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March 1, 2019

Via e-mail

Eric Steltzer
Massachusetts Department of Energy Resource
Executive Office of Energy and Environmental Affairs
Boston, Massachusetts 02110

RE: DOER Request for Stakeholder Comment: Offshore Wind Additional Procurement Study

Dear Mr. Steltzer:

Anbaric Development Partners is pleased to submit the attached comments in support of your study of additional offshore wind procurements in Massachusetts.

Thank you for the opportunity to provide input.

Best regards,

Stephen Conant
Partner/Project Manager

DOER Request for Stakeholder Comment:
Offshore Wind Additional Procurement Study

Section 21 of Chapter 227 of the Acts of 2018 ("2018 Act"), An Act to Advance Clean Energy, requires the Department of Energy Resources ("DOER") to investigate the necessity, benefits and costs of requiring the electric distribution companies to conduct additional offshore wind (OSW) generation solicitations of up to 1,600MW beyond those already required by 83C of An Act Relative to Green Communities, St. 2008, c. 169, as amended by St. 2016, c. 188, § 12 ("Section 83C").

DOER is inviting interested stakeholders to provide input into its investigation under the 2018 Act by responding in writing to the following questions. These questions solely pertain to additional procurements above and beyond the 1,600 MW solicitations currently required by Section 83C. Any reference to "additional OSW procurements" refers to solicitations that are incremental to the 1,600 MW of solicitations already authorized under Section 83C.

Please email written responses to eric.steltzer@mass.gov **by Friday March 1, 2019 at 5:00pm**, and where applicable, links to resource materials that may be useful for DOER to review in its investigation. Please note that responses will be considered public information. Thank you.

Respondent Information

1. Please provide the name of your organization and your contact information.

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2. Please briefly describe your organization and your interest in the Commonwealth's OSW procurements.

Anbaric Development Partners ("Anbaric") is a Massachusetts company with its main office in Wakefield. It has a long-held interest in offshore wind development in the state. In 2011 ANBARIC initiated the first offshore wind transmission lines for the state called the Bay State Offshore Wind Transmission System.

In 2018 the Federal Energy Regulatory Commission (FERC) granted ANBARIC's Massachusetts OceanGrid Project the authorization to run an open season to charge negotiated rates to users (producers or consumers of electricity) of common transmission line. (*See, Anbaric Development Partners, LLC,* Order Granting Application for Authorization to Charge Negotiated Rates, Subject to Condition, and Granting Waivers, 162 FERC ¶ 61,097 (2018) in Docket No. ER18-435-000).

Anbaric has an expertise in submarine transmission cables that is derived from its work as a pioneer in the development of subsea transmission systems including the 660 MW Neptune Regional Transmission System[1] connecting New Jersey and Long Island, and the Hudson Transmission Project[2] connecting New Jersey and New York City. Today Anbaric's Massachusetts OceanGrid has an active interconnection queue position with ISO-NE to deliver 1200 MWs offshore wind to Massachusetts.

Anbaric's comments will focus primarily on transmission and the advantages of developing a coordinated offshore wind transmission network. As discussed in response to question 11, separating generation from transmission for procurement in future RFPs and developing them in a coordinated manner as occurs in terrestrial generation development allows for a better planned transmission system that is more economical, less environmentally damaging, and ultimately more beneficial to the future growth of the offshore wind industry, whether that be for the next 1600 MW being considered here or beyond.

Necessity

3. Are additional OSW procurements for long-term Power Purchase Agreements that are above and beyond those authorized by Section 83C necessary to support the development of OSW?

Offshore wind is in its nascent phase on the east coast of the United States. The 1600 MWs now authorized under Section 83C are important steps forward. A decision to move forward with an additional 1600 MWs that the Commonwealth is considering under 2018 Act will send a signal to investors in locally sourced supply chain infrastructure that there is planned pipeline of projects that will support their investments. Investments made now, including investments in the transmission needed to move offshore wind energy to shore, will make offshore wind projects even more viable in the future and position Massachusetts as a center for the development, construction and ongoing maintenance of such facilities, while also delivering even lower and more competitive prices.

[1] http://anbaric.com/neptune/

[2] http://anbaric.com/hudson/

a. What are the advantages and disadvantages of longer and shorter term (i.e. 10 years, 25 years) periods for Power Purchase Agreements to developers, ratepayers, or others?

Subsea transmission systems can be expected to have longer life cycles than generators. Subsea cables are particularly long-lived, with expected operating lives of 50 years, or more. Therefore, long term contracts for offshore wind transmission systems will yield substantially lower prices for consumers.

b. Are there advantages or disadvantages in soliciting OSW in a stand-alone procurement – or could it compete in a broader renewable or clean energy procurement?

Anbaric does not offer a view on whether the procurement of offshore wind generation should be a stand-alone procurement or combined with other renewable of clean energy procurements. As will be discussed in response to Question 11, Anbaric does believe there are advantages to separating the procurement of transmission from generation.

4. Are the opportunities to participate and earn revenue in the wholesale markets (e.g. Energy, Capacity, and Ancillary Services) and renewable energy certificate payments sufficient to support the development of new OSW projects?

Why or why not?

Anbaric offers no response.

Are there recommended changes to the wholesale market structure or renewable energy portfolio standard that would impact your answer?

Anbaric offers no response.

5. Are there other forms of financing mechanisms, such as Offshore Renewable Energy Certificates (ORECS), that could support OSW?

Anbaric offers no response.

6. What are the costs and benefits of an additional OSW procurement(s) on potential pricing and other impacts on wholesale markets (e.g. Energy, Capacity, and Ancillary Services)? Please be as specific as possible as to which markets you are referring too.

Anbaric offers no response.

a. What, if any, would be the effect on the wholesale markets caused by an additional OSW procurement(s)?

Anbaric offers no response.

b. If there would be any negative effect, are there recommended solutions to mitigate the effect?

Anbaric offers no response.

7. Would additional OSW procurement(s) incremental to procurements under Section 83C have any specific wholesale market impacts on other low/no emission resources?

Anbaric offers no response.

8. What are the potential pricing and compliance impacts of additional OSW procurement(s) on Renewable Energy Certificate and Clean Energy Certificate markets?

Anbaric offers no response.

9. Will additional OSW procurement(s) have specific seasonal market impacts?

Anbaric offers no response.

Transmission

11. What are the advantages and disadvantages of requiring a coordinated OSW transmission network?

There are five advantages of requiring a coordinated OSW transmission network. These include:

1) cost savings to rate payers,
2) more efficient access to limited interconnection points,
3) reduced environmental footprint and less conflict,
4) accelerated permitting, construction and grid connection, and
5) more opportunities to coordinate activity with other state procurements.

1) Cost savings to rate payers – With a coordinated OSW transmission network, transmission costs can be spread across multiple offshore wind generation projects. Transmission costs typically range between 15 to 25 percent of an offshore wind project's total. Based on reports from European offshore development, sharing transmission reduces transmission's portion of the project cost up to 40 percent. Additionally, transmission can be financed separately from

generation because the required return on infrastructure is lower than on generation, and infrastructure can be financed over a much longer period with corresponding lower costs.

The current 83C process of limiting the competition to wind generation developers runs the risk of giving control of the early transmission infrastructure to generators who then may limit access to the best onshore interconnection points by other competitors. A coordinated OSW transmission network selected through a separate RFP would prevent this and offer price transparency for every offshore wind project. It would provide a level playing field for each offshore wind bidder by neutralizing locational advantages that may accrue to the first winning wind project. Further, it would move permitting risks of the interconnection points to the transmission developer and reduce the risks of interconnection costs to wind generation projects. This pricing transparency, sharing of risk and intensification of competition should lead to significantly lower costs for the offshore wind generation. In Europe (most notably Germany and the Netherlands), where the ownership of transmission and generation have been kept separate, unsubsidized generation bids are being offered in competitive RFPs. Separating the ownership of generation from transmission in future procurement via a coordinated OSW transmission network will set the Commonwealth on a path to lower cost generation procured at market parity with other energy resources in New England.

2) More efficient access to limited interconnection points – In September 2014 MassCEC issued a report[3] that identified some of the physical constraints of connecting large volumes of offshore wind to the grid in southern New England. It identified the limited number of interconnection points on land in Massachusetts, Connecticut and Rhode Island that could accommodate the amount of wind envisioned at the time. An "ambitious" scenario in the study was 3,000 MWs for Massachusetts alone. Today Massachusetts is already looking at 3,200 MWs, while the neighboring states of Connecticut and Rhode Island are considering at least an additional 2,000 MWs in addition to the 800 MWs for which they have contracted. A coordinated OSW transmission network will make better use scarce and high-value interconnection points, cable routes, and sea-to-shore transition points. Without such a network, the first winning projects make it extremely challenging and/or cost prohibitive for later projects to lay additional cables on the already used routes, to expand the relevant substations, or to permit another line in an environmentally sensitive area.

A coordinated OSW transmission network — funded and operated independently of generation — would create efficiencies, minimize environmental impacts and build a foundation for expansive development of wind energy in the ocean south of Massachusetts. An independent offshore grid would enable generators to compete for contracts without needing to factor in the risk and costs of building and connecting transmission. This will allow for more vigorous competition among transmission developers, allowing for more transmission bidders to compete and lowering their prices.

[3] ESS Group, Offshore Wind Transmission Study Final Report (Sept. 2014), http://files.masscec.com/research/MassCECOSWTransmissionStudy.pdf.

A coordinated OSW transmission network will also enable generators that have won BOEM auctions more flexibility in their bids in response of future Commonwealth procurements. At present, a generator will bid its own lead line into the procurements and can be expected to bid in 400-800MW blocks because that is the current state of the subsea transmission technology. In these conditions, there will typically be only one winner, even though more generators have spent hundreds of millions of dollars on their WEA leases. In contrast, a 1200MW "master" HVDC facility can entertain bids of any size from the qualified generators. With this larger size come economies of scale.

3) Reduced environmental footprint and less conflict – An approach that requires each offshore wind generation developer to build its own transmission infrastructure from each offshore wind farm to an interconnection point on the onshore bulk power grid, when extended over the course of developing a full 3,200MW program, could yield eight or more sets of generator lead lines across the ocean floor. These lines would compete for the few viable interconnection points on shore that can accommodate large amounts of injected electricity without dramatic and costly upgrades. A proliferation of seabed transmission cables is inconsistent with avoiding and mitigating impacts on environmental resources and potential conflicts with other established uses, such as fishing, especially in crowded and complicated areas along the Atlantic Coast.

The impacts of multiple lead lines carry over to the onshore as well. Continuing with this example, activities involved in laying and connecting eight or more sets of generator lead lines to inland interconnection substations would require digging up the roads and rights-of-way, along with other construction disruptions, eight times through communities along the routes.

A coordinated OSW transmission network would take these impacts into consideration and seek to minimize disruptions on the seabed and onshore to a few as possible. An OSW transmission network could reduce the number of offshore collector stations and make better use of limited on shore rights-of-way. The impacts to the ocean floor as well as communities and ecosystems where cables come ashore are reduced by having few numbers of high-capacity electric transmission cables in lieu of a radial electric transmission cable from each and every wind farm. Fewer cables means fewer trenches through the ocean floor and fewer onshore cable projects. Fewer transmission cables would minimize the impact of transmission line siting on the ocean bottom habitat as well as in the coastal marshes and estuaries where it would make landfall. Further, fewer transmission cables would mean fewer undersea construction campaigns and lessen potential impacts on endangered species such as the Right Whale. Finally, coordinated OSW transmission network would also reduce the number of seafloor infrastructure points that fishing operations would have to avoid.

4) Accelerated permitting, construction and grid connection – An experienced subsea transmission developer familiar with the engineering challenges, large-scale project management, permitting processes, public engagement and financing realities could accelerate the pace of transmission permitting, construction, and ultimately connection of offshore wind power generation facilities to the grid. This is true of activity in the ocean environment, but also in the terrestrial environment where right of way issues, local community engagement, and local permitting area major

considerations. A coordinated OSW transmission network can be planned, reviewed and built in parallel with wind farms and are scalable as multiple WEAs are developed and ready to be brought on line.

5) More opportunities to coordinate activity with other state procurements – As we have seen in the first round of 83C procurements for Massachusetts, the neighboring states of Connecticut and Rhode Island stand ready to sign contracts with offshore wind generators that were not selected by Massachusetts. These projects are smaller in size and enhance the risk that the limited number of good interconnection points may not be used efficiently. Ultimately, this could limit the amount of wind energy that can be moved to shore at a low price. Thus, a well-designed coordinated OSW transmission network could incorporate the offshore wind procurement goals of neighboring states. Transmission procured in a separate process separate from generation could be sized at a scale that provides the opportunity for the states to run separate but coordinated procurements to get the lowest cost for all participants.

11 a. If there are advantages, what would be required to accomplish this?

A coordinated OSW transmission network — selected, funded, and operated independently of generation — would create efficiencies, minimize environmental impacts and build a foundation for expansive development of wind energy in the ocean south of Massachusetts. A coordinated OSW transmission network would enable generators to compete for contracts without needing to factor in the risk and costs of building and connecting transmission. This will allow for more vigorous competition among transmission developers, allowing for more transmission bidders to compete and lowering their prices.

One method of accomplishing this is set forth by Representative Paul Brodeur in House Bill No. 2814. It is co-sponsored by Representatives Patricia Haddad, Bradley Jones, and Sarah Peake. If enacted, it would enable the procurement of expandable transmission separate from generation. The legislation lays out a process by which an expandable transmission developer would first obtain all needed environmental permits prior to being authorized to build a project. This would avoid any risk of creating stranded cost due to under-utilized transmission, a problem that the first 83c procurement encountered in evaluating the expandable transmission network proposals that were part of that RFP.

Any competent transmission building company would be allowed to bid. This would be an important change from current law under which only the few generators holding leases can bid to provide transmission. Opening competition to all qualified transmission developers would foster aggressive bidding to provide transmission service. That is, it would allow for "apples to apples" comparisons of different designs and approaches to sharing the expandable transmission system.

Once awarded a contract to build the transmission, the winner would be obligated to obtain all necessary permits, at its own cost, for siting and operating the transmission system. The transmission developer awarded the contract would be working through the permitting process for the transmission network while solicitations are issued and contracts awarded to developers of generation. The transmission developer would be obligated to complete the design and permitting

of the transmission network in time for construction of generation to begin. Construction of the transmission could take place concurrently with construction of the generation. This is the essence of a coordinated OSW transmission network.

This approach would allow for flexibility that can lead to additional reliability benefits and costs savings. Massachusetts could size the ocean grid for not just near term (i.e. next two year) procurements but, for an additional 6,000 MW of offshore wind. This would allow for highly efficient pricing and design. As noted above, components of the system would be built as needed to serve contracted generation. This procurement model also lends itself to multi-state shared efforts since the federal lease areas are co-located. States like Connecticut, Massachusetts, Rhode Island – for example – and others could again work together on their renewable energy goals by jointing funding a coordinated OSW transmission network that would interconnect offshore wind at the least cost and with the least environmental impact.

11 b. Are there changes to the solicitation process that could accomplish this?

Yes, future RFPs should allow for the separation of transmission and generation in the RFP and the selection process. The bundling of generation and transmission in the current 83C RFP process makes transmission an afterthought rather than the fundamental building block that would be provided through coordinated OSW transmission network designed to serve a robust, nation-leading offshore wind industry. Thus, solicitation of an ocean grid transmission system should be separated from generation in upcoming RFP processes.

Further, the initial Section 83C RFP requires interconnection at the capacity standard established by ISO-NE. While not requiring participation in the Forward Capacity Market, ISO New England has been clear that it will only fully award a capacity interconnection when a resource clears the Forward Capacity Market (FCM). These two requirements -- by the RFP on the one hand and ISO-NE on the other -- are incompatible. Subsequent procurements should allow transmission entities to show that their projects are interconnecting to unconstrainted points on the New England transmission system. This is a demonstration that could be made through work performed by competent and qualified power engineering firms. Doing so would achieve the objective in the 83C RFP regarding deliverability without imposing on a transmission developer a capacity obligation that it is ineligible to obtain under current ISO-NE rules. This decoupling from ISO-NE's processes is necessary because of the complexity of ISO-NE's capacity requirements.

11 c. Could state or regional support for a transmission system to support further offshore wind development be sufficient to finance further offshore wind development?

State or regional support for a transmission system could be sufficient to finance further offshore wind development. The Commonwealth's Executive Office of Energy and Environmental Affairs ("EEA") has been studying this question since at least 2009. In January of 2010 MassCEC published a report by the Analysis Group which acknowledged the advantages of a coordinated

OSW network to the then emerging offshore wind industry.[4] The study evaluated different scenarios for the ownership of shared transmission lines. One scenario explored in some detail was the creation of an Offshore Wind Transmission Authority ("OWTA"). By moving the burden of paying for transmission away from individual generators, where the cost of transmission may be materially different for each generator's bid, an OWTA could create a level playing field for the wind generators to just compete on the price of their energy.
It would not be necessary for the OWTA to build the transmission system or even pay for its full development, it could pay for enough capacity on a line offered through an open season that would be enough to create a level playing field for all bidders who would pay an equal proportional cost of the capacity needed on a shared transmission line.

The two states that have led the development of onshore wind – Texas and California – have both implemented programs that cause transmission to be built and financed separately, and they have done so in order to facilitate greater competition among generators. Their programs have been extremely successful.

Other Factors that Impact Cost and Price

12. What, if any, impact will the expiration of the federal Investment Tax Credit have on future pricing for additional OSW procurement(s)?

Anbaric offers no response.

13. What is the potential for advancement of technological improvements in offshore wind sector to affect pricing for any additional OSW procurement(s)?

The rate of technological changes counsels for the development of a separate ocean grid transmission system. There are significant changes now taking place in submarine cable technology. Where the previous standard for moving large volumes of offshore wind was 800 MWs via AC or DC cables, newer high-voltage direct current cables with voltages up to 400kV can move more than 1200 MW from converter stations that can be hundreds of miles from shore. A 1200MW HVDC transmission system from the WEA south of Massachusetts to, for example, Boston is quite feasible.

Just as the rate of change and demand for larger more efficient turbines is being driven by offshore wind developers, so too is the rate of change for transmission technology being driven by the developers of offshore wind transmission systems. By separating transmission from generation, technological advancements in each area will be driven and put into commercial operation sooner than if transmission is left to generators alone.

[4] Analysis Group, Strategic Options for Investment in Transmission in Support of Offshore Wind Development in Massachusetts (Jan. 2010), http://files.masscec.com/research/StrategicOptionsInvestmentTransmissionSupportOffshoreWindDevelopmentMassachusetts.pdf.

14. What restrictions on price shall there be on any additional OSW procurements, if any? Should each successional procurement be required to reflect a price decrease?

As the offshore wind farms move further from shore and the available on-land interconnection points are further inland, the cost of transmission will become an increasing larger component of the overall project cost, making it difficult if not impossible for subsequent procurements to reflect a price decrease. A coordinated OSW transmission system would allow each successive OSW generation RFP to utilize the high-capacity, networked cables that would be in place into the optimal on-land interconnection points. This would allow generators to compete using the latest technology and in a range of sizes from fairly small farms to very large proposals.

15. With pending retirements in New England should there be a particular focus on specific development areas and/or transmission interconnection points to relieve future reliability constraints?

Anbaric offers no response.

Economic Development and Supply Chain

16. Will requiring the Distribution Companies to undertake an additional OSW solicitation of up to 1600 MW impact the development of offshore wind supply chain services in the Commonwealth?

An additional OSW solicitation of 1600 MW will have a positive impact on the development of offshore wind supply chain services. A coordinated OSW transmission network where transmission is separated from generation, and can be planned in advance, will signal to the market that it should invest in supply chain services for Massachusetts and New England.