UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Interconnection for Wind Energy and Other Technologies	Docket No. PL04-15-000
Standardization of Small Generator Interconnection Agreements and Procedures	Docket No. RM02-12-000
Standardizing Generator Interconnection Agreements and Procedures	Docket No. RM02-1-001 Docket No. RM02-1-005

POST-CONFERENCE COMMENTS OF THE NORTH AMERICAN ELECTRIC RELIABILITY COUNCIL

The North American Electric Reliability Council, a New Jersey non-profit corporation ("NERC")[1], is pleased to present these comments in response to the issues and questions raised at the Commission's September 24, 2004, technical conference to review a petition for rulemaking submitted by the American Wind Energy Association ("AWEA") related to the adoption of certain requirements for the interconnection of large wind generators. NERC believes that all generators should meet NERC reliability standards in addition to standards developed by the Regional Reliability Council ("RRC") in which the generator is located. NERC reliability standards define requirements for reliability performance, and each RRC has the flexibility to implement more stringent standards where required.[2]

[1] NERC was formed after the Northeast blackout in 1965 to promote the reliability of the interconnected electric systems in North America. Its mission is to ensure that the bulk electric systems that serve North America are adequate, reliable, and secure. It works with all segments of the electric industry as well as customers to "keep the lights on" by developing and encouraging compliance with rules for the reliable operation and adequacy of supply of these systems. NERC comprises ten Regional Reliability Councils that account for virtually all the electricity supplied in the United States, Canada, and a portion of Baja California Norte, Mexico.

[2] NERC's Operating Policies and Planning Standards are in the process of translation to Version 0 of NERC's Reliability Standards. The citations to NERC standards in these post-conference comments are to existing NERC Operating Policies and Planning Standards.

NERC's comments address four topics related to the AWEA petition:

1. NERC Standards Development Process
2. Low Voltage Ride-Through Capability
3. Telecommunications Equipment
4. Reactive Power

1. NERC Standards Development Process

NERC establishes reliability standards for the North American interconnected electrical grid. NERC develops reliability standards using an ANSI-accredited development process that is designed to achieve consensus through stakeholder participation. NERC welcomes and encourages the participation of AWEA in NERC's standards development process to ensure that specific concerns of wind generators are considered in the standards that NERC develops to protect and promote electric grid reliability. The NERC standard development process has a mechanism for considering new standards as well as changes to existing standards that may be proposed by any segment in the electric industry, including transmission customers.

NERC does not believe that Appendix G of the Large Generator Interconnection Agreement is the appropriate place to formulate reliability standards for collections of wind generators (i.e., wind farms) that in the aggregate can have a significant impact on the planning and operation of the electric grid. Reliability standards for the electric grid should be developed through the NERC standards development process. Appendix G could more properly be used to identify elements of the key interconnection requirements that should be addressed by the generator and the transmission provider, or to establish the technical framework of an interconnection agreement for a collection of wind generators. NERC requests that the Commission refrain from setting reliability standards in Appendix G and, instead, encourage AWEA to pursue its reliability-related issues within NERC and regional processes.

2. Low Voltage Ride-Through Capability

AWEA proposes that wind generators accommodate the low voltage ride-through characteristics described in Table 1 of AWEA's proposed Appendix G. AWEA also proposes that wind

generators that are in a generation supplier's existing inventory be exempt from any standard for low voltage ride-through capability established in Appendix G.

NERC Planning Standard III, System Protection and Control, C. Generation Control and Protection, Standard 3, addresses the ability of generators to withstand transient conditions. It states, "Temporary excursions in voltage, frequency, and real and reactive output that a generator shall be able to sustain shall be defined and coordinated on a Regional basis."

NERC believes that the regional planning process is the appropriate vehicle for establishing the technical requirements for generator transient performance in a region. NERC cannot tell if the low voltage ride-through capability described in Table 1 of AWEA's petition is either adequate or appropriate. NERC and the RRCs would need to perform further assessments of the transmission grid to determine the required low voltage ride-through capability before NERC could consider a specific standard proposed by AWEA. Reliability of the electric grid in some regions may require low voltage ride-through characteristics that are different than those proposed by AWEA. The reliability requirements of the grid, as defined and coordinated by the NERC reliability standards and the respective RRC criteria, establish the necessary technical characteristics of a generation source interconnecting to the grid. The technical capabilities of the generator must not establish the reliability standard. For this reason, NERC does not believe that existing inventories of wind generators should be exempted from compliance with any voltage ride-through capability requirement.

NERC believes that FERC should not incorporate a one-size-fits-all technical standard in Appendix G. Rather, the Commission should require that generation that interconnects within a region must meet the technical requirements appropriate to the area of interconnection, as defined and coordinated by the RRC.

3. Telecommunication Equipment

AWEA proposes that non-synchronous wind generators install supervisory control and data acquisition (SCADA) capabilities that enable: (1) limitation of maximum plant output during

system emergency and system contingency events; and (2) bi-directional electronic communication between the system operator and the wind facility of sufficient capability to accommodate reliable scheduling and forecasting information exchange.

NERC Operating Policy 4, System Coordination, and its Attachment 4B, Electric System Security Data, describe the minimum data requirements for control areas and reliability coordinators. This policy requires that the control area have available to it the generator MW and MVAR capability, MW and MVAR net output, and the status of automatic voltage control facilities.

AWEA's proposal is not specific enough for NERC to determine exactly what information is included in AWEA's proposal for SCADA. Therefore, NERC believes that FERC should make clear in Appendix G that the data requirements of NERC Operating Policy 4, or more stringent requirements determined by the RRC to ensure the reliability of the electric grid, are applicable. NERC believes it would be inappropriate and would have an adverse impact on electric grid reliability to waive the data requirements contained in NERC standards.

NERC believes that providing SCADA information at the point of interconnection for a grouping of wind generators is a reasonable interpretation of NERC's information requirement.

4. Reactive Power

AWEA proposes that non-synchronous wind generators be required to maintain a composite power delivery at full rated power output at the point of interconnection at a power factor within the range of up to 0.95 leading and up to 0.95 lagging, or a lesser range based on system impact studies.

NERC Planning Standard I, System Adequacy and Security, D. Voltage Support and Reactive Power, Guide 3, recommends that at continuous rated power output, new synchronous generators should have an overexcited power factor capability, measured at the generator terminals, of 0.90 or less (lagging) and an underexcited power factor capability of 0.95 or less (leading). If the

generator does not meet this requirement, the generator owner should make alternative arrangements for supplying an equivalent dynamic reactive power capability to help meet the area's reactive power requirements. Guide 3, while not a standard, is considered to be good utility practice and the industry has been responsive to this guide.

NERC emphasizes that sufficient reactive resources must be located throughout the electric systems to ensure their reliable operation, with a balance between static and dynamic characteristics. Both static and dynamic reactive power resources are needed to supply the reactive power requirements of reactive power losses in the transmission system and provide adequate system voltage support and control. They are also necessary to avoid voltage instability and widespread system collapse in the event of certain contingencies. Dynamic reactive power support and voltage control are necessary to ensure that the electric systems can withstand power system disturbances. Generators, synchronous condensers, and static VAR compensators can provide this dynamic support. A non-synchronous generator that cannot meet the current NERC guidelines should make alternative arrangements for supplying dynamic reactive power capability just as a synchronous generator is required to do. In fact, NERC believes that at the point of interconnection, a collection of wind generators should have the same characteristics as a synchronous generator. The wind generator has flexibility under NERC standards as to how to provide this dynamic reactive power capability.

NERC believes that any power factor requirements for wind generators that are different from other generators should be developed through the NERC standards development process. NERC also believes that it is inappropriate to apply less stringent generator power factor requirements for a generator or group of generators based on a study of a specific transmission system configuration at a specific point in time. First, our investigations of widespread blackouts and even local system disturbances clearly reveal the dynamic operation of the generation and transmission system in real time. Second, transmission system configurations and power flows change through time as load areas grow and interchange patterns vary. Therefore, determining reactive requirements based on an analysis of a particular transmission configuration at a particular time is not sufficient. The range of power factor capability in NERC Guide 3 provides

an adequate margin in dynamic reactive power support to reduce the likelihood of cascading outages and provides support to the electric grid as it matures over time.

NERC believes that measuring the power factor range at the point of interconnection is a reasonable interpretation of NERC guides for a collection of wind generators.

Conclusion

NERC is dedicated to improving the reliability and security of the bulk power system, and looks forward to working with AWEA and any other electric industry stakeholders in the development of appropriate reliability performance standards for groupings of wind generators.

Respectfully submitted,

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