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NJ SAA Answers - Invenergy

Provided below are Invenergy's comments in New Jersey Board of Public Utilities Docket No. QO20100630 In the Matter Declaring Transmission to Support Offshore Wind a Public Policy of the State of New Jersey. These comments are in response to the questions that the NJBPU asked to offshore wind and transmission developers.

The questions for OSW developers include the following:

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?

Uncertainty about whether the SAA transmission project is actually built on time and interconnection is actually made available to the offshore wind project. Any process that cannot be controlled or influenced by the offshore wind project developer in-house, such as permitting, community outreach, engineering, etc. for the interconnection facilities, will increase the risk for the offshore wind project and will make financing difficult.

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.

Until a decision by the Board is made on which SAA POIs will be funded, a developer will be incentivized to work on their own interconnection scenarios. If a better option is available through the SAA process (in terms of cost of interconnection, distance from the lease area, complexity of the cable route, etc), a developer will likely look to switch to an SAA POI even if the POIs are not constrained by the Board, and as long as the switch does not put the offshore wind project at the back of the interconnection queue line (currently a POI switch is considered a material modification by PJM and effectively restarts the study

process). However, the open question will be who wears the risk of failure to come online at a scheduled time and deliver ORECs if the developer is effectively not allowed to develop their own interconnection solutions and is constrained on which POIs can be used and cannot impact the speed, quality and operations of the company building the SAA project.

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.

From a developer's point of view, it will be significantly cheaper to only be responsible for installation of the cable to the offshore substation and to leave the permitting and construction of the cable and the onshore substation to the SAA project developers. The issues arise regarding risk of the SAA project developers not meeting their timelines and the operations considerations for the now split assets (SAA project owns and operates, unless these are transferred to the offshore wind project, virtually all the infrastructure responsible for the delivery and injection of the offshore wind project's power into the grid). Responsibility for outages and non-delivery of power and ORECs will need to be specifically outlined ahead of project financing and construction.

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.

While Option 3 is attractive in theory, a developer will worry about the risk profile for this approach. As with other options, where an outside party controls a critical path item for the offshore wind project – interconnection and ability to deliver power and ORECs – per its obligations, the emphasis will be on who will be contractually responsible for delays or failure to achieve offshore wind project's COD. Also, if a variety of projects depend on the Option 3 to come online and all could be delayed, such a structure will be disadvantageous to the public. Ensuring that an entity with a substantial record of developing and building such projects is entrusted with this

effort is crucial. At the same time, developers need to be allowed to pursue development of backup interconnection options that they can fully control.

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?

If injection of this additional capacity could trigger overloads on the system as a whole or force additional significant upgrades; or if the guaranteed COD of the SAA Option 2 and 3 solutions will be achieved later than the offshore wind project's guaranteed 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?

If the question refers to the location of the offshore substations (collector platforms) under Option 2, it would be best to create a process where the developers can work with the SAA process winners to determine these locations. For onshore substations locations, it is likely that the SAA developers are proposing specific power corridors and have secured certain land rights for these facilities, so the locations of onshore substations can be finalized at the time of the Board's SAA decision.

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.

Using HVDC transmission for long-distance (over 70 miles) interconnection solutions lowers transmission losses, minimizes environmental impact of the cable installation and allows for the same area to house transmission for more offshore wind capacity, as fewer cables are needed to support the same project capacity compared to HVAC option.

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.

Not able to comment on this. HVDC solution is the state of the art for long-distance transmission. There will be a lot of demand for quick commercialization of 400 kV and 525 kV HVDC cables.

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. 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?

Redundancy can be achieved with an HVDC cable option. As long-distance transmission will be needed for a multi-state or regional approach, HVDC is likely to be the only reasonable option for this infrastructure until the last mile before the POIs.

11. How does the selection of an Option 2 transmission solution affect the permitting risk for OSW generation projects? What about an Option 1b?
The success of implementing Option 2 will depend on the willingness of state and local authorities to grant necessary approvals. For Option 1b, as the transmission corridors will be built within fairly populated areas, it would potentially be more challenging.

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

Permitting, environmental, engineering risks are all substantial due to the high density of the NJ coastal communities and the difficult permitting regime in the state. Potential delays, forced changes in landfalls, required construction practices that are beyond best management practices can further increase the risk for the project.

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?

The owner and operator of the Option 2 or 3 cable needs to take on the risk of the potential future failures, propose mitigation strategies and agree to pay damages to offshore wind project owner/operator if the problems are caused by preventable issues and are not remedied in time.

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

Increased reliability benefits are high and will need to be calculated by PJM who has the most information about the state of the system. In terms of direct economic benefits, high level of investment in local communities will bring billions of direct benefits. Depending on the solutions picked, cost savings from not replicating power corridors by each developer reaching the same set of POIs are also significant.

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[1]ready2 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.

Developers will use tier 1 manufacturers for their equipment in order to secure financing and have a reliable project to deliver on the energy/OREC contracts. Considering potential global supply issues or changes with certain manufacturers, requiring developers to use the equipment of certain manufacturers may bring additional risks and costs to the project. Requiring a mesh-ready option is more reasonable assuming it is likely that a meshed-ready network will be available ahead of the project's COD and this additional spend will not be wasted.

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-ready3 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.

Same comment as above regarding requiring specific OEM's equipment to be used. Companies that have already implemented the mesh-ready solutions in Europe and elsewhere may be better suited to comment on specific unavailability of OSW generation during the integration process.