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March 1, 2019

By E-Mail

Eric Steltzer
Department of Energy Resources
Boston, MA 02110

Subject: DOER Request for Stakeholder Comment on Offshore Wind Additional Procurement Study

Mr. Steltzer:

RENEW Northeast, Inc. submits these comments in response to the Department of Energy Resource's February 6, 2019, Request for Stakeholder Comment on Offshore Wind Additional Procurement Study.

Thank you for the opportunity to provide this feedback.

Sincerely,

Francis E. Pullaro

Francis Pullaro
Executive Director

Respondent Information

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

Francis Pullaro
Executive Director
RENEW Northeast, Inc.
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2. **Please briefly describe your organization and your interest in the Commonwealth's OSW procurements.**

RENEW Northeast, Inc. (RENEW) is a non-profit association uniting environmental advocates and the renewable energy industry whose mission involves coordinating the ideas and resources of its members with the goal of increasing environmentally sustainable energy generation in the Northeast from the region's abundant, indigenous renewable resources. RENEW has focused on highlighting the value of grid-scale renewable resources-specifically offshore and onshore wind, solar and hydropower- and energy storage systems and the benefits of transmission investment to deliver renewable energy to load centers in the Northeast. RENEW members own and/or are developing large-scale renewable energy projects, battery and pumped energy storage systems, and high-voltage transmission facilities across the Northeast. They are supported by members providing engineering, procurement & construction services in the development of these projects and members that supply them with multi-megawatt class wind turbines.

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?**

Yes. Renewable energy developers generally use project financing to raise debt and/or tax equity. Equity investment in the case of offshore wind is primarily designed to capture the federal Investment Tax Credit. These lenders and tax equity providers generally require long-term contracts with creditworthy buyers as a condition to making project investments. Today, renewable energy projects and even most traditional new generation are very difficult to finance without a long-term commitment due to the risks of relying on short-term energy markets to recover a project's long-term capital investment.

The key ingredient for the success of a procurement program is providing developers with the knowledge that they can compete for a long-term commitment from a creditworthy counterparty, such as the distribution utilities, for their products of energy and Renewable Energy Certificates (RECs).[1]

[1] *See* Peregrine Energy Group, Inc., New Energy Opportunities, Inc., *Study on Long-Term Contracting Under*

The ISO New England wholesale market does not provide renewable energy resources with any opportunity to secure a long-term commitment that locks in a significant portion of revenue to obtain project finance like new natural gas power plants have been receiving for years. Based on a RENEW analysis of ISO New England's Forward Capacity Auction (FCA) 12, new gas plants lock in revenue equal to roughly two-thirds of their capital costs for their first seven years of operations. By contrast, renewable resources like offshore wind could lock in revenue of only 10 to 16 percent of their capital costs. This leaves 84 to 90 percent of their capital costs to be recovered through sources like energy and RECs that are subject to significant market price risk. Essentially, the capacity market design attracts capacity resources with lowest capital cost but potentially highest variable cost which is likely a new gas generator. This design is flawed in that it frustrates state renewable public policy goals by excluding renewable generators having high capital costs but low variable costs.

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?**

Long-term contracts will also lower the cost of capital since most investors will use a risk-rated return. With less risk from long-term contracts, developers will also accept a lower return. A longer contact (e.g., 20 years) also results in a lower unit ($/MWh) price with the capital cost recovery spread over more years.

A significant benefit of long-term contracts for consumers comes from lowering the development cost of renewable energy by giving developers and their investors the confidence to commit their capital. This benefit was acknowledged in the 2018 New York State Research and Development Authority (NYSERDA) Offshore Wind Policy Options Paper.[2]

Long-term contracts also provide consumers an important hedge against volatile and rising electricity prices.[3] While natural gas prices are historically low today, forecasts indicate rising prices over the long term. Despite today's rock bottom natural gas prices, consumers are unable to secure a long-term lock on these low prices due to the futures market lacking liquidity beyond a year. Here is where offshore wind energy and its lack of fuel inputs can fill a role as an alternative hedging instrument for electricity consumers like a 30-year fixed-rate mortgage protects consumers from interest rate volatility. In addition to being able to moderate short term price spikes, a

Section 83 of the Green Communities Act 29-30 (December 31, 2012) (Submitted to the Massachusetts Department of Energy Resources), http://www.mass.gov/eea/docs/doer/pub-info/long-term-contracting-section-83-green-communitiesa-act.pdf.; and The Brattle Group, *The Importance of Long-Term Contracting for Facilitating Renewable Energy Project Development* (May, 7, 2013).

[2] New York State Energy Research and Development Authority, *Offshore Wind Policy Options Paper* 27-28 (January 29, 2018), https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/Offshore-Wind-Policy-Options-Paper.pdf

[3] *See* Bolinger, Mark, Lawrence Berkeley National Laboratory, *Revisiting the Long-Term Hedge Value of Wind Power in an Era of Low Natural Gas Prices* LBNL-6103E (March, 2013), http://emp.lbl.gov/publications/revisiting-long-term-hedge-value-wind-power-era-low-natural-gas-prices

longer-term contract (e.g., 20 years) will provide a hedge against rising electricity prices over the next several decades due to the underlying price for natural gas. Although energy market prices are uncertain, they can be represented using a probability distribution for each future year. By contrast, long-term wind contract prices are known with certainty. While energy market costs could be cheaper in the future, they are much more likely to be higher than wind contract costs.

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?**

While mature in Europe, offshore wind is still an emerging technology in the United States. Economies of scale are needed for the U.S. market to experience the significant cost declines that Europe obtained and to create the certainty for the market to make investments in a U.S. supply chain. While the first Section 83C winning price places it at near parity with onshore wind and solar resources and even the cost of new combined cycle natural gas generation, it is still priced above those resources. It therefore still requires a dedicated procurement.

RENEW recommends Massachusetts develop and maintain a long-range plan or schedule for the procurement of offshore wind. It would be updated as solicitations are completed or additional legislated requirements are enacted. The plan would specify the date, size, and other key parameters of future solicitations. It would be a guidance document for the entire offshore wind industry– generation developers, transmission developers, and supply chain– to plan their activities and strategies, thereby fostering competition and price reductions. This plan would provide a basis for developers to design and propose competing, shared transmission proposals that could potentially meet some or all the needs of later projects.

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

The response to question 3 explains why wholesale markets do not enable project financing at this time. In addition to the design of the capacity market favoring low capital cost, high variable cost resources like new gas generators, the ISO market design also does not recognize that RPS policies in place in five of the six New England states are highly effective, successful *market-based* policies that incentivize growth of new renewable energy capacity to meet the region's energy needs. Even if the ISO capacity market design did provide its long-term revenue lock in to renewable generators, the ISO deems revenue from competitive state procurements to be "out of market" so resources that have state contracts face significant barriers to qualify in the capacity market.

During the Integrating Markets and Public Policy process at NEPOOL, RENEW advanced a proposal for a Forward Renewable Capacity Market (FRCM) to establish an efficient solution to achieving state public policy goals and identifying the associated transmission needs. A FRCM would be a compatible enhancement to the existing Forward Capacity Market with commitments that could be made through a competitive auction-based central procurement administered by ISO New England with the states responsible for agreeing on and establishing the FRCM auction total requirements, including resource types, and any clearing conditions. Results of the FRCM auction could also establish transmission needs driven by public policy requirements.

Should another effort be launched to reform the ISO New England markets to enable renewable energy resources to secure commitments under the ISO Tariff rather than through long-term contracts, it would take many years for the reforms to clear the stakeholder process and gain FERC approval assuming that stakeholders could even agree on those reforms. Due to this uncertainty, Massachusetts should not expect to replace anytime soon its highly successful model of long-term contracting for energy and RECs.

RENEW does observe that legislation has been proposed to give communities the ability to enter into long-term contracts directly with offshore wind developers in a way that would help enable project financing. If passed, this community empowerment legislation (SD 2098/HD 3717) could allow developers to increase the capacity of proposed projects. It would be complementary to contracting by the distribution utilities but certainly not a replacement for contracting to due to the small scale.

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

With Fixed REC-only contracts, developers and investors face exposure to the volatile energy market and must make a higher risk investment and correspondingly demand a higher rate of return reflected in higher financing charges and other risk-related considerations for ratepayers. A "Market OREC" or "OREC contract-for-differences (CFD)" unlike a Fixed REC could enable financing of projects with lower risk to developers and therefore lower cost to consumers. Under a Market OREC approach, a project bids an OREC (MWh) price and receives that price from the distribution companies (utilities). Once operational, a project (or a designated party) sells the energy, capacity, RECs, and any other products generated by the project into the market. The revenues from the sale of these products are applied against the OREC price with the difference netted by ratepayers. In other words, ratepayers either get a credit or debit for the difference between the OREC price and total revenues from those products sold in the market.

While New York's pending RFP is seeking proposals having bids for Fixed and Indexed ORECs and this approach is workable for developers,[4] the NYSERDA Options Paper

[4] An Index OREC pays the difference between the project's winning bid price (expressed as an all-in revenue amount) and the average commodity market price as expressed in a market index or composite of indices. This structure could address jurisdictional (federal supremacy over state law) concerns potentially created by a Market OREC by avoiding a link between premium payments and the project's actual commodity sales.

explained how the bundled contract (energy and RECs) is better for consumers. This bundled approach originated in Massachusetts with the 2008 Green Communities Act. As the NYSERDA Options Paper details, the Massachusetts procurement model is still the standard to beat. Although New York has maintained the REC-only structure, other states like Connecticut and Rhode Island adopted the Massachusetts approach for their renewable energy procurements for its benefits to consumers.

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.**

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

    Competitive wholesale electricity markets, like any other commodity market, set prices based on the most expensive resource necessary to meet demand. With renewable resources having little operational costs and no fuel costs- they are among the cheapest resources to operate- their output is generally sold into energy markets at a price near zero. They thus reduce wholesale clearing prices in the energy market by making it unnecessary to dispatch more expensive resources with higher operational and fuel costs.

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

    See the response to question 4. States should not have to "pay twice" for capacity when all or a portion of new renewable energy capacity is excluded from the ISO New England capacity market.

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

RENEW is not aware of any consequences for existing non-emitters. For example, according to ISO-NE reliability studies relating to the SEMA/RI zone, the fact that up to 5370 MW of offshore wind could be interconnected at low cost should mean that congestion and curtailment of resources in that zone will not pose a problem to existing wind and solar resources.[5]

[5] Presentation, ISO New England, 2016 Economic Studies Preliminary high-level order of magnitude transmission development costs 18 (January 18, 2017), https://www.iso-ne.com/static-assets/documents/2017/01/a6_2016_economic_studies_preliminary_high_level_order_of_magnitude_transmission_development_costs_scenario_6_update.pdf

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

The Massachusetts legislature in 2018 accelerated the RPS based on the need for more renewable energy resources to meet the Global Warming Solutions Act requirements and to ensure that, as new resources connect to the grid, REC prices do not collapse to the detriment of existing off-contract renewable resources that rely on REC revenue to remain economic and are needed to maintain the baseline of non-emitting resources. At first glance one would think oversupplying RECs in the long term by not accelerating the RPS will lower costs by suppressing REC prices. A 2017 study, however, shows that it does not result in huge RPS compliance cost savings as utilities sell RECs for large loss and place costs on ratepayers.[6] Oversupply also shuts down some existing renewable resources and will require more GHG emitting natural gas generation to enter service. Over the next several legislative sessions, the legislature might need to revisit the issue of whether the 2018 RPS acceleration is enough to keep pace with the level of new resources obtaining contracts.

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

New England is dangerously dependent on natural gas imports for electric power generation with half the electricity generated in the region relying on this one fuel. While the region has a surplus of generation capacity, the natural gas infrastructure is not always adequate to deliver all the fuel needed for both heating and power generation during winter. the region has limited dual-fuel generating capability, with emissions restrictions on burning oil; coal, oil, and nuclear power plants, which are needed to maintain reliability when natural gas is in short supply, are retiring. As more older power plants retire, the region's reliability will continue to decrease if natural gas if the ISO New England market rules favor natural gas over renewables for new power plants.

In December 2018, ISO New England's System Planning Department conducted a high-level assessment of the effects offshore wind would have had on the power system and region under conditions similar to the cold weather in late December 2017 into early January 2018.[7] The assessment considered production costs, environmental emissions, fossil fuel savings, and electricity prices. The ISO concluded that offshore wind would have displaced significant amounts of fossil fueled generation. This would have reduced wholesale energy prices, increased reliability by lowering the demand for natural gas on the constrained pipeline system and lowered emissions.

[6] Sustainable Energy Advantage and Synapse Energy Economics, *Increasing the Connecticut Renewable Portfolio Standard* (September 25, 2017), http://www.synapse-energy.com/sites/default/files/Increasing-the-Connecticut-Renewable-Portfolio-Standard-17-070_0.pdf

[7] Memorandum, ISO New England, High-Level Assessment of Potential Impacts of Offshore Wind Additions to the New England Power System During the 2017-2018 Cold Spell (December 2018), https://www.iso-ne.com/static-assets/documents/2018/12/2018_iso-ne_offshore_wind_assessment_mass_cec_production_estimates_12_17_2018_public.pdf

10. **Is an additional 1600MW of solicitation(s) the appropriate target? Why or why not?**

RENEW supports a procurement requirement higher than 1600 megawatts to further the Commonwealth's economic development objectives and for the industry to reach economies of scale for long-term reductions in the levelized cost of energy.

A study conducted by BVG Associates Limited, the results of which are documented in its 2017 report "U.S. Job Creation in Offshore Wind" prepared for the Massachusetts Clean Energy Center and some neighboring states, concludes that European factories have capacity to export turbines to supply a single 400 to 500-megawatt project each year.[8] The study revealed that a 4,000-megawatt offshore wind build-out results in a low probability of turbine assembly local to the projects while an 8,000-megawatt buildout (800 megawatts each year for 10 years) increases the likelihood to medium.

Transmission

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

RENEW supports transmission development policies most likely to enable deployment of offshore wind at the lowest cost and risk to ratepayers. In addition to a generator being able to provide its own lead line to shore, RENEW supports further exploration of other forms of competition for transmission projects to serve multiple offshore wind projects. Expandable Transmission Networks (ETN), in which several offshore wind farms connect to a single or multiple offshore substations, could prove to be another other form of cost-effective transmission.

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

Based on the Independent Evaluator Report on the first Section 83C solicitation, uncertainties associated with the quantitative evaluation of ETNs and the potential for significant stranded costs were issues that would need to be resolved if ETNs are to be competitive in future solicitations. For this reason, RENEW suggests further study of ETNs.

The ISO New England Loss-of-Source limit for interconnection of new generation and elective transmission upgrades ("ETUs") also applies to ETNs. The limit prohibits more than 1,200 megawatts of generation resources to be interconnected to a single radial transmission line. ISO-NE Planning Procedure 5-6 Appendix A, General Transmission System Design Requirements for the Interconnection of New Generating Facilities and ETUs to the Administered Transmission System, states that the interconnection must be designed so that, "with all lines initially in service, there is no normal design contingency or common mode transmission system, station, or

[8] BVG Associates Limited, U.S. Job Creation in Offshore Wind (October 2017), https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/US-job-creation-in-offshore-wind.pdf

internal plant failure" that will result in a net loss of more than 1,200 megawatts of generating resources. Consideration of ETNs will need to acknowledge the ISO New England 1,200-megawatt limit and that ETN's of more than 1,200 megawatts could not be requested in any solicitation.

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

As the Commonwealth moves ahead in considering future RFPs for another 1,600 megawatts of offshore wind, RENEW recommends the Department review the Massachusetts Clean Energy Center's prior work to evaluate whether refinements are necessary to the previous RFP for concerning the types of shared transmission proposals that could be considered in future RFPs in addition to bids with single generator lead lines.

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

Planning transmission to serve gigawatts of multiple large-scale renewable energy projects having contracts with multiple states may lower the all-in delivered cost of remote renewables and should be explored further. The review should also include the need for possible land-side transmission upgrades.

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)?**

RENEW has no comment.

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

Regional supply chain development, economies of scale, operational experience and larger turbines will reduce the levelized cost of energy for offshore wind and its premium over other large-scale renewable sources deployed on land.[9]

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?**

The Section 83C requirement that the levelized price for subsequent procurements be lower than the equivalent cost of offshore wind generation procured under prior solicitations should

[9] Sustainable Energy Advantage, LLC, *Northeast Offshore Wind Regional Market Characterization* 16 (October 2017), https://www.nyserda.ny.gov/-/media/Files/Publications/Research/Biomass-Solar-Wind/Master-Plan/Northeast-Offshore-Wind-Regional-Market-Characterization.pdf

not continue into the next 1,600 megawatts of offshore wind procurements. As the first Section 83C winning price is near parity with onshore wind and solar resources and even the cost of new combined cycle natural gas generation, the declining price requirement has proven to be unnecessary. Rather, DOER should take a comprehensive view of bids to allow for increased economic development opportunities.

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?**

    According to ISO-NE reliability studies relating to the SEMA/RI zone- where today's projects are planning to interconnect- and the ISO New England 2016 Economic Study, interconnection requirements for offshore wind are expected to be neither complicated nor costly. The ISO finds that with careful selection of Points of Interconnection, up to 5370 MW of offshore wind could be added to the system without the need for major transmission upgrades.[10]

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? If so, what potential economic benefits to the Commonwealth may result if OSW supply chain services are located in MA?**

17. **Are there certain services or products in the OSW supply chain that are more likely to locate in the Commonwealth than others?**

18. **Are there actions, outside of additional OSW procurement(s), that the Commonwealth should consider to secure OSW supply chain services are located in MA? Please explain.**

    RENEW's response to these questions is contained in its response to question 10 which cited the 2017 report "U.S. Job Creation in Offshore Wind" prepared for the Massachusetts Clean Energy Center and some neighboring states as the scale of procurement needed to maximize the economic development benefits of offshore wind. The report also provides detailed information on the types of jobs expected to be created to support offshore wind development.

[10] ISO New England, *supra*, note 5.

Regional Coordination

19. **Should Massachusetts coordinate with other states in any future solicitations of OSW?**

    Massachusetts should be supportive of coordination with other states on offshore wind procurement. It could take of the form of loose coordination as with Rhode Island piggybacking on the first Section 83C RFP or a joint multistate RFP.

20. **What are the advantages or disadvantages to coordinating?**

    Coordination among Northeast states could improve transmission upgrade efficiency. It could help provide the scale of offshore wind development needed to maximize the economic development benefits of offshore wind and and for the industry to reach economies of scale for long-term reductions in the levelized cost of energy.

Other

21. **Please provide any other comments pertain to the necessity, benefits and cost of additional OSW procurement(s)?**

    RENEW recognizes that offshore wind projects must be developed with strong, and reasonable, protections in place to protect our coastal and marine environment and wildlife, especially vulnerable species like the endangered North Atlantic right whale. Individual RENEW members will provide specific recommendations for ensuring projects avoid, minimize, and mitigate environmental impacts during all stages of development which will allow for project development to proceed in an economically reasonable and environmentally appropriate manner.