ATLANTIC SHORES offshore wind

VIA E-MAIL directed to: Board.Secretary@bpu.nj.gov

Aida Camacho-Welch
Secretary of the Board
New Jersey Board of Public Utilities
Docket No. QO20100630

May 19, 2022

Re: IN THE MATTER OF DECLARING TRANSMISSION TO SUPPORT OFFSHORE WIND A PUBLIC POLICY OF THE STATE OF NEW JERSEY

Dear Ms. Camacho-Welch,

Atlantic Shores Offshore Wind, LLC, a 50/50 joint venture between EDF-RE Offshore Development, LLC (a subsidiary of EDF Renewables, Inc.), and Shell New Energies US LLC, (Atlantic Shores"), supports the State's commitment to advance the offshore wind industry in the State of New Jersey.

Atlantic Shores currently holds one of the largest portfolios of offshore wind lease areas in the US, adding up to a total of 262,404 acres and an expected capacity potential of over 4.5 GW ("Portfolio"). Atlantic Shores' Portfolio includes the areas within Lease OCS-A-0499 and Lease OCS-A 0549, which amounts to 183,353 acres, collectively, and hosts Project 1, a 1,510 MW project awarded an OREC from the New Jersey Bureau of Public Utilities ("NJBPU") in June 2021; and Lease OCS-A-0541, which totals 79,351 acres and was awarded to Atlantic Shores by BOEM pursuant to the recent ATLW 8 Bight Auction. Out of the full Atlantic Shores' Portfolio,1.5 GW is under firm offtake contract, leaving over 3 GW of uncommitted capacity strategically positioned to meet the offshore wind procurement goals of its target markets, including New Jersey.

Atlantic Shores has participated in the recent stakeholder meetings led by the NJBPU and appreciates this opportunity to submit comments concerning the above referenced matter, in accordance with guidance provided in the Request for Additional Information issued on April 27, 2022.

Sincerely,

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Joris Veldhoven, President

Offshore Wind Developers:

1. What are the most significant risks to completing your OSW generation project(s) on time and within budget if your project relies on one or more SAA transmission projects? How can those risks be best mitigated?

   The risks are not equal among the different SAA scopes. Each Option has risks and benefits:

   - **For Option 1a**, the risks are quite similar to a typical radial interconnection due to the potential use of existing right of ways (ROWs) and substations, with the largest risk focused on project-on-project schedule.
     - To mitigate this risk, the Transmission Developer could begin their scope of work ahead of OSW Project execution to have the upgrades in place for the planned/proposed OSW Project back feed / COD.
     - Additionally, the Transmission Developer could identify a more efficient solution than what is found in the standard interconnection process, where solutions are identified based on reliability needs only. With the SAA, selected Option 1a projects could address reliability and congestion to avoid curtailment risks for generators. On the downside, selecting Option 1a would require the NJBPU/PJM pre-select the Points of Interconnection (POIs) to be used, creating a 'race' for those POIs.

   - **For Option 1b**, on the surface, the risks appear similar to a typical radial interconnection but present a number of nuances. The SAA process allows for use of existing facilities to be upgraded that would not be possible with the standard interconnection process, thereby allowing work to start earlier. On the downside however, selecting Option 1b would require the NJBPU/PJM pre-select the POIs to be used, creating a race for those new POIs. Additionally, Option 1b projects remove export cable ROW site control, local permitting, community relations, design, and execution schedule from the OSW Developer's overall responsibility, to the exclusion of the portion between landfall and Transmission Project terminus. This creates project-on-project risk that must be addressed. Similar to Option 1a, the OSW project schedule is dependent on the Transmission Project delivery on time. Additionally, the OSW Developer loses much of the ability to directly engage with local communities to share information, gather stakeholder feedback, incorporate it in design and discuss mitigations – which may indirectly hinder its ability to secure site control in other areas.
     - To mitigate this risk, it is absolutely necessary that Transmission Developers and OSW Developers be very transparent and coordinated throughout the development, design and execution phases. This coordination would also involve the NJBPU to keep all parties fully aware of any schedule or risk changes.
     - An additional mitigation would be a requirement that most approvals and site control of the Transmission Project be completed prior to the OSW project COP

submittal, thereby allowing an OSW Project to submit its COP excluding this key scope and meet federal filing requirements.

- **For Option 2**, additional risks related to the offshore portion of the cable are added to the risks described above for Option 1b. The main additional risks pertain to offshore export cable route feasibility: unless a Transmission Developer has completed in-water surveys from landfall to offshore substation, generally de-risked the route, and filed a federal ROW application, an OSW Developer would have little certainty that this route is viable from a design, permitting, or execution schedule perspective.
  - The same mitigations as those highlighted for Option 1b should be considered.
  - Additionally, the NJBPU could consider favoring these Transmission proposals that have completed offshore surveys, or at minimum make a solid demonstration of their project's feasibility.
  - From the OSW Developer's perspective, if the NJBPU were to require mandatory connection to an Option 2 project in future OSW solicitations Round 4 and beyond, or as an option for Round 3, the solicitation could build in flexibility with regards to OSW project design and COD. This would account for uncertainties associated to interconnection if the Transmission Developer cannot provide certainty on its own scope.
  - Lastly, there is additional risk in design coordination. Both the Transmission Developer and OSW Developer should coordinate their design as early as possible to optimize their respective designs and avoid any conflict in interface.

- **For Option 3**, the risks are similar to Option 2, but also include the need to match key equipment ('technical' risks associated with design, quality, interface, and deliverability schedule) and potentially expand the footprint of the offshore substation as part of the COP ('permitting' risk, including stakeholder acceptance, and permitting schedule).
  - The ROW uncertainty can be mitigated with in-water surveys, detailed design work, and close coordination on the federal ROW application.

If OSW generation project(s) rely on multiple SAA projects assigned to different Transmission Developers, multiple interfaces, Transmission projects design and schedules, and the need engage with a wider set of stakeholders for community engagement increase the overall risk on the OSW program.

2. For new Bureau of Ocean Energy Management ("BOEM") leaseholders, are there concerns about obtaining a PJM queue position given that a Board decision on the SAA may constrain the potential points of interconnection ("POIs") for future New Jersey OSW projects? Please describe the considerations related to utilizing SAA POIs and how OSW developers might switch from their queue positions (if already acquired) to the SAA-provided POI.

- Current site control requirements to file a PJM queue request include an executed federal lease. SAA proposals do not, and very little information regarding site control for the ROWs is public. For OSW Developers, this makes it difficult to assess permitting and construction feasibility of many potential SAA projects.
- Several SAA projects propose new POIs, which means a new queue position request will not be submitted for those until the SAA projects are awarded. As a result, these new queue positions will be part of the PJM queue reform, which, if approved, will not allow projects currently in the PJM queue to change to these new POIs. As a way to bring wind projects online faster and leverage PJM studies, PJM should allow for a POI change from an OSW Developer's original POI to the SAA POI to provide OSW Developers the opportunity to leverage current queue positions.
- Based on the proposed PJM interconnection reform transition, queue positions in cycles AG2 through AH1 will likely resubmit interconnection applications. Thus, working with PJM and FERC to allow POI change for those queue positions in the tariff language and PJM will provide the opportunity to utilize SAA POIs.

3. If the Board were to select one or more Option 2 proposals under the SAA—onshore substations to offshore collector platforms (see, the November 18, 2020 Board Order under this same docket for more information on the Options 1)—please provide additional details and considerations for connecting and coordinating OSW generation projects in terms of the costs, timing and operability of the OSW generation projects.

    - For Option 2 proposals to be a value to OSW projects and ratepayers, the locations of the cable routes will be driven by onshore and offshore surveys, technical feasibility, stakeholder engagement, permitting considerations and overall delivery schedule.
        - Offshore cable routes take on very different risks and technical requirement than onshore cable routes, that Transmission Developers should be able to address.
        - The risk of delays in delivering Transmission projects, while OSW projects move ahead, create a potential for stranded OSW projects off the coast.
        - Mitigation requires coordination between Transmission Developers and OSW Developers during the development phase, including collaboration on survey work and stakeholder engagement.
    - Connection of OSW generation projects to SAA Option 2 projects can be done in different ways:
        - First, if an HVDC technology is used, the location of the offshore platform(s) should be coordinated to allow for the most efficient design in terms of costs of construction, environmental impact, and electrical losses. The design shall leverage as much as possible the benefits from the HVDC cables and reduce the length for HVAC cables, or collector system cables if not step-up platform is used.

    - Second, the use of an HVAC platform to step-up the voltage from the WTG collector system to the export cables shall be confirmed. The need for this platform can be removed if the HVDC platform integrates this step-up. In this case, strong coordination in the design, construction and commissioning of this interface will be required.
- In terms of timing, the energization of the collector system is required well in advance of the OSW project COD. Typically, 12-14 months are required for the commissioning of the turbines (backfeed). Having the Option 2 facilities in full operation in time is critical for the OSW project schedule.
- Strong coordination will also be required during operations. The agreement between the OSW Developer and the Transmission Developer shall cover many aspects including access to the platform for the cable and OSW project maintenance and offshore converter platform(s) maintenance schedule. Operation requirements including an offshore grid code shall also be addressed.
- Lastly, to mitigate risk from an Option 2 project being delayed and negatively impacting a proposed OSW project COD, Atlantic Shores will pursue all appropriate federal and state permitting as if Option 2 elements will not be available unless the location is fully approved. The risk currently exists that if we are required to use an Option 2 solution that gets delayed and will not be ready, we will have a project delay with the associated negative impacts on supply chain.

4. If the Board were to select one or more Option 3 proposals under the SAA—offshore network connecting lease areas and substations to each other—please provide additional details and considerations for connecting and coordinating OSW generation projects in terms of the costs, timing and operability of the OSW generation projects.

   To fully assess the value of an Option 3 solution, both the NJBPU and OSW project developers would need to assess the impact of a backbone connecting multiple wind farms, including considerations on:

   - Costs associated with interlinks, and funding of these costs
   - Design and particularly sizing of the interlinks, with most cost-efficient design depending on the capacity of OSW connected (see Q&A 7)
   - Curtailment, metering, and dispatch, with related impacts to OREC commitments re; OWEC allowance as well as OSW projects' business case, requirements for coordination and regulation by the system operator and the potential need for agreements between generators
   - Readiness timeframe, including technology maturity and multi-project planning
   - Project-on-project risks (as developed in previous questions re: permitting, stakeholders, schedule, design interface, etc.)
   - Redundancy, reliability in case of natural disaster or cable failure

5. If an SAA Option 2 or Option 3 proposal is selected, is there any situation in which an OSW generation project would not be able to use the SAA Option 2 or Option 3 solution?

A number of factors could impact an OSW project's ability to use Option 2 or 3:

- Location: route feasibility with regards to critical habitats, offshore cable crossing, colocation with other sea floor uses (sensitive fishing grounds, sand borrow, dredge dumping, and restricted areas).
- Schedule:
  - Transmission project maturity and readiness to meet the proposed timeline of the OSW project (backfeed) required date rather than COD. Once under an OREC Order, OSW projects have commitments and requirements for COD, local economic spend, as well as supply chain commitments, key vessel contracts, and other schedule drivers. It may not be in the ratepayer's interest to see these milestones delayed.
  - Timing of approvals and design coordination involves extensive local community outreach that must also occur well in advance of an OSW project execution phase to avoid schedule slippage.
  - If an Option 2 proposal were selected but the Transmission project were denied approval or be delayed, the OSW project would be as well.
- Permitting: if an Option 2 or 3 proposal were selected, early coordination on permitting would be needed since it is unclear how federal agencies would handle these OSW projects that are already undergoing federal review. A scope change, to include Option 2 or Option 3 elements would likely delay their execution schedule and COD.

6. How should the Board consider the optimal locations for Option 2 substations? Should such determinations occur at the time of the Board's SAA decision or following the Board's OSW generation solicitations? If the location is determined after the generation solicitations, what type of coordination between generation and transmission developers would be required?

- OSW developers expect that transmission developers will have matured their proposal enough to offer 2-3 potential locations when bringing concepts forward to maximize efficient OSW project design.
- OSW Developers want to avoid the project substation and Option 2 substation being located far from each other. OSW Developers need flexibility to optimize their layout, including their offshore project substation. Knowing the location of a project offshore substation is essential to a wind project design and bid proposal, however it is unlikely and undesirable that a Transmission project offshore substation location be fixed without interface with OSW Developers.
- The optimal location for an Option 2 SAA platform should be established between the OSW Developers and the Transmission Developer. Final location will be confirmed following geoscience investigation, environmental assessments, and technical evaluation. The OSW Developers shall coordinate with the Transmission Developer on the preferred location prior to submitting their application for an OREC award.

- The coordination shall include the position of the offshore platform(s), the voltage of the connection (HVAC or medium voltage) and the cables routes.

7. Describe if and how the primary transmission line technology used for the Option 2 proposal, HVAC or HVDC, affects the development – timing, sizing, locational considerations, and costs – of new OSW projects.

    - When possible and if the OSW project is relatively close to the POI, HVAC remains the most cost-effective solution, ultimately benefiting the ratepayer.
    - The sizing of an HVDC solution operating at 320-400kV is 1200-1400 MW per circuit. On the other hand, HVAC cables could carry 350-400 MW per circuit, increasing the number of cables, impact and higher LCOE of the project versus a maximized HVDC connection.
    - HVDC benefits vary based on lease location to POI (long distance, losses, reactive power needs, cost optimization). In most cases, HVDC offers fewer cables, less disturbance, consolidated landfall, less crossings, reduced permitting, and reduced impacts on the environment as well as local communities. The maturity of the technology and supply chain is still evolving, but most likely provides the optimal solution in the future.
    - Schedule-wise, the design, construction, and commissioning of an HVDC solution is typically 60 months. For HVAC, a shorter timeline can be accommodated. If an HVDC solution is to be used, proper planning is required not to delay the OSW project COD.

8. For an Option 2 or Option 3 scenario, do you believe that the selection of HVAC or HVDC will affect the ability to receive federal funding that may prioritize "innovative" technologies? Please address availability of federal funding for transmission and/or federally-backed loans/loan guarantees.

    The only known federal incentive to OSW, the Investment Tax Credit (ITC) is currently assumed to include substations and export cable costs as eligible as part of the OSW project global CAPEX. At this point, we are uncertain if a Project 2 or 3 scope can qualify for ITC separate from the OSW project.

9. Describe how risks of cable outages are managed with HVAC versus HVDC technology, particularly where using large single HVDC lines for any offshore segment.

    - In a radial connection, with HVAC system, the loss of a cable will impact up to 400 MW. With an HVDC solution, the loss of a cable would lead to the loss of the full export capacity. Assuming an HVDC solution will be required for future projects, a generator lead line (radical connection) could be shared between several OSW Projects with a mesh-ready solution. However, the capacity would be limited to the AC capacity of a cable, providing significant design coordination, and regulatory changes to allow for system operations.

- With the SAA process, a Transmission Developer can and should include some additional reliability elements such as an interlink without impacting the process of connecting the generator.

10. For an Option 2 or Option 3 scenario, please address whether an HVAC or HVDC would better integrate into a multi-state or multi-regional offshore wind transmission grid? Should coordination or future computability opportunities affect the Board's evaluation of proposals?

    - In a multi-state or multi-regional offshore transmission grid, the assumption is that the transmission lines distances will be greater, which makes HVDC connection more competitive and will reduce the number of undersea cable circuits.
    - Integrating an Option 2 or 3 in a multi-state or multi-regional grid will require serious assessment of the regulatory impact. Additionally, multiple vendors would likely be required thus adding more risks on the feasibility of the solution. For the current goal of connecting 7.5 GW, priority shall be given to connecting the OSW projects in time and within planned costs.

11. How does the selection of an Option 2 transmission solution affect the permitting risk for OSW generation projects? What about an Option 1b?

    - Options 1b and 2 can impact permitting by creating a change to an OSW Project COP submittal and review process under the National Environmental Policy Act as well as the other required federal permits coordinate through this regulatory review process. Such a change may include new surveying on and offshore, which will likely cause schedule delays, increased costs, and further review by the federal agencies.
    - For those projects with COPs already undergoing federal review, adding a new ROW through an Option 2 project will likely cause schedule delays. The process for how to switch out an OSW project offshore or onshore cable ROW for a new 1b or 2 solution has not been fully explored.
    - If an Option 1b or 2 project has begun permitting and can be incorporated into an OSW generation project, the risk of COP delay may be reduced.

12. Please share any other important risks associated with an Option 2 solution that can impact project development.

    - The key risk is the ability of the Transmission Project to meet the timelines of an OSW Project. Routing cables takes at least a year of surveys, as well as consultation with federal and state agencies. This also includes work with other cable owners, fishermen, and coastal communities. As mentioned above, close coordination and anticipated work vs. the OSW Project schedule are minimum mitigation requirements.

13. Through what mechanisms should the risk of Option 2 or Option 3 cable failures be allocated? Does the potential risk for failure impact the preference for HVAC versus HVDC cables?

- Since no liquidated damages can be applied to regulated transmission, the system must be robust and built in a way that dramatically reduces single points of failure – similar to or better than how an OSW Developer would design and build this infrastructure if they were in control.
- Cable failure is not the primary deciding factor between an HVDC and a HVAC connection. When HVDC is needed, the use of interlinks under an Option 3 project can increase the export cable system reliability. In theory, this can also be achieved with a mesh-ready solution in the case of a radial connection. However, the feasibility of a mesh-ready is to be confirmed and properly assessed.

14. If an Option 2 or Option 3 proposal is selected, please detail the potential reliability and economic benefits.

    - If Options 2 and 3 are designed to handle generation from more than one OSW project, choosing a combination of Transmission projects will reduce risks of curtailment by allowing power from one OSW project to potentially flow to multiple substations.
    - The SAA Project selected should include some elements to increase the reliability of the overall solution, where single points of failure would be limited. The reliability should be equal or better than what would be provided with a radial connection. The SAA process provides an opportunity to design an offshore and onshore grid that considers not only the reliability needed to inject OSW generation from multiple OSW projects to the PJM grid, but also, the addition of elements to increase the overall State grid reliability as well as improving market efficiency.
    - On the economic benefits, the connection of the solution onshore should consider POIs with no congestion and no curtailment for OSW injection.

15. For the build out of transmission facilities under the current generator radial lines approach, please provide additional details and considerations on the costs, feasibility, timing, and operability of requiring OSW developers of future projects to utilize certain specified technology types, including potentially identifying common Original Equipment Manufacturers, requiring mesh- ready offshore substations, or other future-proofing specifications. Further, please detail the anticipated coordination that would be required to eventually interconnect between mesh-ready substations, including any anticipated unavailability of OSW generation or other foreseeable risks.

    The concept of "mesh ready" is one that can make sense electrically but presents several serious challenges on the permitting, commercial, technical, and legal side:

    - Pre-defining technology types and potential OEMs is not conducive of a low-cost / high quality / high local content approach as it removes the ability, for the OSW Developers or Transmission Developers, to issue competitive tenders thereby relieving pressure on the supply chain to provide their best offers.

- Additionally, a unique technology and/or OEM, removing optionality, preclude Developers from finding the optimized design and effectively increases usual risks associated with a lack of diversity and flexibility.
- A mesh ready AC solution would provide challenges on the energy regulatory side for the design and operation of a mesh solution. There are currently no FERC or NJBPU rules regarding how this market would be structured. For example:
    - Is it feasible and compliant from a FERC perspective? From a NJ OREC, energy, and capacity revenues structure perspective?
    - How does the power dispatch impact the power generated by each wind farm, their pricing, metering, and curtailment? Where would energy be metered, and which party would be responsible for the incremental losses?
    - What would be the operability rules of the HVDC radial lines with a meshed AC grid?
    - Would the independent system operator take control of both the meshed grid and HVDC radial lines? If so, how would the HVDC radial line be compensated for?
- Oversizing the platforms to make them mesh ready will add both costs that must be accounted for in the bid process, and design considerations that must be accounted for in the COP process.
- If the connection of the offshore platform is performed on the DC side, the use of a multi-terminal can provide a suitable and available solution. This is considering a unique vendor is selected for the converters. On the other side, if multiple vendors are selected, significant effort are required to develop a DC grid code, use of DC circuit breaker offshore and coordination on the design and implementation of the converters. The industry is currently exploring such DC grids in Europe and Atlantic Shores would consider the development of a multi-terminal with different vendors as risky for both schedule and costs.

16. For an Option 2 and Option 3 proposal, please provide additional details and considerations on the costs, feasibility, timing, and operability of requiring OSW developers of future projects to utilize certain specified technology types, including potentially identifying common Original Equipment Manufacturers, requiring mesh-ready offshore substations, or other future-proofing specifications. Further, please detail the anticipated coordination that would be required to eventually interconnect between mesh-ready substations, including any anticipated unavailability of OSW generation or other foreseeable risks.

    If an Option 2 or 3 is selected with a mesh ready solution, the generator impact could be limited if the offshore converter platform is properly designed. If a common bus is used to connect both the mesh solution and the WTG collector system, particular attention shall be paid to the voltage control, reactive power control and other operation aspect such as power management.