State of New Jersey

Before The

Board of Public Utilities

In the Matter of Offshore Wind Transmission	)	Docket No. QO20100630

Comments of Anbaric Development Partners, LLC In Response to New Jersey Board of Public Utilities' Request for Additional Information

Transmission Developers:

1. How should the Board ensure that projects are completed on schedule given upcoming OSW generation projects' timelines? Please explain how changes in a future OSW generation project schedule may affect a selected SAA project, if at all.

It is imperative for a SAA transmission project to be completed and commissioned on schedule to offer sufficient transmission capacity at the required commercial operation date of the OSW generation project to enable its MWhs to reach the terrestrial grid. Due to their sheer scale, (offshore) transmission projects often take a long time to complete. The main reasons for long development times are often related to complex permitting and interconnection procedures, technology qualification (e.g. cable PQ tests), limited supply chain for equipment and limited availability of suitable installation vessels.

To minimize the risk of delays due to these reasons, the Board is recommended to award the transmission projects as early as possible, and to prioritize transmission proposals which have adopted measures to mitigate these risks. For transmission, one of the most difficult risks to hedge is onshore routing and permitting. The onshore route is where the project has the most direct impact on people and communities, and where delay is most likely to surface. Proposals, like Anbaric's routes to Deans, that have already obtained nearly all onshore permits have a distinct advantage in reaching a timely COD. To ensure the timely delivery of the first offshore transmission projects, the BPU should lead with those that have substantial onshore permits – this early onshore work provides certainty in routing, in POI selection and accessibility, and in the shore transition location, which impacts offshore routing and permitting. Delays in the onshore permitting could have cascading impacts on offshore routing and permitting, project design and specification, equipment tenders, financial close, and all the way through to construction. In addition, to minimize the risk of supply chain issues, the Board is recommended to choose transmission proposals which are based on a design approach that minimizes the amount of transmission equipment needed such as the total length of cable and the number of required offshore platforms. For example, designs which use high capacity HVDC technology at 400 kV for option 2 links, and offshore platform designs which use direct connection of the wind farm array cables.

In addition, it is recommended to prioritize projects which provide the opportunity to permit and construct onshore cable corridors which can host multiple option 2 links. By doing so, apart from the vastly reduced impact to local communities, any subsequent project will have significantly reduced permitting and construction risk, providing further certainty that the transmission link will be built in time for the first offshore turbine to start generating. The commercial operation date of an OSW project is understood to be the date at which the full solicited capacity is commissioned. Prior to that date, during the sequential installation of the offshore wind turbines, the OSW project is already capable of generating some of its solicited capacity. To do so however, requires a functioning transmission link. Hence there is a benefit in completing the transmission link already before the OSW COD. The Board is encouraged to enable and stimulate such coordination between the OSW and transmission developer which is of benefit to the New Jersey rate payer.

Future changes in an OSW generation project schedule will impact the commissioning of offshore transmission links. One of the steps in trial operation requires the transfer of full load, which is only available once the connecting offshore windfarm is completely constructed. Hence, late completion of the offshore wind farm can also lead to a delay in the commissioning of the offshore transmission link and therefore possibly on the transmission link's financial performance. Accordingly, it is important for the Board to require the generation developer to communicate frequently with the transmission developers of the SAA transmission projects and for those developers to communicate frequently with the generation developers. It is also important that each understand, in detail, the other's development schedule and milestones. This communication is routine in any large construction project and should be effective in the offshore industry.

Texas' CREZ transmission projects provide an excellent example of how planning and procuring transmission in advance of generation development can facilitate the large-scale deployment of renewable generation. Due in large part to the early development of transmission, Texas now leads the nation with over 45 GW of wind, solar, and batteries deployed. New Jersey is not unlike Texas, in that the state has incredible potential for renewable energy development that is far from load, and a transmission system in between that was not originally designed to move power in these directions.

Impacts of Changes to OSW Generation Schedules on Selected SAA Transmission Projects

Changes in OSW generation projects' schedules could include advancing the project(s) more quickly, delaying the project(s), or increasing the capacities sought in future procurements. In any of these scenarios, communication among and between the generator, the transmission provider, the BPU, and PJM will be critical.

- As generation project schedules may advance more quickly than originally planned – due to expedient execution, changes in policy, or a host of other reasons – it is even more critical for the BPU to select experienced development teams with transmission proposals that have made significant permitting progress. As discussed above, onshore permitting can be a significant hurdle for timely transmission project delivery, and projects that have permits in hand will be able to move more expediently.

- Delays in generation projects' schedules need not impact the pace of transmission development, however, if the delays are significant, it may be desirable to slow down activity and spending on the transmission project(s) to minimize the impacts on the ratepayers. Communications with all interested parties will be critical in making these decisions.
- If the pace or scale of offshore generation procurements increases, either accelerating the procurement of 7,500 MW or by going beyond 7,500 MW, transmission systems that are designed with networking, modularity, and scalability in mind will be more ready to meet the future needs of the industry and of New Jersey.

2. Please outline any anticipated changes in tax policy and any federal sources of money transmissions developers might seek for a selected SAA project —or that New Jersey could seek.

Proponents of renewable energy continue to push for an ITC that applies to the transmission portion of offshore wind. Versions of such a tax credit have been included in proposed legislation that is still pending before Congress. Whether bundled radials or separate planned transmission, the ITC does not currently apply to the wires portion of a project.

While federal money is available to states and tribes, there is less in terms of any grants currently available for developers. As discussed in response to Answer 5, the DOE loan program provides funding opportunities for hard to finance projects, where the debt is eventually sold to banks. However, financing is not anticipated to be a barrier for a state-backed cost of service RFP award. Further, developers like Anbaric have investors with significant capital resources to provide project funding at a competitive cost of capital.

3. Other than an act of Congress amending the current Federal Investment Tax Credit ("ITC"), might there be an innovative way (such as in collaboration with OSW generation developers) for Option 1b, Option 2, or Option 3 projects that support OSW to qualify for the ITC?

While the Build Back Better legislation proposes a 30% Investment Tax Credit for third party transmission, current Federal law does not allow for this. Further, whether the ITC applies to a generator-owned transmission component of an offshore wind farm is not a settled issue. The IRS has issued guidance on this only once, in the context of an onshore wind farm, and in that guidance demarcated the high side of the step-up transformer as the cut-off point. Though asked a number of times in the context of offshore wind, the IRS has not specifically ruled on whether the relevant step-up transformer is the one upstream of the export cable or downstream of the export cable. Thus, even a simple generator lead, developed, built, and owned by the generator may not qualify for the ITC.

If the IRS were to rule that export cables and the associated transmission infrastructure under generator ownership qualify for the ITC, Anbaric would be open to exploring structures that take advantage of this benefit for New Jersey ratepayers, but with uncertainty that even a generator lead line would qualify, it is not clear that innovative structures would qualify. If the ITC does become applicable to transmission assets under any IRS ruling, New Jersey ratepayers would benefit from the reduced capital requirements.

4. How might transmission developers explore the availability of federal funding opportunities that may be available to support transmission projects? How would receipt of such funding be incorporated into bids or financing arrangements? How might the Board coordinate on applying for such opportunities?

Given the unpredictable nature at the current time regarding the availability of federal funds generally, and the requirements and timing associated with any potential funds this is obviously a complex topic. However, it is clear that Biden Administration and Congressional leadership recognize the importance of transmission and the need for transmission investment to facilitate the clean energy transition. Anbaric has engaged DC representation to assist with understanding opportunities that are available, as well as to assist with advocacy for pro-transmission policies and funding, as well as to help to educate elected officials and regulators as to the critical need for this investment. Engaging industry organizations to assist with this effort is also critical. Their attention has rightfully been on helping to establish the industry and policy formation that would facilitate the industry's growth with a focus on the generation side. The time is now ripe for that advocacy to also include transmission, and specifically federal transmission investment. Currently, even without further appropriation, there are numerous programs under IIJA that would be worth exploring, all housed under DoE's "Building A Better Grid Initiative." That initiative, by design, is meant to leverage $16.5 billion in IIJA funding to accelerate the development and deployment of new transmission lines that will connect Americans to cleaner electricity.

Examples of these programs include:

- $5 billion DoE Office of Clean Energy Demonstration "Program Upgrading Our Electric Grid and Ensuring Reliability and Resiliency
- $2.5 billion DoE Office of Electricity "Transmission Facilitation Program"
- $500,000,000 DoE "State Energy Program"

The vast majority, if not all, of the federal programs envision the state or other public entity as the applicant for and recipient of the funds, rather than being available for a transmission developer to pursue independent of a project contract with a public entity.

As the clear national leader in offshore wind transmission procurement, New Jersey is poised to lead on the subject of federal funding of these projects as well. New Jersey's framework can help

DoE and other relevant departments, and well as Congress, establish a funding framework that could work nationally and incentivize smart, future-looking transmission investments.

5. How might transmission developers explore the availability of federally backed loans for loan guarantees that may be available to support transmission projects? How should developers and the Board coordinate on applying for such opportunities? How would receipt of such loans or loan guarantees be incorporated into bids or financing arrangements?

The DOE Loan Program Office provides funding for renewable technology that may have promise but is not quite market ready or is otherwise challenging to finance at attractive rates. While a significant undertaking, a large transmission project that has regulated rate under a federal tariff is a lower risk proposition than, for example, a merchant transmission project. Bids with cost controls and related incentives will be bound to meet the terms set out in the bid. While it will be a developer-by-developer decision where to seek debt financing, attractive rates are likely to be available for a regulated rate award.

A developer's investment backing may also impact a decision to seek funding from a source like the DOE LPO. Where a developer has access to significant capital at a competitive cost, that path may provide the best option for rate payers.

If DOE loans were utilized, the terms of the financing should simply flow through the regulated rate – e.g. lower interest loans will result in a lower cost of service recovery than higher interest loans.

6. How might a selected SAA project manage and mitigate material and equipment supply chain risks and any associated costs, particularly as they might related to HVDC?

Supply chain limitations are one of the key risks in realizing offshore transmission infrastructure. HVDC technology is highly specialized and there are a limited number of companies worldwide who deliver offshore converter stations and its subcomponents, and submarine HVDC cables and its raw materials. Hence the production capacity is limited. In particular, no local supply chain for HVDC equipment currently exists in the US, although several cable factories are preparing to produce HVDC cables or are being built. Key steps that a SAA developer can take to minimize those risks are:

- Communicating with key OEMs throughout the development process
- Use of designs which employ commercially available technologies to be assessed through technology maturity and market surveys
- Early engagement with multiple suppliers to provide the supplier industry with a view on future pipeline and allow the industry to increase capacity and build-up inventory. This could be achieved through a RFI and PQQ process.
- Use designs which minimize the amount of required transmission equipment/infrastructure. In practice this means HVDC export links at 400 kV

with offshore platforms which directly connect the offshore wind farm array cables
- Focus on standardization and modularity in designs. Through standardization, the barriers to entry are lowered, larger volumes of the same equipment are required, allowing the industry to ramp-up faster to meet demand. Modularity in designs, if timed well, enables offshore converter stations to be procured in mini-series to minimize the time and cost of engineering, technology qualification and to allow yards to 'series produce'.
- Setting up framework contracts with vendors to arrange priority access in production planning based and carry out the preparations to be able to immediately secure production slots / vessel availability upon SAA award
- The available supply chain for a SAA project can potentially be widened by adjusting the contract strategy. By splitting the procurement of different elements of the transmission link over multiple vendors, a larger number of vendors could be contracted with a higher total production capacity, but at the cost of introducing more interface risk and introducing integration issues

7. How might a selected SAA project manage financial risk, including, but not limited to, market and interest rate dynamics, labor costs, raw material and supply chain costs, land procurement costs, and insurance?

Similar to our discussion above regarding the mitigation of material and supply chain risks through the SAA approach, the SAA approach can mitigate financial risks by moving quickly and at scale. Early engagement with vendors will be key to mitigating labor costs, raw material costs and supply chain costs. SAA transmission projects that are modular in nature, and that will deploy multiple offshore platforms and equipment will be able to implement framework agreements with vendors to protect against these types of risk. Similarly, early approval of projects, even if constructed in multiple phases over a number of years, will allow proponents to procure land for all aspects of the project up front. Projects like Anbaric's Boardwalk Power Link's connections into the Deans substation have already obtained rights to nearly all, if not all, of the parcels required to build the project, thus nearly fully insulating ratepayers from increasing land values.

Large projects that lock in financing now will be insulated from future rate hikes, whereas an incremental approach to financing would expose future projects to additional interest rate risk. Further, proposals that include low and fixed ROE requirements already mitigate this financial risk.

None of these risks are unique to SAA transmission projects, but by selecting and planning now for future transmission needs, the SAA approach is uniquely suited to mitigating these risks.

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

As a threshold matter, the greatest benefit of the Board of Public Utilities' SAA approach is the elimination for offshore generators of interconnection to the terrestrial grid and on-shore permitting. By planning and procuring transmission in advance of the offshore generation tenders, the NJ BPU and PJM are placing those risks on seasoned transmission developers -- companies whose core business is interconnecting to the grid and permitting projects on-shore. By planning, procuring, and permitting transmission before generation, the BPU and PJM level the playing field among offshore wind generators, enhance competition, and remove a significant risk that would otherwise be priced into the OREC bids. This approach itself will yield significant benefits for New Jersey's ratepayers.

To maximize reliability and economic benefits of the SAA approach to New Jersey ratepayers, the BPU should acknowledge the proven benefits of a grid, that is the benefits of scale and networking advantages, and therefore, should select an integrated Ocean Grid, that is a complete Pathway of at least three Option 2 projects and fully networking the offshore platforms via the Option 3 inter-links, as explained further below. Nonetheless, there are substantial reliability and economic benefits associated with Anbaric's HVDC Option 2 links. The principal reliability and economic benefits of Anbaric's HVDC links follow.

Reliability Benefits of HVDC:

Each of Anbaric's Option 2 proposals are based on HVDC voltage source converter (HVDC-VSC) technology, which provides the following reliability benefits:

- Reactive power consumption or generation can be controlled efficiently to meet the grid code requirements and system needs to enhance system reliability.
- Zero active power operation is possible with HVDC-VSC technology (i.e., STATCOM operation), which can very quickly respond to stabilize the voltage of the power grid, reduce system power losses and harmonics, increase both transmission capacity, and limit transient voltage. In contrast, line commutated Converter (LCC) technology requires a minimum amount of active power transfer to stay connected.
- VSC-HVDC converters have the ability to connect to weak AC grids.
- Limited/minimal harmonics produced by VSC technology, thereby requires minimal or no filtering.
- Provides fault ride-through capabilities for certain network faults, allowing the HVDC-VSC system to continue operating and regulating the AC grid during a fault period.
- Does not contribute to faults which can over-duty circuit breakers at the connecting substation.
- Allows black-start capability
- Enables excellent control capabilities, low losses, proven technology/high reliability, and good scalability.

- More compact converter station with less or no filtering required (particularly advantageous for offshore wind applications).

All of the above benefits, except frequency regulation, which is more related to the generating technology rather than the transmission technology, can only be provided by HVDC transmission technology.

Economic Benefits of HVDC:

- Over long distances, HVDC has lower losses than AC, with no need for intermediate platforms or reactive power support.
- HVDC inter-links can transport more power over longer distances than AC inter-links.
- HVDC systems require far fewer cables than AC systems of equivalent power, thus have a smaller environmental footprint and impact, fewer cables coming into shore and through communities, potentially fewer construction cycles and lower impacts on the host communities.
- Anbaric's proposed HVDC systems are based on a common design standard, thus creating a modular design that can be replicated as the system expands over time, lowering engineering and procurement costs.

As explained below, these reliability and economic benefits increase substantially if these Option 2 links are incorporated into an integrated offshore grid.

Reliability and Economic Benefits of an Integrated Offshore Grid:

Two or more Option 2 links, when combined with Option 3 offshore inter-link(s), are capable of being configured into a multi-terminal offshore transmission grid which can be used to exchange power between the respective onshore POIs. This functionality unlocks the benefits and ancillary services, as listed below:

- Relieve onshore congestion between these POIs and benefit from differences in LMPs at these POIs
- Improve network availability by providing an alternative offshore transmission path parallel to the onshore transmission grids between these POIs
- Provide black-start capability:
  - To one of the connected POIs in case it has become islanded due to an onshore grid outage
  - To any connected POIs in case the offshore WTGs are equipped with grid-forming capability
- Reduce curtailment by providing alternative paths to shore if power flows on the primary path are limited due to onshore congestion

- Provide redundancy if the primary path to shore is out of service for any reason. Absent a switchable inter-link, OSW capacity would be stranded until the primary link was returned to service.
- Inter-links create a redundant supply off auxiliary power to the offshore substation platform and the connected offshore wind farm, thus reducing the capital and operating expenses, and the environmental impact of installing and running diesel generators offshore, which would otherwise be necessary for a radially connected offshore wind farm.
- By providing redundancy and reduced curtailment as described above, a networked offshore grid will also reduce the need to run fossil generation, thus reducing SO_2, NO_X and CO_2 emissions.

Economies of Scale:

Vendors have confirmed with Anbaric that if more than one project is awarded, there will be a commercial discount on Engineering, Procurement, Construction (EPC) contracts ranging between 3% - 12%. Considering potential synergies that lead to cost-savings, Anbaric estimates that if a full Pathway is awarded, the overall cost-savings for the award of a full Pathway is up to 10%, as compared to the sum of the individual costs of the projects. Factors contributing the 10% cost savings include:

- A “commercial discount” from vendors on EPC contract due to:
  - Combining multiple projects in one tender with equipment vendors and installation companies, improving the production efficiency
  - Repeating the design and reducing the cost of engineering
  - Improving the utilization of yards, factories, and vessels to obtain more competitive prices
  - Capitalizing on lessons learned from first time project completion, and applying these lessons to subsequent projects
  - Simplifying and reducing spare parts costs
- Synergies on non-EPC development cost of the pathways include overhead and construction period cost.
- Sharing the cost of preparing cable corridors (removal of debris, rocks, unexploded ordnance, etc.) over multiple projects
- Sharing the cost of permitting cable corridors over multiple projects
- Sharing the cost of submarine cable works such as surveys, mobilization and demobilization, termination work, project management etc. This specifically applies to the interlinks if they are built in the same time frame at the end of all projects.