models and Self-Study of Feasibility

Order No. 2003 currently requires that a valid and complete Interconnection Request be on file with the Transmission Provider before the Interconnection Customer may receive Base Case Data. In the NOPR, the Commission seeks comments on how to balance the need of wind generators to self-study prior to filing a completed Interconnection Request with the need to protect this critical energy infrastructure information and commercially sensitive data against unwarranted disclosure. The NYISO suggests that this balancing concern can apply to all developers of merchant generation, whether synchronous or non-synchronous. For example, Base Case Data

could be made available to all potential developers in advance of the submission of a complete Interconnection Request, subject to executed agreements to protect the confidentiality of such data. This approach would likely enable developers of all types of generation technology to submit a more fully informed and effective Interconnection Request.

Assuming that Base Case Data were to be made available in advance of the Interconnection Request to an Interconnection Customer proposing a large wind facility, that Customer should then be able to complete its facility design and submit a more comprehensive Interconnection Request. This approach would also further support the Commission's correct decision in Order No. 2003 that the Interconnection Customer should have its design substantially completed prior to submitting its Interconnection Request and the Commission's reasoning that providing one class of Interconnection Customers extra time to submit design specifications would be unfair to others in the queue. Making Base Case Data available to all Interconnection Customers without the condition of having already submitted their Interconnection Request would treat all project developers equally.

Other Technologies

The NYISO suggests that tidal power technologies could also be appropriately included in the final Appendix G.

Variations from Appendix G

In the NOPR, the Commission proposes to permit Transmission Providers to justify variations from the terms of the final Appendix G under three categories of variations from the LGIP and the LGIA: variations based on regional reliability

requirements; variations that may be consistent with or superior to the standard interconnection provisions and agreement; or, flexibility for independent system operators (“ISOs”) and regional transmission operators (“RTOs”) to seek “independent entity variations” from the pricing and non-pricing provisions of the LGIP and LGIA.

The NYISO generally supports and urges the Commission in its final rule to allow Transmission Providers the opportunity to justify variations from the terms of a final Appendix G, but the NYISO also urges the Commission to contemplate the allowance of variations from Appendix G that would establish more stringent interconnection requirements if a project were deemed to have a potentially negative affect on transmission system safety or security. The Commission’s discussion in the NOPR appears to contemplate only variations that would reduce interconnection requirements for a large wind facility if such variations do not jeopardize system reliability. It is entirely reasonable to presume, however, that an interconnection scenario could develop for a Transmission Provider under which a proposed facility might raise system security issues even under the terms of the final Appendix G. Under such circumstances, the Transmission Provider should have the opportunity to demonstrate the need for even more stringent interconnection requirements, with the understanding that any variations from Appendix G’s requirements, whether less or more stringent, would be applied equally to similarly situated Interconnection Customers.

The Commission’s proposal to allow for variations is also particularly important with regard to differences in regional operating circumstances. The Commission’s final rule should provide the flexibility necessary to ensure that technical requirements can be adopted that will accommodate specific local or regional operating circumstances. Only

through such flexibility will the Commission be able to meet its stated objective of recognizing the specific technical needs of large non-synchronous generating facilities without compromising transmission grid safety and security. For example, Phase II of the New York Wind Study recommended several future interconnection options that should be considered in New York. These future options include requiring wind generation to have the ability to set power ramp rates, governor and reserve functions, and meet zero-power voltage regulation. The NYISO, or any other Transmission Provider, should have the ability to demonstrate the need for new requirements such as these if such capabilities will advance the expansion of wind generation without diminishing transmission system security.

II. Conclusion

For the foregoing reasons, the NYISO urges the Commission to adopt a final Appendix G to the LGIP and LGIA in a form consistent with these Comments.

Respectfully submitted,

NEW YORK INDEPENDENT
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March 2, 2005