VOWDA Recommendations on Facilitating Transmission from Offshore Wind Energy Projects

BACKGROUND:
The Code of Virginia § 67-1206 states the following:

A. The incumbent, investor-owned utility for the onshore service territory adjacent to any offshore wind generation project shall, at the request of the Department of Mines, Minerals and Energy, initiate a transmission study. Such utility shall initiate the transmission study no more than 30 days following the request of the Department of Mines, Minerals and Energy, and shall report to the Department of Mines, Minerals and Energy within 180 days of the request. The Department of Mines, Minerals and Energy shall report the results of the study to the Authority. The Department of Mines, Minerals and Energy shall request the study no later than July 31, 2010.

B. Upon receipt of the study, but no later than May 31, 2011, the Authority shall recommend such actions as it deems appropriate to facilitate transmission of power from offshore wind energy projects.

STATUS:

This preliminary study evaluated onshore transmission facility improvements that would be required for four offshore wind generation scenarios:

(A) Total offshore wind capacity of 2,700 MW generating 900 MW during the summer, with system load at projected 2020 summer peak;

(B) Total offshore wind capacity of 2,700 MW generating 2,700 MW during the “shoulder” seasons of spring and fall, with system load at 80% of the projected 2020 summer peak;

(C) Total offshore wind capacity of 4,500 MW generating 1,500 MW with system load at projected 2020 summer peak; and

(D) Total offshore wind capacity of 4,500 MW generating 4,500 MW during the “shoulder” seasons of spring and fall, with system load at 80% of the projected 2020 summer peak.

In all scenarios, the offshore wind projects would be connected to Dominion Virginia Power’s system at the Landstown 230 kV substation in south Virginia Beach. The study found that during summer peak loads, Scenarios (A) and (C) would not be expected to create any transmission deficiencies. During the fall and spring, however, with the offshore projects generating at full capacity, but with system loads reduced by only 20%, Scenario (B) could significantly overload three 230-kV lines, and Scenario (D) could substantially overload five 230-kV lines. Unless developers opt to pay for system upgrades, their project output may have to be curtailed under these conditions to prevent system overload when the offshore projects could otherwise be generating at full capacity. Overcoming such deficiencies and guaranteeing that full project
output can be safely absorbed by the system would require developer investments ranging from $30 million under Scenario (B) to $70 million under Scenario (D).

Until the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) issues its Virginia Call for Nominations (and publishes the lease blocks that are nominated by commercial project developers in response to the Call), it is difficult to estimate what the aggregate generation amount from offshore wind projects will be. The Virginia Call area is estimated to have a total potential installed capacity in the range of 3,000 to 3,600 MW, depending on turbine size and rotor diameter. This estimate is well bracketed by the scenarios studied by Dominion, as described above.

In addition to considering how commercial development of offshore wind would affect the onshore transmission system, VOWDA also should consider the costs and benefits of shared offshore interconnection facilities. In a “business as usual” scenario, each offshore wind project developer would be responsible for permitting and financing its submarine export cable from the project’s offshore electric service platform to the onshore interconnection point. The total capital investment and cumulative environmental effects of having each project connect to the onshore grid by its own individual export cable would be higher than if projects can be connected to a common offshore “backbone” that makes landfall at only a few designated shore crossing points.

A shared interconnection also would provide greater business process certainty for project developers, eliminating the need for them to incur pre-development costs for cable route surveys, individual interconnection studies, and cable permitting activities. More importantly, it sends a positive signal to potential investors in the offshore wind supply chain, since steady development of multiple offshore projects is more likely if they already have a shared offshore interconnection facility that is permitted and financed.

Such offshore shared interconnection facilities are being evaluated in three different initiatives:

1. On March 31, 2011, Dominion Virginia Power announced plans to implement a preliminary scoping study of an offshore transmission line to facilitate the offshore wind industry in Virginia. According to a Dominion press release, “Dominion plans to complete the study this year, evaluating options to best support multiple offshore wind projects off the coast of Virginia. The company would work with PJM Interconnection through its Regional Transmission Expansion Planning process.”

2. Also on March 31, the Atlantic Wind Connection (AWC) filed the first-ever unsolicited right-of-way application with the BOEMRE to support construction of an offshore transmission system that would interconnect the four Mid-Atlantic Wind Energy Areas. This project, as mapped in Figure 1, would enable up to 7,000 megawatts of offshore wind capacity to be connected to the PJM system. It also would increase PJM system reliability and reduce congestion in the heavily congested corridor between Virginia and the northern New Jersey/New York City area. See Appendix for detailed map of lease blocks and planned capacity for each phase.
3. In response to a U.S. Department of Energy (DOE) Funding Opportunity Announcement for Offshore Wind Market Barrier Removal, a Pre-Application was submitted in response to Topic Area 4.2 for “Utility Interconnection and Integration Case Studies” by a team led by ICF International, LLC, based in Falls Church, partnered with Dominion, PEPCO, and Virginia Tech. This Pre-Application was successful and the team has been invited to submit a full proposal, which is due on June 10, 2011. The proposed project would involve power flow studies to understand and quantify the impact that a shared offshore transmission network would have on the onshore power grid with respect to the type and cost of upgrades needed, and improvements in system reliability, particularly considering the geographic wind resource diversity that extends across the transitional meteorological zone from northeastern North Carolina through Maryland, ensuring more stable power flows than if offshore wind projects in these states were connected to the onshore grid by individual cables.

VOWDA will remain informed about the progress of these three initiatives, requesting updates as appropriate from each of the different groups. VOWDA’s objective with respect to these initiatives is to support the development of transmission resources that enable and expedite the
development of offshore wind in Virginia in a cost-effective (to both developers and ratepayers) and environmentally sensitive manner.

**RECOMMENDATIONS:**

The VOWDA Board met on May 3, 2011, and after consideration of the Dominion Virginia Power study performed pursuant to Virginia Code § 67-1206, presentations regarding the three initiatives referenced herein, and recognition that without the federal Call for Information and resultant applications for projects offshore, determined that it is premature to make final recommendations regarding facilitating transmission from offshore wind projects. The Board noted that when the General Assembly initially passed legislation requiring recommendations by May 31, 2011, the federal Call for Information was anticipated to be issued and knowledge of which wind projects would be built and the capacity they would yield was also anticipated to be known before May 2011. The Board applauds the efforts that have been made thus far and opined that the work that has been done on transmission positions Virginia ahead of the curve in its readiness to help facilitate lease block nomination and associated interconnection decisions by commercial project developers off Virginia. The Board adopted the following interim recommendations and proposed making additional recommendations in its October 15 Annual Report after the federal Call for Information and resultant applications have been filed:

1. VOWDA should support and encourage the studies being conducted by PJM, Dominion Virginia Power, and the Atlantic Wind Connection and determine appropriate action once those studies have been completed.

2. VOWDA should explore U.S. Department of Energy federal loan guarantees and U.S. Department of Treasury § 1603 renewable energy grants to be utilized to help facilitate new transmission and associated necessary system upgrades as they pertain to offshore wind development.

3. VOWDA should continue to monitor the progress of other states’ offshore efforts and explore opportunities to eliminate duplication of efforts and ensure orderly, predictable, and sustainable offshore wind projects and associated supply chain development, particularly as the Mid-Atlantic Wind Energy Areas are developed.

4. The DMME has contracted with both James Madison University and Virginia Tech to provide expert technical support in several key areas. One of the tasks being performed by James Madison University (JMU) is to identify grid interconnection options for potential test/demonstration turbine locations, ensuring that appropriate conditions for Power Quality testing are met. JMU also has been tasked with coordinating with Dominion Virginia Power to determine needs and process for PJM interconnection studies and planning, design, and installation of test pad interconnections. VOWDA should explore applying to the Virginia Resources Authority for financing in a public-private partnership to develop these test pad interconnections.
Appendix: Atlantic Wind Connection Details

The AWC will have 650 miles of offshore transmission circuits constructed over approximately a 10-year timeframe, with 7,000 MW total transmission capacity at full build-out.

**Phase A**: Southern New Jersey & Delaware with up to 2,000 MW capacity; 2016 in service date.

**Phase B**: Southern New Jersey to northern New Jersey/New York, with additional capacity of up to 1,000 MW; 2017 in-service date.

**Phase C**: Parallel circuit from Maryland to northern New Jersey/New York, with additional capacity of up to 2,000 MW.

**Phase D**: Maryland to Virginia with up to 1,000 MW capacity.

**Phase E**: Parallel circuit from Delaware to Virginia with up to 1,000 MW capacity.

See map of lease blocks and offshore hub locations on next page.