

**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 AMERICAN WIND ENERGY ASSOCIATION  
ON NOTICE OF PROPOSED RULEMAKING**

**I. INTRODUCTION**

In Order No. 2003, the Commission adopted standard procedures for the interconnection of large generation facilities and a standard large generator interconnection agreement. The Commission required public utilities that own, control, or operate facilities for transmitting electric energy in interstate commerce to file revised Open Access Transmission Tariffs (OATTs) containing these standard provisions, and use them to provide interconnection service to generating facilities having a capacity of more than 20 megawatts. In Order No. 2003-A, on rehearing, the Commission determined that the standard procedures and agreement were designed around the needs of traditional synchronous generation facilities, and that generators relying on non-synchronous technologies, such as wind plants, may find that a specific requirement is inapplicable or that a different approach is needed. Accordingly, the Commission granted certain clarifications, and also added a blank Appendix G (Requirements of Generators Relying on Non-Synchronous Technologies) to the standard generator interconnection agreement as a placeholder for the inclusion of requirements specific to non-synchronous technologies.

The American Wind Energy Association (AWEA), representing the manufacturers, developers, and owners of wind generation in the United States, filed proposed language on May

20, 2004, to be included in Appendix G of the Large Generator Interconnection Agreement (LGIA). AWEA is generally pleased to see that the Commission has created the proposed rules for new technologies. In our own efforts to define the interconnection standards and procedures for wind, AWEA found that some flexibility is needed to achieve appropriate standards. In these comments, AWEA hopes to convey the times and places where the pursuit of the desired standards is better accomplished with a degree of patience for the transition, and the use of judgment, to bring about the end state in a reasonable manner.

## **II. COMMENTS**

### **A. The Commission Should Implement a Transition Period**

#### **1. Timing**

AWEA is concerned that the immediate imposition of the proposed standards following the issuance of the Final Rule could create undue discrimination against new entrants through the imposition of unjust and unreasonable costs.

The Notice of Proposed Rulemaking (NOPR) sets forth technical requirements for inclusion in Appendix G to the LGIA. These requirements would apply to interconnection service for wind generation plants in recognition of the technical differences between wind and synchronous generating plants and the increased penetration of larger aggregated wind plants on the transmission grid. The offering of an LGIA by a Transmission Provider necessarily occurs after the customer has completed the interconnection study process. Currently, many wind generation plants have completed the interconnection process, contracted for wind turbine design, manufacture, and delivery, all in keeping with present standards and requirements.

While AWEA, for example, fully supports the adoption of a standard for low-voltage ride-through capability (LVRT) and power factor requirements for wind energy facilities greater

than 20 MW, the proposed standard anticipates widespread adoption of wind technology. The immediate enforcement of this requirement is not necessary, as there is no record evidence that the reliability of any control area in the United States has been sacrificed due to present lack of an LVRT standard. As the adoption of these standards will require changes to the existing procurement practices for wind developers, and these changes remain uncertain, requiring adoption of a new standard without a transition period would unjustly and unreasonably harm wind developers in competition with existing generators.

## **2. Transition Period**

There should be no doubt that AWEA supports the Commission's desired intention to introduce LVRT, Supervisory Control and Data Acquisition (SCADA) capability and power factor requirements for windfarms over 20 MW. AWEA proposed these requirements in its Petition, with the understanding that retrofitting existing windfarms and inventories of generators ready for installation would not be required. (See AWEA Petition at 3).

The important distinction in timing for implementation of the new standards is the lead time for the manufacture of the technology. There are windfarms that are under contract for construction in 2005 that have specified turbine designs based on the standards and requirements in place at the time of the contract execution. These particular existing contracts that are in place between private parties may not meet the new standards. However, where Transmission Providers have contracted for the new standards' capabilities and/or where windfarm developers/owners have ordered equipment consistent with such capabilities, the new standard will be met. It nevertheless will be commercially impossible for all windfarms and wind generating equipment under contract at this time to be redesigned without abrogating contracts. It takes a year for the pipeline of contract negotiation and equipment orders, design, retooling,

manufacturing, and shipment of generators to accommodate changes required by the LVRT standard. The +/- 0.95 power factor capability likewise has implications for design, equipment orders, and product shipments for either turbines or balance of plant systems that are already specified and ordered for delivery, in many cases.

AWEA respectfully requests that the Commission introduce a reasonable transition period for the requirements of Appendix G of the LGIA. All existing individual generator units that are interconnected to the network at the time of the adoption of the new standards, and any generator that has executed an LGIA prior to January 1, 2006, or has requested in writing the Transmission Provider file with the Commission an LGIA in unexecuted form, should be exempt from meeting the relevant standard(s) for the remaining life of the existing generator equipment. All other generators entering interconnection requests and existing individual generator units that are replaced should be required to meet the new standards. This reasonable transitional accommodation will allow the proposed requirement to become a national interconnection standard whose costs will be borne by the wind developer/turbine manufacturer, without penalizing generators that have in good faith already made investments based on the old standards.

The Commission has historically understood the need for a reasonable transition period between existing and new regulations. The length of such transition period is determined by the nature of the new regulations. For example, in its Generation Interconnection Final Rule, the Commission established a 60 day transition to its new rules. Standardization of Generator Interconnection Agreements and Procedures, Order No. 2003, 68 Fed. Reg. 49,845 (Aug. 19, 2003), FERC Stats. & Regs., Regulations Preambles 6 31,146 (2003) (Order No. 2003), order on reh'g, Order No. 2003-A, 106

FERC 6 61,220 (2004) (Order No. 2003-A), reh'g pending; see also Notice Clarifying Compliance Procedures, 106 FERC 6 61,009 (2004). While a sixty day period was appropriate for the contractual changes ordered by Order No. 2003, a period longer than sixty days is required in order to transition to the new LVRT and power factor requirements established in this proceeding, due to the long lead times for equipment procurement and installation. Such longer transition periods have been recognized as being appropriate. For example, the Commission's new hydro rules implemented a transition period for compliance, consistent with the nature of the regulatory change. Hydroelectric Licensing under the Federal Power Act, III FERC Stats. & Regs. 6 31,150 (July 23, 2003) ("Order No. 2002"); Order No. 2002-A, 106 FERC 61,037 (2004).

Therefore, consistent with the Commission's prior practices, and the particular circumstances of this case, the Commission should find that the Final Rule will not apply to any generator that, prior to January 1, 2006, has executed an LGIA or has requested in writing the Transmission Provider file with the Commission an LGIA in unexecuted form, and should further clarify that the Final Rule will not apply to the remaining life of all existing generator equipment.

**B. Power Factor Requirements Must Be Waived Where No Need Is Found**

The Commission proposes to "allow the Transmission Provider to waive the power factor requirement for wind plants where such capability is not needed at that location or for a generating facility of that size, provided that such waiver is not unduly discriminatory and is offered on a comparable basis to similarly situated wind plants." (NOPR at p. 11.) AWEA believes this language should be clarified to make plain that a Transmission Provider *must* waive the requirement unless it can show that it is needed. The Commission further proposes that where the power factor requirement is waived, the interconnection agreement would be

considered a non-conforming agreement under section 11.3 of the LGIP, requiring that it be filed with the Commission. AWEA believes this approach is inappropriate and inconsistent with the Commission's decision in Order 2003-A.

First, AWEA sought in its Petition to establish a non-discriminatory and study-based approach to requirements for reactive power support for windfarms. AWEA responded to Order 2003-A, which exempted all wind facilities from meeting the +/-0.95 reactive capability by proposing:

“If System Impact Studies demonstrate that reliability criteria are met at less than (closer to unity) 0.95 lagging (capacitive), then that resulting figure becomes the power factor range requirement.” (page 10)

AWEA believes that the blanket application of a requirement to provide the nominal 0.95 leading/lagging standard is going to increase costs and stymie development of wind resources if there is no need for the capability at that point on the grid. If there is no showing that the addition of costly external voltage control devices is necessary to meet reliability standards, the requirement of the nominal 0.95 leading/lagging standard may be an unnecessary expense and is not just and reasonable.

The Commission proposes to require that wind generation plants “maintain a power factor within the range of 0.95 leading to 0.95 lagging, measured at the high voltage side of the wind plant substation transformer(s). AWEA sees a need to specify a minimum real power output at which this requirement would apply. For a clear interpretation of the limits of this standard, AWEA would respectfully propose that reactive power criteria use a minimum real power output, set at >10% of rated output.

**C. Final Design Specifications Should Not Be Required at the time a Wind Facility Submits an Interconnection Request**

In the NOPR at paragraph 23, the Commission addressed the question of the need for wind generators to provide final design specifications with the Interconnection Request. The Commission's policy has been to protect the queue process from delays or disruptions. The Commission also noted that in earlier rulemakings, the Commission has been concerned that Transmission Providers would not be able to act on an incomplete Interconnection Request, and that giving "one class of Interconnection Customers extra time to submit design specifications would be unfair to other Interconnection Customers in the queue."

AWEA does not seek to disrupt or damage the queue process with this request. There have been questions about the efficacy of the queue approach raised elsewhere, but here AWEA asks for a much lesser review of the queue requirements. The transmission queue should recognize that windfarms are not similarly situated to synchronous generation, and thus treating these technologies differently in the queue is not unduly discriminatory. A large windfarm, with 100 to over 400 wind turbines, is different in layout than a conventional power plant. To completely characterize the design of a windfarm, the physical layout across a site that may be many miles in length is required. The physical placement of roads, turbines, transformers and voltage support devices requires detailed site work that will affect the electrical characteristics created by the medium voltage collection system of the windfarm. A significant unknown in this layout is the point of interconnection, options for which will be discussed at the Scoping Meeting *after* the interconnection request is made. These physical layout challenges create a meaningful difference between large generators that use wind and synchronous generators. From this difference, a series of incentives and requirements follow from the queue process.

AWEA feels strongly that there is much to be gained and nothing lost if wind generators are not required to submit detailed modeling data at the time the Interconnection Request is submitted. The first-come, first-served nature of the interconnection queue creates incentives to begin the request process, while the design of the wind generation facility and its point of interconnection are better determined after more discussion with the transmission provider and the permitting agencies.

**1. All projects have incentive to enter queue quickly, but wind farm collection system is unique burden.**

The allocation of resources on a first-come, first-served basis with the interconnection queue provides benefits for an Interconnection Customer entering the queue early. Earlier queued projects are better situated to utilize existing transmission system capacity to serve their interconnection requirements, while later queued projects are more likely to require network upgrades. Early entry into the queue, therefore, minimizes the risk to the project for schedule delays, costs for upgrades, environmental impacts with attendant resistance from the environmental community and landowners.

**2. Detailed Utility Design Data is Unavailable Until After the Time the Interconnection Request is Submitted.**

Entry into the interconnection queue gives the Interconnection Customer access to the Transmission Provider's transmission planning and regulatory staff. Such access gives the Interconnection Customer the opportunity to share information about its project with the Transmission Provider staff and receive valuable advice on options for developing an optimum interconnection and options for proceeding through the interconnection process. This is of significant importance in the post-September 11 environment, where ready access to accurate

system data needed to make such decisions, such as power flow base cases and transmission system maps and diagrams, has become severely limited for security reasons.

Indeed, jurisdictional Transmission Providers are prohibited from sharing critical energy infrastructure information (CEII), and therefore will not give advice on interconnection options to potential interconnection customers until they submit an interconnection request. AWEA would support the Commission working toward a solution that would permit Interconnection Customers to review CEII data, as such a policy change would allow for a more efficient interconnection process through a self-study option.

But as a policy allowing for the sharing of CEII data does not exist, and perhaps cannot exist in the post-September 11 period, other accommodations for Interconnection Customers should be made. Based on the rapid schedule in which wind farms can be developed (and often times must be developed to meet deadlines of state Renewable Portfolio Standards or conditions imposed by cyclical expiration of federal Production Tax Credits), the Commission should not require wind plants to have their design substantially completed prior to submitting Interconnection Requests. The collector system detailed design specifications are not normally available this early in the development.

### **3. Detailed Windfarm Design Data Is Not Needed At The Time The Interconnection Request Is Submitted.**

The interconnection Feasibility Study requires a power flow and short circuit analysis that relies mostly on the utility transmission system conditions, and only a simple characterization of the power output of the windfarm as a single generation source. Despite this, the Large Generator Interconnection Procedures (LGIP) has a number of requirements for a complete interconnection request, including location information that is open to be changed in the scoping meeting with the Transmission Provider.

Attachment A to Appendix 1 of the LGIP requires the following of a Wind Generator: “A completed General Electric Company Power Systems Load Flow (PSLF) data sheet or other compatible formats, such as IEEE and PTI power flow models, must be supplied with the Interconnection Request.” This is being interpreted by many (not all) Transmission Providers to mean that the Wind Generator must submit detailed configuration and branch impedance data on the windfarm’s medium voltage collector system with the interconnection request. Such data, however, is not always available early in the process because the point of interconnection is not always firmly established at the time the Interconnection Request is submitted. Indeed, one of the purposes of the Scoping Meeting, as defined in the LGIP, is to discuss interconnection options, including alternative points of interconnection.

For a wind generating facility, the layout of the medium voltage collector system is relatively complex, depending on the number and relative positioning of the wind turbine generators. The precise layout of the collector system cannot be established firmly until the Point of Interconnection is determined. This is because the location of the point of interconnection drives the location of the main step-up substation, where all of the collector feeders are terminated. Therefore, detailed data on the collector system is not, by definition of the LGIP process, always available at the time the interconnection request is submitted.

In addition, detailed impedance data for modeling the collector system is not actually required to conduct the Interconnection Feasibility Study, the purpose of which is to “preliminarily evaluate the feasibility of the proposed interconnection to the Transmission System.” This study consists merely of preliminary power flow and short circuit analysis. To conduct such analysis, the appropriate level of modeling detail would be to use a single generating unit connected through step-up transformation, with the equivalent power output

characteristics (MW output and MVAR range) as the total net MW output of the wind generating facility in question. Such detail is more than adequate for preliminary power flow analyses. It is also conservative for the short circuit analysis in that it neglects the impedance of the collector system to which the individual generators will be connected through to the Transmission Provider's system, thus resulting in higher short circuit levels in the results than if the collector system impedance had been taken into account.

Many reasonable Transmission Providers operating today under the new LGIP, with a grasp of these basic tensions in transmission planning analysis, do not require submission of the collector system detailed configuration and impedance data until the beginning of the Interconnection System Impact Study. At the time of the Interconnection System Impact Study Agreement, the windfarm collector system designs and corresponding impedance data are required to capture the effects of varying voltage levels across the distributed collector system for the more detailed power flow, short circuit and stability analyses. It is this well-informed practice that AWEA seeks as the standard for interconnection in the LGIP. Accordingly, the Final Rule should modify this requirement for windfarms.

#### **D. Clarifications of Other Requirements**

##### **1. SCADA Capability**

AWEA proposed that the interconnection standards for windfarms over 20 MW include the capability to communicate in two directions by SCADA. AWEA is concerned that the wording to "receive instructions" (NOPR Appendix G, section ii) from the Transmission Provider implies that there is an obligation created to perform a range of operational changes that are more properly the subject of either bilateral contracts or market rules. AWEA simply wishes

to clarify that the SCADA capability in the interconnection requirements does not establish a presumption that automatic generator control or other output controls are part of the standard.

AWEA emphasizes that this proposed standard requires only the installation of the physical equipment as an interconnection standard. It is crucial to this standard that the Commission clearly state that the terms and conditions for use of this capability is a separate transmission service issue, not an interconnection issue. Accordingly, such terms and conditions must be resolved by contract or Commission approved transmission tariff and not as an interconnection standard. (AWEA Petition at 9)

## **2. Other LVRT Clarifications**

AWEA here suggests language to clarify the conditions when the LVRT would not be expected to maintain operation of the windfarm. These would be 1) for faults on the Transmission Provider's side of the Point of Interconnection, where the clearing of the fault would effectively disconnect the facility from the system, 2) where the windfarm may be intentionally tripped off line following the fault if this action is performed intentionally under a Special Protection Scheme (SPS), and 3) for other than three-phase faults (i.e. the LVRT standard applies only to three-phase faults). Various engineers representing Transmission Providers and equipment suppliers in other discussions of LVRT in order to clarify the expectations and limits of the standard expressed these clarifications.

## **III. CONCLUSION**

AWEA appreciates the Commission's efforts to develop distinct interconnection requirements for wind facilities that recognize the differences between such facilities and other types of generation. AWEA urges the Commission to make the modifications proposed in these

comments to ensure a smooth transition to the new standards and to ensure that the requirements are applied in a reasonable manner.

March 2, 2005

Respectfully submitted,

By: \_\_\_\_\_

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## **CERTIFICATE OF SERVICE**

I hereby certify that I have this day served the foregoing document upon each party designated on the official service list in this proceeding.

Dated at Sacramento, California, this 2<sup>nd</sup> day of March, 2005.

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Ron O'Connor