UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Offshore Wind Integration in RTOs/ISOs Docket No. AD20-18-000

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**Introduction**

My name is Jon Wellinghoff[1] and I am the CEO of the energy policy consulting firm, GridPolicy, Inc. and I thank the Chairman, the Commission and Staff for scheduling this extremely important workshop and for providing me an opportunity to participate. My firm represents a wide spectrum energy development and technology companies including wind development, battery storage and grid enhancing technologies. The remarks I am providing the Commission today are my own and of my firm, GridPolicy, and do not represent those of my clients or any other party to this proceeding. I do wish to acknowledge, however, the assistance of the Center for Renewable Integration[2] and their principals, Jeanne Fox, Harry Warren and Kerinia Cusick for providing research for and input to my recommendations and conclusions. I also wish to recognize the Brattle Group and your previous panelist, Dr. Johannes Pfeifenberger, and his colleagues for the exceptional work that they did on the studies prepared for Anbaric regarding offshore wind transmission options for New York and New England.[3] The evidence presented in those studies provided the foundation for my recommendations.

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[2] Center for Renewable Integration
[3] See: Offshore Wind Transmission: An Analysis of Options for New York, and Offshore Transmission in New England: The Benefits of a Better-Planned Grid

To put my remarks and recommendations in context, I believe we face perhaps the most significant global challenge that has ever confronted the human race. Our accelerating climate crisis, precipitated primarily by the combustion of fossil fuels, is a clear existential threat to our survival. To combat that threat we must rapidly decarbonize our energy sector, including the production of electricity. Offshore wind is a reliable high capacity factor (>50%) resource that can provide substantial carbon free energy and capacity to critical load centers in the U.S. It is estimated that there is a technical potential off our shores of more than 8,000 terawatt hours of annual wind energy or more than twice our entire annual energy consumption.[4] Legislated carbon reduction policy goals of the Eastern Seaboard states from Massachusetts to Virginia could require the development of as much as 100-150 gigawatts of offshore wind. A national goal to achieve zero carbon by 2050 would certainly require at least that level of offshore wind development.

Development of offshore wind in the U.S. not only is a critical element of combating our climate crisis, but it also assists in addressing environmental justice and job creation issues. Development of offshore wind allows us to shut down dirty fossil fuel plants often located in low income and communities of color that spew harmful emissions into those communities. It has also been well established that transmission buildout and attendant infrastructure requirements for offshore wind development could create as many as 83,000 of high paying jobs by 2030.[5]

The Commission has indicated in its notice that this conference will consider…

> *"…whether and how existing regional transmission organization (RTO) and independent system operator (ISO) interconnection, merchant transmission and transmission planning frameworks can*

[4] See: Offshore Wind Outlook-2019
[5] Offshore wind's once-in-a-generation opportunity

*accommodate anticipated growth in offshore wind generation in an efficient or cost-effective manner that safeguards open access transmission principles. The conference also will provide an opportunity for participants to discuss possible changes or improvements to the current regulatory frameworks that may accommodate such growth."*

The Commission has asked my panel 3 to address the following:

*"…whether and how existing RTO/ISO generator interconnection and transmission interconnection frameworks could accommodate anticipated growth in offshore wind generation in the short and long terms and, if not, consider the nature of any impediments."*

The Commission then asks a series of eight questions focused on the issue of using a "merchant transmission" approach for the development of offshore wind transmission infrastructure. I will not answer those eight questions directly. Instead I will provide my views on the overall considerations for the conference outlined by the Commission and the suitability of the merchant transmission alternative for offshore wind transmission development. Finally, I offer my recommendations to the Commission for a Commission lead policy initiative to most efficiently achieve the objective of enabling the optimum level of offshore wind development at the least cost while accounting for the Commission's jurisdictional responsibilities, the historical orders of the Commission relevant to transmission planning and cost allocation, and the public policy objectives of the states to reduce carbon through development of offshore wind. Note that because the most advanced efforts to develop offshore wind are focused on Eastern Seaboard states from Massachusetts to Virginia, my remarks will primarily address that region of the country. There is the potential, however, for significant offshore wind development on the West coast. A variant of my proposed Commission policy initiative would be appropriate to consider in that region.

**How to Best Accommodate and Facilitate Growth of Offshore Wind Development**

If we are to derive the maximum economic and social benefits from offshore wind development we must plan thoughtfully and strategically. The "elephant in the room" for this technical conference is not whether the RTO/ISO merchant transmission rules accommodate a "transmission first" approach to offshore wind transmission development. But rather the critical question is what infrastructure configuration of offshore and attendant onshore transmission development for offshore wind development will best facilitate robust, expeditious, efficient and cost effective development of those valuable, high capacity factor, carbon reducing resources. The merchant transmission model issue is a second order question after the first question is answered.

Hopefully, at the point the Commission has considered the evidence presented by preceding panels #1 and #2 at this workshop, the question of optimum transmission development infrastructure configuration for offshore wind will have been answered. But for those who may be reading this statement independently of those previous panels let me offer this opinion. We ideally want to solve for minimizing costs over the total build out of offshore wind transmission development- both offshore facilities and needed onshore interconnections, 10 to 20 years and farther into the future. We want to optimize for the maximum amount of wind development technically feasible- making the most of existing points of interconnection onshore. We want to minimize environmental impacts- reducing the total number of lines and line interconnections.

There currently appear to be two primary infrastructure alternatives on the table for advancing offshore wind transmission development. Most of the states with offshore wind under development (Massachusetts, New York, New Jersey, Virginia) are using state sponsored purchase power agreements (PPAs) to facilitate projects. Those PPAs incorporate costs for both the wind

generation project development and the attendant offshore and onshore transmission gen tie line and substation interconnection equipment. And these projects are using a radial generator lead line infrastructure (RGL) for the offshore wind transmission topology consisting of a single transmission line from each wind development project to the onshore point of interconnection.

A second alternative topology has been proposed in the two Brattle studies I referenced in my **Introduction** above.[6] That is a planned mesh network (PMN) topology consisting of an HVDC backbone network acting as a gathering overlay for the multiple wind development projects sponsored by the states. The Brattle studies consider separate PMN systems could be created in the sub-regions of ISO-NE and the NYISO. Brattle did not do a study for PJM. But a unified single network could be created along the entire Eastern Seaboard from ISO-NE through PJM.

A merchant transmission regulatory approach could be used to develop either an RGL or a PMN transmission infrastructure for offshore wind development. That is why it is a second order inquiry. But to answer the primary question of which transmission topology is superior, I believe the Commission should consider all of the evidence presented in this workshop. My review of all that available evidence of the two alternative infrastructure models indicates that the PMN model proposed by Brattle is clearly superior in every single respect to the RGL model. To summarize the benefits and advantages of the PMN model from the Brattle reports and other evidence presented and submitted:

- PMN minimizes costs ($2-$3 billion less expensive than the current RGL approach in ISO-NE and NYISO with additional savings if one considers PJM)
- PMN maximizes offshore wind development potential (eliminates congestion of multiple radial lines)

[6] See footnote 3, above.

- PMN maximizes carbon reduction potential
- PMN reduces risk of cost overruns and delays
- PMN reduces environmental impacts (disturb fishery zone once with network line interconnection rather than multiple times with multiple radial lines)
- PMN reduces curtailments thereby increasing reliability
- PMN maximizes onshore interconnection potential (Brattle NE study- PMN 11.7 GW vs RGL 5.8 GW)
- PMN reduces or eliminates problem of new offshore wind simply displacing old onshore wind and/or solar
- PNM poses no reliability or planning issues
- PNM increases potential for competition among wind developer (radial line cost and interconnect feasibility not determining factor in levelized cost of energy)
- PNM can lead to offshore wind development w/o need for PPAs (Europe)
- PNM increases potential for state collaboration and coordination (NJ is only state looking into PMN, but still proceeding with RGL)

The list above is not exhaustive, but it should be sufficient for the Commission to conclude that the question of the most appropriate infrastructure model to utilize for offshore wind transmission development is the PMN or planned mesh network model.

**Regulatory Development Models to Facilitate a PMN Transmission Infrastructure**

It is the Commission's statutory responsibility to ensure that transmission rates are just and reasonable. The Commission does this through its transmission planning and cost allocation orders including Order 1000 as well as individual orders regarding transmission cost recovery

applications and RTO/ISO tariff issues. The Commission clearly has full jurisdiction over the transmission planning and cost allocation for offshore wind transmission infrastructure.

There are a number of regulatory approaches that could be taken by the Commission to facilitate the use of the PMN transmission infrastructure model. Merchant transmission development is one of those regulatory approaches that could be considered for the task of promoting the PMN model. I do not believe, however, that it is particularly suited to the task.

First, the Commission should consider that there have been several purely "merchant" based transmission projects proposed in the past. But none of them have yet been successful. The most notable is Atlantic Wind Connection. Atlantic Wind originally proposed in 2009 the construction of an HVDC offshore transmission backbone from the Carolinas to New York and New England to gather and deliver wind energy from offshore wind developments to the load centers of the East coast. Calculations provided to me as Chairman of FERC at the time by the project developers indicated that the project was "profitable" simply with energy interchanges between the Southeast and New York and New England. Although initial development costs were backed by Google and Japanese investors, the project was unable to secure funding to proceed with building actual transmission infrastructure. A second merchant transmission project that also looked promising from a financial modeling perspective was the Tres Amigas project in Northeastern New Mexico. That project would have constructed a triple ring bus HVDC interconnection station to intertie the three U.S. interconnects together. Again, this project was unable to obtain financing and did not proceed.

There have been two notable projects that some may consider in the merchant category that did get built and were used as effective PMN transmission infrastructure for onshore wind

development. Those projects are the CREZ project in Texas and the Tehachapi project in Southern California. Neither is really a merchant project, per se. Both projects were planned and authorized by an independent planning authority. ERCOT in the case of CREZ and CAISO in the case of Tehachapi. Neither project was dependent on merchant revenues, but rather were compensated under a traditional cost-of-service rate recovery scheme. Both projects had multiple wind developers who agreed and understood that the PMN transmission infrastructure would be built and was the most cost effective way to get their wind energy to market. The CREZ project was competitively bid. The Tehachapi project was awarded to the incumbent transmission owner in the region, Southern California Edison. Summarizing and paraphrasing from the Brattle New York study at pages 41 and 42 the critical characteristics of these two PMN transmission infrastructure first projects were as follows:

*CREZ*

- $7 billion transmission build out
- Phased development of PMN enabled delivery of 18.5 GW wind from 5 "competitive renewable energy zones" to rest of Texas
- Allowed rapid merchant development of wind in W. Texas
- Reduced electricity costs by $1.7 billion annually
- Process:
    - ERCOT designed transmission system configurations to integrate each renewable energy zone through a staged, expandable approach
    - Desired configurations selected by TPUC and developed by competitive transmission developers and incumbents

*Tehachapi*

- Identified as a high wind potential region in southern California almost 20 years ago
- California policy makers solicited interest in building wind in Tehachapi

- CAISO developed a transmission plan for the region
- The transmission enabled 4,500 MW renewable power development
- 250 circuit miles, $2.1 billion cost
- Built by SCE
- Costs allocated using existing CAISO transmission cost allocation system

As can be seen from this discussion, neither CREZ nor Tehachapi are pure merchant transmission projects although they are successful examples of PMN transmission infrastructure first development. The pure merchant model has a number of significant barriers to its being suited to assist in the development of offshore wind PMN transmission infrastructure. Among those barriers are the financing challenges facing a merchant developer with no assurance of wind development customers to support the project. Atlantic Wind is evidence of this significant impediment. Currently with states working to fund transmission through PPAs, a merchant PMN transmission developer would have no confidence in securing sufficient commitments to support the project. Second there is no clear set of tariff rules in any of the RTO/ISOs that support merchant transmission development. Tehachapi was successful because it could be developed under existing CAISO planning and cost allocation provisions for a cost of service project and because FERC issued a separate order approving the concept for the project thus ensuring no regulatory impediments to it proceeding. Similar action will be necessary if a PMN transmission infrastructure is to be supported by the Commission to facilitate cost effective, efficient offshore wind development on the Atlantic coast. Merchant transmission is not the appropriate regulatory approach to accommodate a PMN transmission infrastructure first development process.

**Recommendations for the Commission to Facilitate a PMN Transmission Infrastructure**

It should be evident that the development of a PMN transmission infrastructure first for offshore wind delivery is preferred to maximize benefits to consumers including assuring just

and reasonable rates. Yet no one is coordinating or facilitating such an effort. The Commission should consider it has a valuable and central role to play in moving a PMN transmission infrastructure process forward. To provide the necessary regulatory and policy support to stakeholders in offshore wind development, including the states, the Commission must consider the full authority it has over interstate transmission planning and cost recovery, including cost allocation. It should also consider the authority is has over interregional planning between the RTO/ISOs as set forth in Order 1000. Currently it appears that little if any planning is occurring regarding offshore wind transmission development at the RTO/ISOs. Further, there is no evidence that the states which are developing offshore wind projects through PPA solicitations are in anyway coordinating with each other or the RTO/ISOs. This seems to be a situation that could heavily benefit from the Commission's authority, expertise and leadership.

Based on the Commission's statutory authority I believe that there is a clear path for this Commission to institute a regulatory policy framework to support the development of a PMN transmission infrastructure on the Atlantic coast. That policy framework could be structured as follows:

- FERC to Issue Policy Statement on offshore wind transmission planning (including development procurement) and cost allocation indicating:
    - Jurisdictional authority over interstate and interregional transmission planning and cost allocation
    - Authority under Order 1000 to facilitate and coordinate interregional transmission planning/cost allocation for offshore wind on the Atlantic Coast
    - Authority under Order 1000 to address the expressed public policy transmission needs of the states
    - Recognition of the states on the Atlantic coast from NE-ISO through PJM which have expressed a public policy transmission need to facilitate and accelerate offshore wind development
    - Preferred offshore wind transmission infrastructure should be a PMN transmission infrastructure first topology based on benefits and costs

- It is in the public interest to facilitate multi-RTO planning, procurement and cost allocation process for PMN offshore wind transmission infrastructure first development from NE-ISO through PJM including NYISO
    - Finds need for that process to:
        - Be expedited to maximize consumer benefits/reduce cost/minimize carbon/increase reliability/meet state public policy goals
        - Be conducted under the interregional and competitive procurement provisions of Order 1000
        - Restrict offshore wind generator developers from participating in PMN infrastructure transmission development

- Based on above policy statement FERC to convene a joint meeting of the boards of ISO-NE, NYISO and PJM to develop a staff multi-RTO/ISO interregional planning and procurement task force for offshore wind PMN transmission infrastructure
    - That RTO/ISO staff task force:
        - Will be chaired by a member of FERC staff
        - Will report to the RTO/ISO boards and the Commission
        - Develop an offshore wind PMN transmission infrastructure needs assessment, plan and project(s) procurement process based on public policy requirements set forth in individual policy/plans developed to date in respective states within ISO-NE, NYISO and PJM
        - Coordinate needs assessment, plan development and project(s) procurement process with states, potential developers, environmental interest, fisheries and other stakeholders
        - Establish a competitive process including bidder qualifications for the procurement of PMN transmission infrastructure project(s)

        - Develop and issue an RFQ to prospective developers of offshore wind PMN transmission infrastructure project(s)
        - Report to RTO/ISO joint boards, FERC and stakeholders results of responses to RFQ and qualified bidders list
        - Develop and issue RFP for development of the offshore wind PMN transmission infrastructure project(s)
        - Evaluate RFP responses and report to the ISO joint boards results of responses to RFP and staff recommendations as to bid award(s)
    - Based on responses reported to the RTO/ISO joint boards by staff task force the RTO/ISO joint boards will select bid award(s) and seek ratification from the Commission

There are undoubtedly additional significant details to work out regarding the above proposed PNM transmission infrastructure policy framework. Regardless of the need for such additional work, that should not pose a barrier to the Commission undertaking the task at hand. The states and other parties interested in advancing efforts to reduce carbon emissions need the Commission to provide collaborative leadership to work with them to help formulate an efficient solution to optimize offshore wind's contribution to meeting our global climate crisis and deliver the financial and environmental benefits of that valuable national resource to the people of the Eastern Seaboard as rapidly and cost effectively as possible.