Orsted and Eversource Investment LLC
Joint Response to

DOER Request for Stakeholder Comment:
Offshore Wind Additional Procurement Study

March 1, 2019

Respondent Information

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

RESPONSE: These comments are provided by Orsted and Eversource Investment LLC ("Eversource"). Contact information is as follows:

Fred Zalcman
Head of Government Affairs
Orsted North America, Inc.
100 Oliver Street, Boston MA 02110
frzal@orsted.com

Patrick Smith
Vice President
Transmission Business Development
Eversource Energy
107 Selden Street
Berlin, CT 06037
Patrick.Smith@eversource.com

---

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

RESPONSE: Orsted and Eversource are the joint venture owners of Bay State Wind LLC and Revolution Wind LLC, two offshore wind development entities eligible to participate in Massachusetts' Section 83C offshore wind procurements.

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?

RESPONSE: Yes. The OSW industry is developing rapidly in response to state-level market demand along the U.S. East Coast, including Massachusetts' groundbreaking commitment to support 1,600 MW by 2027. However, a sustained, stable and significant commitment to procurement of OSW will be required in order to maintain this momentum and encourage industry participants to make the necessary investments in a domestic supply chain, specialized infrastructure, workforce development and other hallmarks of a mature industry.

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?

RESPONSE: Longer-term PPA's are more congruent with the useful life of the OSW asset, which is typically 25-30 years. This has several advantages. First, a longer contract tenor minimizes the developer's merchant risk exposure over the life of the asset. This enables developers to offer ratepayers a lower price reflective of the lower risk premium associated with a fixed long-term offer. Second, Massachusetts' "pay-for-production" approach incentivizes developers to maximize project up-time and production over the tenor of the contract. A longer PPA period will facilitate Massachusetts' ratepayers receiving the project benefits over the majority of the project's lifetime. Ratepayers are given a long-term hedge against future market volatility and energy price increases. Further, longer term contracts enable Massachusetts to claim the RECs, embodying the environmental benefits of the output from these facilities, over a longer period of time.

Under shorter-term contracts developers must adjust their return expectations to factor in the higher risk exposure, raising the ultimate price charged to ratepayers.

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?

RESPONSE: See answer to 3 above. Developers need demand certainty at this early juncture in the industry's maturation. A transparent, defined, and continuous procurement cycle is crucial to industry growth and cost minimization. It should be borne in mind that OSW projects require significant upfront capital investment and the permitting process is complex and relatively untested. As a consequence, there is considerable developer risk inherent in the project development cycle at this stage of the industry and state clean energy authorities should avoid exacerbating this by exposing OSW to additional regulatory uncertainty.

Eventually, OSW should be able to compete head-to-head with other renewable technologies *provided* such procurements adequately weight the relative local economic development benefits, reliability benefits and costs of all technologies.

---

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?

RESPONSE: See response to 3.a., above. The current limitations on the ability of OSW developers to rely on wholesale market revenues alone turns more on the uncertainty, tenor and variability of these revenue streams than about the sufficiency of estimated lifetime revenues.

In particular, revenue opportunities in the Capacity Market are limited and can be significantly improved. Changes to the ISO New England Forward Capacity Market rules, which currently are disadvantageous to renewable resources like Offshore Wind, would further support development of new OSW Projects in Massachusetts. The biggest challenges to new OSW Projects' opportunities for revenue in the ISO-NE Capacity market are the sunsetting of the Renewable Technology Resource (RTR) exemption and the method in which Offer Floor Prices (OFP) are calculated. Additionally, the recent establishment of a Substitution Auction (SA) for renewable resources as part of ISO-NE's CASPR initiative, intended to mitigate these structural disadvantages for renewable resources like OSW, are wholly insufficient.

---

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

RESPONSE: Yes, certain states have adopted other forms of financing to achieve their OSW procure goals. However, a fully-bundled power purchase agreement is the optimal arrangement as it provides developers with a

fully hedged long-term revenue stream and thus minimizes the risk premium borne by ratepayers; while at the same time providing electricity consumers with security against volatile and escalating power prices in the future.

Ultimately, Orsted and Eversource continue to support the PPA construct for procurements beyond the initial 1,600 MW. This approach has enjoyed considerable success in New England in bringing renewable energy projects on-line at least cost to ratepayers. And, as noted, it provides the "perfect hedge" in the form of a long-term financial commitment with a creditworthy counterparty, minimizing developer financing risk premiums and enabling lower prices being offered 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 market you are referring to.

RESPONSE: Additional OSW procurements would, generally speaking, add low cost supply to the ISO New England wholesale markets which could displace older, inefficient generation. This could result in lower energy prices which would be reflected in customer electric costs. Additional OSW procurements may also lead to more supply in the ISO New England Capacity Markets if resources clear in an auction. More overall capacity supply would result again in lower wholesale capacity prices thereby lowering customer electric costs.

---

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

RESPONSE: No, additional offshore wind procurements would not impact the wholesale market position of other low/no emission resources specifically.

---

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

RESPONSE: Generally, increased supply of RECs via additional OSW procurement unaccompanied by any corresponding increase in demand for RECs should lead to an oversupply situation which would typically result in lower REC prices. However, the Massachusetts legislature responded last session to projected oversupply by increasing the Class1 RPS requirement. Policymakers should continue to monitor the supply/demand balance to encourage renewable energy growth and diversity consistent with state greenhouse gas reduction goals and other objectives.

---

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

RESPONSE: As recognized by Section 83C, OSW can be beneficial in enhancing system reliability to address winter peaks. OSW will help insulate New England ratepayers from winter electric price spikes by reducing thermal generation in New England. Throughout the U.S., fluctuations in seasonal temperatures and extreme weather patterns have resulted in unexpected constraints to current infrastructure. Due to the retirement of non-gas generation (i.e., coal and nuclear) this dynamic is only expected to worsen.

An analysis conducted for BSW by Levitan and Associates Inc. (LAI) found that reduction in winter peaks ascribable to 400 MW of OSW will result in estimated savings to Massachusetts ratepayers of over $150 million per year.[1]

---

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

RESPONSE: Yes, a minimum of an additional 1,600 MW target by 2027 would provide the industry with the signal that Massachusetts will continue to support the development of OSW. With 800 MW already contracted, and the potential for another 800 MW to be solicited and procured as early as 2019, it is imperative that additional capacity be committed to so as to avoid a deployment "cliff" and the discouragement of further development activities. An incremental 1,600 MW will support ongoing pre-development and site characterization within the established federal lease areas potentially serving the Massachusetts market, and will encourage continued investment in a MA-based supply chain.

Absent a strong market signal, Massachusetts risks its first mover advantage. Since the passage of 83C in 2016, both New York (9,000 MW by 2035) and New Jersey (3,500 MW by 2030) have adopted more aggressive OSW targets. Further, legislation is being considered in Connecticut and Maryland that would establish or expand authority for OSW procurements at or near the existing levels in Massachusetts. Individually and collectively, this recent procurement authority could eclipse Massachusetts' leadership position and impair its ability to attract suppliers and service providers.

Transmission

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

RESPONSE: The full scope approach[2] has proved to be an efficient, cost-effective and low risk way to interconnect offshore wind (OSW) generation to the onshore grid. OSW developers are highly proficient at designing and constructing offshore transmission, having constructed ~8GW to date in the UK, and are on track to construct a further +13 GW in the US, UK and Taiwan by 2025.

Furthermore, the full scope approach allows developers to optimize the size, design and lifetime of the highly interdependent generation and transmission assets allowing them to design and operate a whole that is more than the sum of its parts. Removing the offshore transmission scope from OSW developers effectively forces them to design the wind farm according to the specifications of the transmission assets; it is the equivalent of the tail wagging the dog.

Indeed, experiences from Germany, the largest market employing a coordinated OSW transmission network, highlights some of the risks that this approach entails as the transmission developer responsible for building Germany's coordinated OSW transmission network:

- experienced significant cost overruns, the worst reaching almost 100 percent;
- struggled with grid connection delays of 6-24 months (with an average of 12 months);
- had to compensate offshore wind developers to the tune of $4bn due to lost revenues

While much of the empirical evidence favoring the full scope approach comes from the extensive record in Europe, the full scope approach is proving itself to be a superior option from early experience in the U.S. as well. The full scope approach yielded an incredibly competitive OSW price in the Commonwealth's first OSW RFP. Further, the Massachusetts Evaluation Team also evaluated a coordinated OSW transmission network, known as an Expandable

[1] Levitan & Assoc., "Contribution to Reducing Winter Price Spikes of the Bay State Wind Project", October 2017. These estimated savings assume that OSW is incremental to the deployment and does not otherwise displace other Class I RPS eligible resources (confidential study previously provided to DOER Section 83C Evaluation Team).

[2] By full scope is meant that developers are responsible for designing and constructing both the offshore wind farm and the transmission assets that connect the wind farm to the onshore grid.

Transmission Network ("ETN"), concluding that a coordinated OSW transmission network imposes needless risk on ratepayers.

> *"Based on extensive discussion, it appears that the Selection Team members agree that the concept of an ETN is not viable and therefore it is inappropriate to burden customers with the risks associated with the future cost recovery"* (Eversource Energy letter to Judith Judson, Commissioner of the Massachusetts Department of Energy Resources)
>
> *"Although a variety of ETN proposals were evaluated, uncertainty regarding the degree to which they would be subscribed in the future created a range of evaluated results. Unitil recommends not pursuing ETN proposals due to the risk of such facilities going unused and becoming stranded costs."* (Unitil letter to Judith Judson, Commissioner of the Massachusetts Department of Energy Resources)

This risk of "unused" transmission assets was in part driven by the fact that the federal OSW lease areas are spread out over a vast geographical footprint (an area that has effectively doubled in size since the 83C RFP with the successful BOEM lease auction in late 2018), making it difficult to *ex ante* design a coordinated OSW transmission network that works for all future OSW projects.

Finally, by maintaining the first Massachusetts RFP's regulatory framework OSW developers are left free to partner with third party transmission developers where it may make sense. The key thing is to leave this up to the OSW developers. In that way third party expertise can be brought in where it is deemed necessary, harvesting any benefits without incurring the disadvantages of a forced *ex ante* planned coordinated OSW transmission network.

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

RESPONSE: As noted above we do not believe that the purported advantages of a coordinated OSW transmission network outweigh the disadvantages and would therefore suggest not changing the highly successful OSW RFP framework that Massachusetts has put in place.

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

RESPONSE: Please see our response to 11.a above.

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

RESPONSE: As noted in our response above we do not believe that a coordinated OSW transmission network is required to "support" offshore wind development. Offshore wind developers have proven time and time again that they are highly capable of successfully designing and constructing offshore transmission systems.

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)?

RESPONSE: Absent further action by Congress, the federal Investment Tax Credit is scheduled to step down to 12% for 2019 qualified investments and thereafter expire for all equipment that does not meet the ITC safe harbor requirements. All else equal, this will require higher pricing in order to offset the loss of federal leverage.

---

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

RESPONSE: Offshore wind costs have declined by more than 50% over the past 6 years, driven largely by technology improvements, scale economies and standardization. These technological improvements and other

factors will continue to translate into cost reduction, particularly in emerging markets such as the U.S. For example, economies of scale associated with wind turbine generators (WTGs) has been a major driver of cost reductions in Europe, and there is every reason to believe that these economies have yet to be fully exploited. Major WTG manufacturers are bringing onto the market new models in excess of 10 MW demonstrating greater conversion efficiency and lower fixed cost per unit of production. Other major components including foundations, export cabling, offshore substations are similarly projected to decline in costs as part of a virtuous cycle – greater global volume leads to investment and innovation, which in turn results in further cost reduction.

Apart from these technological improvements, other factors should contribute to a downward trajectory in pricing, particularly in maturing markets such as the U.S. These factors include, but are not limited to:

- The availability of Jones Act compliant installation vessels that will result in more optimal logistical solutions for the staging and construction of wind farms;
- The redevelopment and revitalization of fit-for-purpose U.S. ports can reduce development costs;
- The growth of a U.S.-based supply chain will avoid price premiums associated with overseas transport of major equipment typically now only found in Europe or Asia; and
- Workforce training should lead to a ready supply of skilled U.S.-based labor for deployment in an ever-increasing scope of construction, operation and maintenance activities.

---

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?

RESPONSE: The U.S. offshore wind market is evolving rapidly and the conditions that gave rise to the statutory requirement "hard wiring" price declines in each successive bid round no longer exist today. Specifically, the U.S. offshore wind market has been marked by the entry of several new, experienced and well-capitalized developers. The first procurements in Massachusetts, and the New England region more generally, demonstrate robust price competition. Few anticipated that the U.S. market would so quickly approach market clearing prices more reflective of the more mature markets in Europe. Moreover, this competition will only intensify in future bid rounds and ensure that ratepayers receive the lowest cost/highest value offers from the market.

Indeed, rather than protecting consumers and ensuring the orderly development of the U.S. offshore wind market, a statutory price decline may act as a barrier to future growth. Factors outside the direct control of developers, including policy changes such as the decline and eventual elimination of the Federal Investment Tax Credit, will make it difficult if not impossible for developers to better the winning bid price in the first Massachusetts auction. If this binding constraint on bid acceptance is not relaxed for the second round, Massachusetts could well lose out to neighboring states (which have no artificial cap on price), eroding the Commonwealth's hard won first mover advantage.

BSW encourages DOER to explore options for flexibly administering the price cap mandate. One option would be for DOER to extend the life of the contract from 20 to 25 years or longer as a means of reducing the unit cost per MWh procured. Another option would be to relax the emphasis on early COD, allowing developers the ability to forward price their bids based on expectations of technological improvement. If DOER determines that it is not afforded such flexibility, the Administration should support a timely legislative fix, such as embodied in several bills introduced this session.

---

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?

RESPONSE: No, there should not be a be a particular focus on specific development areas and/or transmission interconnection points to relieve future reliability constraints. Placing restrictions on developers will not best serve customers because offshore wind solutions will not be optimized. Similar to requiring the use of an offshore transmission network, limiting developers to certain Points of Interconnection (POI) effectively forces them to

design the wind farm according to the specifications of a potentially non-optimal POI. It is another example of the tail wagging the dog.
Additionally, the ISO-NE interconnection process is not conducive to such constraints. Focusing POIs to certain areas would likely result in developers seeking queue positions at the same node, thereby leading to inefficiencies and confusion in determining the likely upgrades needed to interconnect.