REVIEW OF TERMS AND CONDITIONS FOR LONG-TERM CONTRACTS FOR RENEWABLE OCEAN ENERGY

Presented to:

GOVERNOR'S OFFICE OF ENERGY INDEPENDENCE AND SECURITY FOR THE STATE OF MAINE

Prepared by:

BOSTON PACIFIC COMPANY, INC.

Craig R. Roach, Ph.D.
Vincent Musco
Sam Choi
Boston Pacific Company, Inc.
1100 New York Avenue, NW, Suite 490 East
Washington, DC 20005
(202) 296-5520

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I. INTRODUCTION AND SUMMARY

As required by Public Law,[1] the Governor's Office of Energy Independence and Security for the State of Maine ("OEIS") is required to undertake a review of terms and conditions for long-term contracts for Renewable Ocean Energy Projects. The OEIS is required to make recommendations to the Maine State Legislature, Joint Standing Committee on Energy, Utilities and Technology regarding terms and conditions for long-term contracts for installed capacity and associated renewable energy and renewable energy credits ("RECs") produced by Renewable Ocean Energy Projects. Renewable Ocean Energy Projects include offshore wind power projects with aggregate generating capacity of 3 MW or more, community-based offshore wind energy projects, hydropower projects that use tidal or wave action as a source of electrical or mechanical power, and other projects that produce electric or mechanical power solely through the use of wind, waves, tides, currents, ocean temperature clines, marine biomass, or other renewable sources in, on, or over Maine's coastal waters.[2]

Boston Pacific Company, Inc. was retained to prepare this Review of Terms and Conditions for Long-Term Contracts for Renewable Ocean Energy (hereafter "Ocean Energy Review"). The Ocean Energy Review will assist the OEIS in developing recommendations to the Maine Legislature regarding long-term contracting opportunities and their effect on the development of Renewable Ocean Energy Projects in Maine. As required in developing the Ocean Energy Review, Boston Pacific paid particular attention to: (1) risks to ratepayers associated with fossil fuel price volatility over the next 20 years; (2) Maine's goals for the reduction of greenhouse gas emissions; (3) Maine's wind energy generation goals under Title 35-A, section 3404, subsection 2; and (4) other potential benefits attributable to the development of offshore wind, tidal, and wave energy projects, including but not limited to public health, job creation and other economic benefits and energy security.

Boston Pacific takes as a given the aggressive goals that the Maine Legislature has set for ocean resource development, and we acknowledge that a recent study found significant potential for offshore wind development in Maine. We feel it is important, however, to note from the start that offshore wind projects at present have very high costs as compared to other power production technologies. For example, regarding capital costs, a study issued by the National Renewable Energy Laboratory (NREL) indicated that offshore wind projects announced for 2012 and beyond have capital costs, on a capacity-weighted basis, in a range between $4,000 and $4,500/kW in 2008 dollars.[3] In another report by the Bureau of Ocean Energy Management Regulation and Enforcement, four European projects with online dates in 2012 had capital costs ranging from approximately $4,100 to $4,900/kW.[4] In comparison, our own in-house estimation of the capital costs for a natural gas-fired, combined-cycle unit is $1,000 to $1,200/kW.

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[1] Chapter 615, 124th Legislature (S.P. 710 – L.D. 1810 – *An Act to Implement the Recommendations of the Governor's Ocean Energy Task Force* §A-7).

[2] For the full text of the definition of renewable ocean energy project, see Maine Revised Statutes, Title 12, §1862, 1.F-1.

[3] National Renewable Energy Laboratory, "Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers," September 2010, page 109. Available at http://www.nrel.gov/wind/pdfs/40745.pdf.

[4] Bureau of Ocean Energy Management Regulation and Enforcement, "Offshore Wind Energy Installation and Decommissioning Cost Estimation in the U.S. Outer Continental Shelf," November 2010, page 135.

Such high capital costs for offshore wind can also translate into a high cost of electricity over a project's life. For example, NREL estimates the levelized cost of energy (LCOE) of a hypothetical offshore wind farm based on available cost data on projects with on-line dates between 2010 and 2015. NREL's estimate of the LCOE includes sensitivities on capital costs, discount rates, and wind speeds that result in a LCOE range between $110/MWh to $400/MWh.[5] We note that, as a matter of caution, such a wide range in LCOE is attributed to the lack of commercially operating offshore wind projects in the United States.

Nonetheless, this cost disadvantage of offshore wind would have to be offset by high natural gas prices, and/or high air pollution emission prices, if offshore wind is to offer cost savings to Maine ratepayers over time. Today, with the Shale Gas Revolution bringing the price of natural gas down significantly, and low prices from RGGI, closing that gap would be difficult. This does not mean that the cost of offshore wind cannot come down or that natural gas prices are unlikely to go up, it is just meant to state an honest caution on costs from the start. More importantly, the cost comparison motivates many of our ten recommendations which are listed below.

- One, use competitive procurement to minimize the cost to Maine ratepayers.
- Two, use strict pay-for-performance contract terms to minimize risks to Maine ratepayers of cost overruns and poor performance.
- Three, use an application process whereby an interested applicant is required to demonstrate the technical, financial, and environmental viability of its proposed project.
- Four, require applicants to submit a detailed cost-benefit analysis of their project, focusing on net economic, environmental, and ratepayer impacts.
- Five, create a carve-out in Maine's Statutes for RECs specifically for Renewable Ocean Energy Projects, sometimes called Ocean Energy Renewable Energy Credits ("ORECs").
- Six, develop long-term contracts to purchase only ORECs, not electric energy or other electric products.
- Seven, include a Rate Impact Limit, as Maine did in its pilot RFP, thus protecting Maine's ratepayers from excessive costs of ORECs.
- Eight, with respect to pay-for-performance terms, state that the OREC provider will only be paid for ORECs actually produced, thus putting the operating risk on the OREC provider and not on Maine ratepayers.
- Nine, also related to pay-for-performance contract terms, require suppliers to pay liquidated damages if they do not perform as contracted and set milestones for project development.
- Ten, issue by January 1, 2014 an RFP for 300 MW of offshore wind only. This would allow sufficient time for thorough bid preparation, while also allowing time for detailed bid review and construction in time to meet Maine's 2020 goal of 300 MW of offshore wind.

[5] National Renewable Energy Laboratory, "Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers," September 2010, page 117-118

II. USE COMPETITIVE PROCUREMENT INCLUDING A PROCESS TO ASSESS PROJECT VIABILITY

It is essential that the best projects are selected to meet the State's goals so, at the outset we recommend that a competitive procurement be used. As part of the procurement, we recommend that any entity interested in developing an offshore energy project off the coast of Maine be required to submit an application with sufficient documentation that will allow the State to assess the viability of the project. Furthermore, we recommend that an evaluation process be established that involves several steps:

1. Pre-screening of applications
2. Opportunity for applicants to cure deficiencies
3. Approve applications that have met a minimum threshold
4. Evaluate applications to determine viability
5. Recommend projects that demonstrate viability

The first step in the evaluation process is a pre-screening of applications to determine whether applications have met a minimum threshold. That is, a level that shows that the applicant has a credible proposal. The significance of this step is to filter out proposals that are not at the stage of development that would allow for a proper evaluation to be performed. Typically, for projects that are seeking to obtain an offtake agreement, we expect to see (a) a resource study that supports generation output estimates, (b) contracts and/or studies that support capital and operations and maintenance cost assumptions, and (c) similar types of documents to support other assumptions.

For example, an application for an offshore wind project would have to include certain key documents such as the following:

- Wind resource and energy assessment by a reputable wind energy consultant
- Engineering, Procurement, and Construction ("EPC") or Balance of Plant ("BOP") contracts; memoranda of understanding ("MOUs") or feasibility studies if contracts are not available
- Turbine Supply Agreement or MOU to supply proposed wind turbines
- Operations and maintenance plan
- Decommissioning plan
- Financial model
- Audited financial statements
- Letters of intent to provide financing/investment
- Market price projections
- Management resumes and bios
- Staffing plan
- Permitting plan and schedule
- Environmental compliance plan
- Site control documents (e.g., commercial leases, right-of-ways, easements)

Before applications are submitted, we suggest creating a checklist to record whether the requested documents are provided in an application. In addition to nominally checking the documents received, the checklist should indicate how applicants are deficient in their submissions. Applicants may submit all of the requested documents, but some documents may be lacking in content or depth to extract any useful information. For example, a permitting plan and schedule might only include a list of permits that need to be obtained without an explanation of the status or progress of specific permits. Clearly, the permitting plan and schedule lacks the content needed for evaluation, and as a result, would be considered deficient.

The second step in the evaluation process is to allow for applicants that were deemed to be deficient in their submissions to rectify their application within a specified timeframe. For applicants that do not correct their deficiencies, their applications are deemed to be non-conforming and therefore eliminated from the evaluation process.

The third step in the evaluation process is to approve applications that have met the minimum threshold requirements. Applicants should be provided with a formal notification indicating such a decision.

The fourth step in the evaluation process is to conduct an evaluation of the conforming applications by a set of criteria to judge the viability of the proposed project. We believe that the criteria chosen, when applied, should result in a project that will be constructed, operated, and decommissioned successfully. The criteria should cover all areas of a project's lifecycle, including development, permitting, financing, construction, and decommissioning.

While applying the criteria, we recommend following a grading system that allows for a straightforward comparison of projects. A binary approach to grading, which allows the evaluator to assess a project against a criterion by a simple "yes" or "no," would be the most objective, but we understand that there are many degrees by which a certain aspect of a project can be evaluated. Therefore, we feel that it is important to identify any risks associated with a particular part of the project. For example, a proposed turbine could be certified, have a significant commercial operating history, and be supplied by a leading manufacturer. However, if the turbine manufacturer was going through financial trouble that could jeopardize the servicing of the turbines or the acquisition of spare parts, we would point that out as a risk.

The final step in the RFP evaluation process is to recommend the project(s) that should be selected to meet the State's targets. Maine has targeted the development of 300 MW of offshore energy resources by 2020. Based on the targeted amount, the construction of only one offshore wind farm could meet that goal, and the ratio of the number of applications received to the number of applications selected could be high. In this case, the entity that ultimately selects the winning applications would have to carefully weigh which project(s), deemed to be viable, can meet the State's goal at the lowest cost and risk to ratepayers. We believe that this only stresses the importance of having a comprehensive and reliable evaluation methodology that selects the best projects.

III. REQUIRE A COST-BENEFIT ANALYSIS

In addition to determining the technical and economic feasibility of a project, we recommend that a cost-benefit analysis be submitted for each project. The cost-benefit analysis will allow Maine stakeholders to determine whether the project is aligned with their interests and can be used as a tool in aiding the selection of the winning application. We view the cost-benefit analysis as consisting of the following parts:

- Net ratepayer impact
- Net economic impact
- Net environmental impact

The Applicant will submit its own cost-benefit analysis along with its application. Similar to the requirements for determining a project's viability in the previous section, we would require applicants to provide supporting documentation for all assumptions and calculations of their cost-benefit analysis. We would expect that the cost-benefit analysis shows each cost and benefit for each year of a project's useful life, which results in a total net benefit calculation. Below, we describe the three components of the cost benefit analysis.

Net Ratepayer Impact

The net ratepayer impact of a project is the degree to which ratepayers will be paying a premium or enjoying a cost savings as compared to market prices over a project's life. Applicants should submit with their application a forecast of the total annual revenue requirement of their project. The forecast of the total annual revenue requirement should be compared to a forecast of energy prices in ISO New England. On a net present value basis over a project's life, if the total annual revenue requirement is less than market cost, the project would demonstrate a net benefit to ratepayers. And vice-versa; if the total annual revenue requirement is greater than market cost, the project would demonstrate a net cost to ratepayers.

Net Economic Impact

With the financing, capital expenditures, and operations expenditures of the project, it is expected that there will be some economic benefits for the State of Maine. These benefits can be generated from the number of jobs created during the various phases of the project's life. The dollar value benefit from those jobs are derived from their associated wages and resulting economic output. Also, revenues from taxes can be included as an economic benefit.

In order to calculate the net economic impact of the project, we would require Applicants to use a widely used and industry accepted input-output model. All of the inputs to the model should be derived from assumptions in the application. For instance, the input for capital expenditures should be the same assumption used in the applicant's financial model and backed up by supporting documentation. We also expect the applicant to substantiate the percentage share for all expenditures that are local to Maine. For the output of the model, the results should be displayed by the number of jobs created during construction and operations of the project, including the dollar value of resulting wages and economic output from those jobs, and taxes.

However, if the net ratepayer impact is negative, the possible negative job and economic impact must be netted out.

Net Environmental Impact

Environmental benefits are determined by a reduction in emissions caused by the generation output of a project. In the case of an offshore wind farm, no emissions are produced from the facility, and thus we would expect a demonstration of positive environmental benefits. These benefits are based on the annual emissions avoided by each megawatt-hour ("MWh") of electricity generated by the facility and the social cost of each avoided emission. For example, the output of an offshore wind farm may cause 100,000 tons of CO_2 to be avoided annually at a cost of $10/ton. This results in an annual benefit of $1 million. The price for these environmental emissions should be from markets such as the Regional Greenhouse Gas Initiative (RGGI). The net environmental benefit of the project is the dollar value of the total amount of emissions avoided over the project's life on a net present value basis.

The cost-benefit analysis should consider all benefits of the project as it relates to greenhouse gas emissions. Two recent reports – one by the OEIS[6] and a second by a consultant for the OEIS[7] – conclude that wind power in Maine can provide significant benefits to Maine through reduction of greenhouse gas emissions. The CEI Report concludes that wind generation in Maine displaces natural gas-fired generation and reduces greenhouse gas emissions in proportion to the displaced natural gas-fired generation's emissions.[8] Further evidence of the benefits of Renewable Ocean Energy Projects, especially offshore wind, is evidenced in the CEI Report's finding that if Maine achieves its goals of at least 2,700 MW of on-shore wind and 300 MW of offshore wind by 2020, New England would enjoy a reduction of approximately 4.1 million tons of greenhouse gas emissions.[9] The CEI Report further concludes that if the Maine achieves its goals of at least 3,000 MW of on-shore wind and 5,000 MW of offshore wind by 2030, New England would enjoy a reduction of approximately 12.2 million tons of greenhouse gas emissions.[10]

IV. HAVE CONTRACT TERMS AND CONDITIONS THAT PROTECT RATEPAYERS

[6] Governor's Office of Energy Independence and Security for the State of Maine, "Maine Wind Energy Development Assessment," March 2012 ("OEIS Report"). Available at http://www.maine.gov/oeis/Wind/Binder1.pdf.

[7] Stephen Cole, Coastal Enterprises, Inc. ("CEI"), Stephen Ward, Perkins Point Energy Consulting, and Robert Fagan, Synapse Energy Economics, Inc., "Maine Wind Assessment 2012, A Report," January 31, 2012 ("CEI Report"). Available at http://www.maine.gov/oeis/Wind/Wind%20Assessment%202012%20Final%20Report%20with%20Attachments%20.pdf.

[8] CEI Report at page 37.

[9] CEI Report at page 38. The CEI Report assumes a capacity factor for on-shore wind resources of 33% and 40% for offshore wind resources.

[10] Ibid.

The most important recommendation we can make is to protect ratepayers from risk in the long-term contracting process. To do this, we recommend signing contracts with developers for ORECs only, not Power Purchase Agreements that would require Maine utilities to buy other products, like energy and ancillary services. We also recommend developing a legislative carve-out for RECs produced solely by Renewable Ocean Energy Projects, i.e., ORECs. We recommend that Maine include a Rate Impact Limit, thereby preventing Maine rate increases above a certain threshold related to the procurement of ORECs. We recommend that the contract contain pay-for-performance provisions, whereby winning bidders are paid only for the ORECs they produce. Finally, we recommend that the contracts include a liquidated damages clause and detailed project development timelines to shift risk from ratepayers to suppliers. Below, we address each of these recommendations in detail.

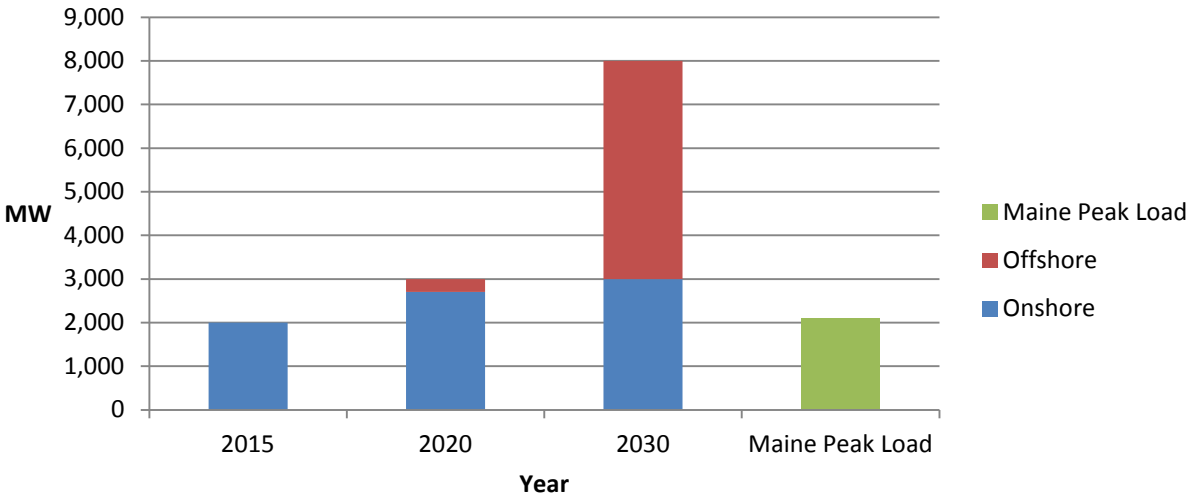
A. Procure ORECs only

There are two main types of long-term contracts that Maine could consider for developing Renewable Ocean Energy Projects. The first is a Power Purchase Agreement ("PPA"). Typically, PPAs require the contracting load serving entity to purchase the capacity, energy, and ancillary services, as well as any RECs produced by the facility. Applicants in the RFP process submit an all-in price for their energy, capacity, ancillary services, and RECs. The second type of long-term contract is a contract solely for RECs, or, in this case, ORECs. An OREC-only contract requires the contracting load serving entity to purchase only the ORECs related to the output of the facility, which sells its energy, capacity, and ancillary services separately, usually into a wholesale market. Applicants in the RFP process for an OREC-only contract provide a single price for their ORECs, which is the price above expected market revenues needed to recover their costs.

We strongly recommend Maine only considers the OREC-only contract option going forward. There are two main reasons for this recommendation. First, the PPA option will not be effective in meeting Maine's statutory goals for development of Renewable Ocean Energy Projects because Maine's load is not large enough to support significant PPAs. Maine's 2010 peak load is 2,100 MW and Maine's 2010 electricity consumption is 12 million MWhs per year.[11] To illustrate the magnitude of how much wind capacity is being targeted, we provide a chart below (Figure 1) that shows a comparison of Maine's statutory goals compared to Maine's 2010 peak load. The goal of 2,000 MW of onshore wind in 2015 nearly matches the 2010 peak load in Maine of 2,100 MW. In 2020 and 2030, the combined onshore and offshore wind goals of 3,000 MW and 8,000 MW exceeds current peak load by 143% and 381% respectively.

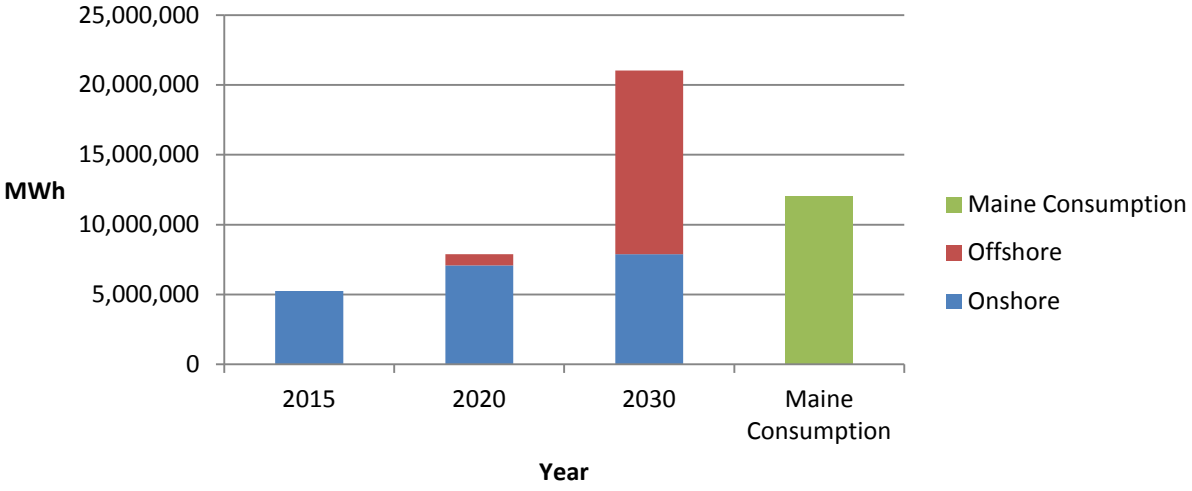
[11] State of Maine Public Utilities Commission, "2010 Annual Report," February 1, 2011, page 14.

Figure 1. Offshore and Onshore Wind Procurement Goals Compared to Current Maine Peak Load



Since wind resources mainly provide energy and lack significant capacity value, we show in Figure 2 below, on an energy basis, a comparison of Maine's statutory goals to Maine's current annual electricity consumption. For this comparison, we chose a rough capacity factor assumption of 30% for wind resources. In 2015 and 2020, wind resources would make up 44% and 66% of current electricity consumption, and in 2030, wind resources would provide over 21 million MWh of electricity, accounting for 175% of 2010 energy consumption. In 2030, offshore wind energy alone would account for 110% of 2010 energy consumption. Having such high amounts of generation relative to demand suggests off-system sales that could pose a risk to Maine's ratepayers by placing the marketing risk of excess energy on them.

Figure 2. Offshore and Onshore Wind Procurement Goals Compared to Current Maine Consumption



With an OREC-only contract, Maine's utilities would buy only the ORECs from a Renewable Ocean Energy Project and let the supplier bear the risk of selling its energy, capacity, and ancillary services into a market, most likely the ISO New England market. Maine's proximity to and participation in the ISO New England markets is an advantage to the OREC-only contract, as ISO New England offers Maine Renewable Ocean Energy Projects the chance to compete in several large wholesale markets, including a market for capacity, day-ahead energy, real-time energy, and ancillary services, including regulation and reserve services. Meanwhile, Maine would not have to dedicate a large percentage of its energy portfolio purchases to Renewable Ocean Energy Projects.

A second advantage of OREC-only contracts over PPAs is the cost. Again, Maine's ratepayers would only be purchasing ORECs from winning projects under the OREC-only option. OREC-only prices will be lower than PPA prices, which include energy and ancillary services. In addition, Maine will continue to be able to purchase lowest-cost energy, either through bilateral agreements or through the ISO New England markets at prices likely below those of Renewable Ocean Energy Projects. And while it is true that the PPA will help shelter Maine's ratepayers from price volatility related to fossil fuel prices for the amount of MW specified in the PPA, it will do so at a high cost.

While we recommend OREC-only contracting if Maine decides to pursue its statutory goals for Renewable Ocean Energy Projects, we must point out some challenges and limitations to the OREC-only option.

- First, the Maine Legislature must create a carve-out for RECs from Renewable Ocean Energy Projects that creates and defines ORECs. This must be done before OREC-only contracting can be done.

- Second, OREC-only contracting will not protect Maine's ratepayers from price volatility related to fossil fuel price movements. Maine would be buying ORECs only, not energy and ancillary services. As a result, OREC-only contracts would not directly displace energy from any other resources from which Maine currently procures its energy, meaning that Maine's exposure to fuel price volatility will likely remain.

- Third, the OREC-only contract price, while a cheaper option than a PPA, will reflect the risk that the Renewable Ocean Energy Project will be unable to sell its energy, capacity, and ancillary services in the ISO New England markets or elsewhere. That risk may be significant, especially since Maine, with 3,500 MW of installed capacity, is a net exporter of electricity,[12] meaning that the OREC suppliers will have to compete with other Maine resources for both transmission capacity and energy purchasers elsewhere in New England.

- A fourth and final caution related to OREC-only contracting is that OREC-only contracts are not as attractive to financiers as PPAs, and thus may not provide by themselves what Projects need to obtain financing.

[12] Ibid.

B. Create Legislative Carve-Out for Renewable Energy Credits from Renewable Ocean Energy Projects

Before Maine can pursue long-term contracting for Renewable Ocean Energy Projects, it must pass legislation that creates a carve-out for RECs procured solely from Renewable Ocean Energy Projects by (1) creating and defining ORECs and (2) mandating that Maine's utilities procure a certain amount or percentage of ORECs annually. There are two reasons why legislation is needed to effectuate OREC-only long-term contracting.

First, REC-only contracting using Maine's existing REC definition is not a viable option for Maine. The primary reason for this is that the Alternative Compliance Payment for non-compliance with Maine's current Renewable Portfolio Standard is too low to provide Maine's utilities with an incentive to procure RECs from Renewable Ocean Energy Projects. Maine's Renewable Portfolio Standard mandates that Maine must procure 40% of its power from renewable resources by 2017, 10% of which must be from new renewable resources.[13] The Maine Renewable Portfolio Standard also specifies a penalty – the Alternative Compliance Payment – that must be paid by Maine utilities that fall short of this Renewable Portfolio Standard mandate. The problem is that the Alternative Compliance Payment, set at $62.13/MWh for 2011,[14] is likely to be lower than the price for RECs bid by Renewable Ocean Energy Projects. As a result, Maine's utilities would have an economic incentive to procure 100% of their RECs from other types of renewable resources or even pay the Alternative Compliance Payment before procuring RECs from Renewable Ocean Energy Projects.

Second, no market exists in New England for ORECs. Thus, Maine utilities would not have the ability to sell ORECs to other New England States. Other New England States have Renewable Portfolio Standards that require the purchase of RECs, but again, REC prices and State Alternative Compliance Payments are well below the expected price of ORECs.

To effectively establish an OREC carve-out, Maine should adopt the same or a similar definition of Renewable Ocean Energy Projects that is currently found in Maine's statutes. The carve-out OREC legislation would need to specify that ORECs can only be provided by certified Renewable Ocean Energy Projects. The legislation should specify an Alternative Compliance Payment that is significantly higher than the current Alternative Compliance Payment in place for RECs.

C. Include a Rate Impact Limit

One way to limit the purchase of high cost of Renewable Ocean Energy Project development in Maine to Maine ratepayers is to include a clause that limits the Project's impact on electricity rates across Maine. This can be done using a Rate Impact Limit, which determines

[13] Maine Public Utilities Commission Rule 65-407, Chapter 311: Portfolio Requirement, originally approved October 1, 1999, Accessed March 30, 2012. Available at http://www.maine.gov/sos/cec/rules/65/407/407c311.doc.
[14] Maine Public Utilities Commission, "Maine Renewable Energy Portfolio Standard Adjustment of the Alternative Compliance Payment (ACP) Rate For Compliance Year 2011," Filed January 27, 2011 Accessed March 30, 2012. Available at http://www.maine.gov/mpuc/electricity/electric_supply/documents/2010AlternativeComplaincePayment_000.pdf.

a per-MWh impact on rates across the State of Maine caused by the proposed Project, and if that impact is above a certain threshold, the proposed Project is rejected.

We strongly recommend a clause of this nature in any RFP issued for ORECs. Rate Impact Limits are particularly attractive because they provide tangible benefits to Maine's ratepayers. By including a Rate Impact Limit, OEIS and Maine regulators will know that electric rates in Maine will not increase by more than the Rate Impact Limit as a result of the OREC procurement.

Maine already has used a Rate Impact Limit in its RFP for offshore wind pilot projects and tidal energy demonstration projects, issued in 2010 ("Pilot RFP").[15] Specifically, Maine's Pilot RFP sought to "mitigate any impacts of a long-term contract" pursuant to the Pilot RFP by requiring that the long-term contracts awarded pursuant to the Pilot RFP "may not result in an increase in electric rates in any customer class that is greater than…$1.45 per MWh." We would recommend a similar approach to any long-term contract with Renewable Ocean Energy Projects. We would recommend that Maine also require – as it did in the Pilot RFP – that winning bidders mitigate the cost of their Projects to Maine ratepayers by taking advantage of current and future federal support applicable to the project over the contract term.

D. Use Pay-for-Performance Structure and Other Important Terms and Conditions

Today, there are no OREC contracts in use right now that would serve as a template for Maine in developing specific terms and conditions of its own for procuring ORECs. Nevertheless, based on our experience in long-term procurements, we believe there are some important terms and conditions, in addition to those included above, that should be part of any long-term OREC contracts executed on behalf of Maine's ratepayers.

Long-term contracts for ORECs in Maine should stipulate that the supplier will only be paid for ORECs produced and delivered. Put simply, if the Renewable Ocean Energy Project does not deliver as promised, its supplier should not be paid. This "pay-for-performance" approach shifts the risk of non-performance off of Maine's utilities and largely onto the supplier. The contract should also stipulate that Maine utilities are not obligated to buy any ORECs in excess of the contracted quantity. Again, this will help protect ratepayers from higher electricity prices caused by the procurement of ORECs.

We would recommend Maine consider two other important pay-for-performance terms and conditions for any long-term contracts for Renewable Ocean Energy Projects. First, Maine should include a liquidated damages clause that protects Maine ratepayers from early termination of the contract by the supplier.

Second, we would recommend requiring detailed project development timelines to be written into the contract. These timelines should specify milestone dates – such as the date of

[15] Maine Public Utilities Commission, "Request for Proposals for Long-term Contracts for Deep-Water Offshore Wind Energy Pilot Projects and Tidal Energy Demonstration Projects," September 1, 2010, Section 2.2. Available at http://www.maine.gov/mpuc/electricity/rfps/standard_offer/deepwater2010/.

commercial operations commencement – and include penalties for failure to meet these deadlines. This clause will also protect ratepayers from the risk that the Renewable Ocean Energy Project will fail to be built on time or at all. We would recommend that this clause allows the supplier that misses a deadline to "catch up" to the stipulated timeline, and to refund to the supplier any penalties if the supplier meets the ultimate commercial operations in-service date. Again, these are terms that we have recommended and included in other engagements for long-term purchase contracts for many types of generation resources.

V. TIMING AND PROCUREMENT AMOUNT CONSIDERATIONS

In this section, we will address the size, frequency, and timing of any long-term contracting procurement efforts by Maine. In summary, Maine's procurement efforts should be driven by the specifics of Maine's statutory goals and the time requirements of the RFP, permitting, and construction processes. As a result, if Maine decides to go forward with an RFP for Renewable Ocean Energy Projects, it should issue the RFP by January 1, 2014 for 300 MW of offshore wind only in its first RFP. This would allow sufficient time for a robust procurement, while also allowing time for bid submission, review, and construction in time to meet Maine's 2020 goal of 300 MW of offshore wind.

The timing of Maine's procurement efforts should be dictated by its statutory goals for renewable ocean energy procurement. Maine has statutory "goals" for wind power development that includes targets for offshore wind. Specifically, Maine's wind power development goals include:

- At least 2,000 MW of installed capacity by 2015;
- At least 3,000 MW of installed capacity by 2020, with potential to produce 300 MW or more of offshore wind power; and
- At least 8,000 MW by 2030 including 5,000 MW located in coastal waters.[16]

There are a few important takeaways from Maine's statutory goals that are important to setting procurement targets and timelines. First, Maine has two targets related to offshore wind: 300 MW by 2020 and 5,000 MW by 2030. Second, Maine has no targets related to Renewable Ocean Energy Projects other than offshore wind. Maine's statutory policy on other Renewable Ocean Energy Projects, such as tidal and wave power, is "to encourage the attraction…of tidal and wave energy" only.[17] Third, Maine has statutory "goals," not mandates.

Given Maine's statutory goals, Maine should focus its first RFP on ORECs from offshore wind only. As noted above, it would be our recommendation that the State Legislature develop a carve-out for RECs from Renewable Ocean Energy Projects, called ORECs, that includes all types of ocean energy – offshore wind, tidal, wave, etc. However, Maine's statutory goals include offshore wind only. We recommend, therefore, that Maine's first RFP for ORECs solicits bids from offshore wind projects only. This will ensure that any long-term contracts

[16] Maine Revised Statute Title 35-A, section 3404, subsection 2.
[17] Chapter 615, 124th Legislature (S.P. 710 – L.D. 1810 – *An Act to Implement the Recommendations of the Governor's Ocean Energy Task Force*, Sec. A-5. 38 MRSA §631, sub-§3).

awarded as a result of the RFP contribute toward Maine meeting its statutory goals for offshore wind development.

The timing of the first procurement should be dictated by two factors: (1) the first target date of Maine's statutory goals for wind power development and (2) the amount of time that applicants need to submit a proposal and develop and construct their project. Maine's first statutory target date for offshore wind is 300 MW by 2020. We would therefore recommend that any long-term contracts that are awarded as a result of the first RFP for offshore wind power specify an in-service date of January 1, 2020. Further, as explained below, we would suggest a tentative RFP issuance date of January 1, 2014.

Estimating a specific timeline for an RFP process for offshore wind is very difficult. However, we would suggest a relatively long timeframe for an RFP to allow enough time for the RFP process, as well as the permitting and construction phases of the project. What makes estimating a timeline for an offshore wind development RFP difficult is that, unlike other types of generation resources that have more established permitting and construction processes, there simply have not been any offshore wind farm developments in the U.S. on which to base a complete RFP schedule. However, there are some phases of the project development process for which we do have credible estimates. For example, KPMG estimates offshore wind construction to take up to three years.[18] Thus, to meet an in-service date of January 1, 2020, a supplier may need to begin construction by as early as January 1, 2017.

We also know that bidders will need sufficient time to develop and submit their bids once the RFP is issued. To that end, in order to have a robust, competitive procurement, we suggest that the RFP be issued a full year before proposals would be due. Allowing potential bidders a full year to develop and submit their bids will help encourage a more robust participation in the RFP and a more competitive result. We would also recommend building in some time to issue a public notice of intent to issue the RFP with a built-in comment period to allow potential bidders to provide feedback on the design, timing, and procurement totals for the RFP. Boston Pacific has found this to be a best practice among other State Commissions for whom we have designed, conducted, and monitored RFPs. These "known" portions of the RFP would suggest an approximate RFP issuance timeframe of January 1, 2014. That would allow Maine time to develop a draft RFP, issue a notice of intent, and invite public comment before issuing a finalized RFP. It will also allow Maine to build in a full year for potential applicants to submit their proposals for evaluation.

Nevertheless, these estimates are rough and uncertain thanks to unknowns related to the development of offshore wind farms. For example, Maine will have to review and approve any executed contracts awarded from the RFP. In addition, the permitting process for offshore wind is unclear and can be lengthy. Prior to construction, developers would need to obtain permits to construct and operate their facilities. Because there have been no completed wind farms built in U.S. Federal waters, it is difficult to precisely estimate the length of the permitting process. Much of the initial analysis hints at 7-10 years, but that data references the Cape Wind project, which was the first U.S. project to obtain a commercial lease. However, the Federal and State

[18] KPMG, for example, assumes a three-year construction phase for a hypothetical 400 MW offshore wind farm. See KPMG, "Offshore Wind in Europe," 2010, page 82. Available at http://www.kpmg.no/arch/_img/9686536.pdf.

government permitting authorities have worked to streamline the permitting process in recent years and so it is our expectation that permitting in Maine would take much less time. Nevertheless, permitting could be a multi-year process, as Project Developers would be required to obtain a number of Federal and State Permits. To give an idea of the volume of laws and regulations that is likely to apply to these Projects, below is a 2010 Table produced by the Environmental Policy Group at Colby College that shows State and Federal laws and regulations that were expected to apply to all offshore renewable energy in Maine at that time:[19]

Table 1. State and Federal Laws and Regulations for Offshore Renewable Energy

Law	Jurisdiction	Location
Mandatory Shoreline Zoning Act	State	MRS Title 38 Chapter 3 § 439-449
Maine Energy Wind Act	State	MRS Title 35-A, Chapter 34 § 3404(2)(B)
Public Trust Doctrine	State	(Sax 1970)
Rivers and Harbors Act	Federal	USC Title 33 § 401-403
Migratory Bird Treaty Act	Federal	USC Title 16 § 703 et seq.
Submerged Lands Act	Federal	USC Title 43 § 1301-1315
National Environmental Policy Act	Federal	USC Title 42 § 4321 et seq.
Coastal Zone Management Act	Federal	USC Title 16 § 1451-1456
Noise Control Act	Federal	USC Title 42 § 4901-4918
Marine Mammal Protection Act	Federal	USC Title 16 § 1361-1407
Pollution Prevention Act	Federal	USC Title 42 § 13101 et seq.
Energy Policy Act	Federal	USC Title 42 § 8251 et seq.
American Clean Energy Leadership Act	Federal	S. 1462
Executive Order 13547: Stewardship of the Ocean, Our Coasts, and the Great Lakes	Federal	Executive Order 13457

As for the size of the first procurement, we recommend that the RFP seeks no more than 300 MW. Maine's statutory goals for offshore wind energy should be the upper limit on total procurement amounts. This will protect Maine's ratepayers from risks related to the potentially high cost of Renewable Ocean Energy Projects beyond the State's statutory goals target amounts.

Boston Pacific makes two other recommendations. First, Maine should wait to issue any RFPs for Renewable Ocean Energy Projects other than offshore wind (e.g., tidal or wave energy). As noted above, Maine has no statutory goals related to tidal and wave energy, only a commitment to "encourage" the "attraction" of these types of resources. Until Maine has a statutory mandate for tidal or wave energy, these technologies represent a significant cost and risk to Maine ratepayers.

Second, Maine should wait until after 2020 to issue any additional RFPs for Renewable Ocean Energy Projects, including offshore wind. Maine's next statutory goal target procurement date is 5,000 MW of offshore wind by 2030. Any further RFPs should use 2030 as a target in-service date. By waiting until after 2020, Maine can gain valuable experience both from its own procurement efforts and from other States that may procure Renewable Ocean Energy Projects as well. Further, delaying subsequent RFPs until after 2020 allows Maine valuable flexibility if the technological landscape changes significantly, or if the economics of Renewable Ocean Energy

[19] *The State of Maine's Environment 2010*, chapter four. Produced by Richard Schwartz, J. Sarah Sorenson, and Henry Wyman of the Environmental Policy Group at Colby College. Available at https://wiki.colby.edu/display/stateofmaine2011/The+State+of+Renewable+Ocean+Energy.

Projects changes. Finally, delaying until after 2020 allows Maine to take advantage of the "goals" nature of its statutory requirements related to Renewable Ocean Energy Projects by allowing a maximum amount of time to decide if it will continue to pursue those goals as the economic, technological, and regulatory variables in the electricity industry changes. If, for example, Maine reconsiders its stance on Renewable Ocean Energy Projects for any reason, either because it has become too expensive, obsolete, or any other reason, Maine can abandon those goals without penalty.