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EVALUATING THE ECONOMICS OF OFFSHORE WIND PROJECTS: EVALUATION OF THE AMENDED APPLICATION BY FISHERMEN'S ATLANTIC CITY WIND FARM, LLC

Presented to:

THE STATE OF NEW JERSEY
BOARD OF PUBLIC UTILITIES
OFFICE OF CLEAN ENERGY

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ABOUT BOSTON PACIFIC COMPANY, INC.

Boston Pacific Company, Inc. ("Boston Pacific") is a consulting and investment services firm located in Washington, D.C. which specializes in the electricity and natural gas industries. For 25 years we have provided information and insight to our clients who span the full range of stakeholders: state regulatory commissions, regional transmission organizations, energy consumers, competitive power producers, electric utilities, gas pipeline companies, and electric transmission companies. We are nationally recognized experts on the electricity business as documented by our service as expert witnesses throughout North America. Boston Pacific is also an industry leader in designing and monitoring major power procurements of every type for state commissions across the country, as well as open seasons for merchant transmission lines. In addition, Boston Pacific has extensive, hands-on experience with a full range of technologies including clean coal ("IGCC"), on and off-shore wind, geothermal, waste-to-energy, solar photovoltaics, and natural gas-fired combined-cycle. Boston Pacific has served the Board of Public Utilities as the Board Advisor for New Jersey's annual Basic Generation Service Auctions for the past six years.

ABOUT OUTSMART BV

OutSmart BV ("OutSmart") is a Dutch engineering firm with extensive technical experience with offshore wind projects. The team members of OutSmart have acquired their expertise working together with manufacturers, developers, contractors, power traders, utilities, insurance firms and consultants. To date, OutSmart has worked with more than 20 offshore wind farms located in Germany, Belgium, the Netherlands, UK, Denmark and Spain. For these, OutSmart has been involved in all aspects of the development, installation, and testing phases. In addition, OutSmart has advised on contracting and procurement, provided project management, and developed and managed the electrical, mechanical and physical infrastructure of offshore wind projects. OutSmart has also advised during contract negotiations.

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I. EXECUTIVE SUMMARY

A. Background

Fishermen's Atlantic City Windfarm, LLC ("Fishermen's Energy" or "Applicant") proposes to build a 25 MW offshore wind facility approximately 2.8 miles from the Atlantic City shoreline (the "Project"). Fishermen's Energy has asked the New Jersey Board of Public Utilities ("BPU" or "Board") to approve this Project and to approve payments for offshore wind renewable energy certificates ("ORECs") that are generated during a 20-year period.

Fishermen's Energy submitted an initial application last year. Boston Pacific Company, Inc. ("Boston Pacific") and OutSmart BV ("OutSmart") evaluated that application and presented our findings in a report dated February 22, 2012. The evaluation was conducted in accordance with the New Jersey Offshore Wind Economic Development Act[1] (the "Act") and the BPU-adopted rules at N.J.A.C. 14:8-6 (the "Rules") that codified new statutory requirements enacted through the Act. Our evaluation of the initial application raised concerns about the significant subsidy that ratepayers would have to pay to develop the project. Further, we found that the Act's requirement to demonstrate net benefits was not met. The report also highlighted significant technical risk that could impair the Project's ability to perform as promised.

Fishermen's Energy submitted an amended application on June 1, 2012 and completed its submission on October 18, 2012. The amended application addressed some of the concerns that were raised in our February 22, 2012 report. This report contains Boston Pacific's and OutSmart's evaluation and assessment of the amended application in accordance with the Act and the Rules.

B. Summary of Findings

In summary, we remain concerned with the significant level of subsidy that would be paid by ratepayers for a project that poses significant technical risk. Although the required subsidy decreased when compared to the initial application, it is still significant considering that the proposed OREC price is [redacted] times higher than Applicant's own estimated electricity market price. The technical risk arises from the use of wind turbines that have not been commercially proven. Further, the Act's requirement to demonstrate net benefits was not met. Based on what we can substantiate, the Project's benefits are not enough to offset the Project's costs. The result is a *net cost* to ratepayers of about $[redacted] million NPV over the life of the project. While the project has secured financing, the financial strength of the project's main source of funding cannot be determined because its financial statements do not meet U.S. accounting standards. As positives, Applicant has assembled an experienced team of contractors to develop the facility and

[1] P.L. 2010, c.57; signed into law on August 19, 2010 (the "Act").

has obtained most significant permits for the project. These conclusions are further elaborated below.

1. **The Act requires the BPU to consider "the total level of subsidies to be paid by ratepayers." [2] By decreasing the starting OREC price from $[redacted]/MWh in the initial application to $[redacted]/MWh in the amended application, the Applicant reduced the size of the subsidy. The subsidy is still high, however, given that the Applicant's own estimate of the market price for energy and capacity in the starting year is $[redacted]/MWh. Moreover, ratepayers would be subsidizing a project with significant technical risks.**

The Act requires that, when considering an application for a qualified offshore wind project, the Board consider the level of subsidies to be paid by ratepayers for the offshore wind project over the life of the project. Our review of the initial application raised a major concern regarding the requested OREC price. At a starting point of $[redacted]/MWh, the requested OREC price represented a significant amount of subsidy to be paid by ratepayers considering that the OREC price was [redacted] times higher than Applicant's own estimated electricity market price of $[redacted]/MWh for the first year of operation. The amended application decreased the OREC price to $[redacted]/MWh[3] for the first year of operation, which is assumed to be [redacted]. The OREC price is now [redacted] times higher than Applicant's own estimated electricity market price of $[redacted]/MWh. [4]

Two key changes were made in order to achieve a lower OREC price compared to what was proposed in the initial application. First, the Project's capital costs were decreased from $[redacted] million ($[redacted]/kW) to $[redacted] ($[redacted]/kW). Second, a higher electricity output was assumed for the project, which resulted in a lower cost per OREC[5]—each OREC represents one MWh.

Even with the decrease to $[redacted]/kW, the capital costs for the Project are still [redacted] higher than the range reported in a study issued by the National Renewable Energy Laboratory ("NREL"). In the study, offshore wind projects announced for 2012 and beyond have capital costs, on a capacity-weighted basis, listed in a range between $4,000 and $4,500/kW in 2008 dollars.[6] In another report, issued by the Federal Bureau of Ocean Energy Management

[2] Ibid, at Section 3.b(2)(a).
[3] Fishermen's Atlantic City Windfarm, LLC's Amended Application, filed May 30, 2012 ("Amended Application"), "Project Proforma – Atlantic City Pilot Project," May 8, 2012, Excel format ("Financial Model"), Project Cash Flow sheet.
[4] Based on Applicant's assumptions for electricity output, and energy and capacity revenues as shown in Amended Application, "Optimized Project C-B Analysis." Note that the Amended Application uses a different energy price forecast methodology than the Initial Application. Also, a different starting year was assumed for the Amended Application.
[5] In the Initial Application, the project's output was assumed to be [redacted] MWh. For the Amended Application, the output is assumed to be [redacted] MWh. The difference results from using a less conservative estimate in the Amended Application that is based on P-50 (P-90 or higher was assumed for the Initial Application).
[6] NREL, "Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers," September 2010 ("NREL September 2010 Report on Large-Scale Offshore Wind Power in the United States"), at page 109.

Regulation and Enforcement ("BOEMRE"), four European projects with online dates in 2012 had capital costs ranging from approximately $4,100 to $4,900/kW.[7] This data suggests that the subsidy proposed by Applicant is higher than necessary; one culprit may be the small scale of the Project.

A key question that must be asked when assessing the size of the subsidy is, what are ratepayers getting in return for such a subsidy? The overarching concern is that ratepayers will be paying a high subsidy for a project with significant technical risks; that is – a 25-MW project that uses a turbine with no commercial operating history and employs a technology that has not been used for this particular class of turbine. It is not clear to us why ratepayers would be asked to subsidize a Project with significant technical risks when there are commercially proven wind turbines readily available in the market that could lower the Project's risks. Doing so would only make sense if the Act intended to subsidize demonstration projects whose purpose was to advance new technologies; however we find no language in the Act stating a purpose to support the demonstration of new technologies.

Regarding capital costs, we note two areas where the capital costs for this project could be reduced. First, Applicant includes $[redacted] million in development fees which, according to Applicant, is a return of and on founder's equity.[8] It is unclear why ratepayers should have to pay for this. Second, the installation costs could be lowered. This is supported by a comparative analysis of capital costs performed by Applicant's owner's engineer, [redacted]. [redacted] found that the marine installation costs are [redacted] higher than expected and says that this may be caused by the lack of competition in New Jersey. For example, wind turbine and foundation installation costs are about $[redacted] higher than [redacted]'s internal cost benchmark, which is based on costs of European projects.[9] [redacted]'s conclusion is that the project may benefit from further negotiation of these costs.[10] We also note that some key capital cost assumptions that went into the revenue requirement calculation were not fully supported.

We also note that, while Applicant provided a capital cost estimate of $[redacted] million, Fishermen's Energy and XEMC New Energy Co., Ltd. ("XEMC") have set, as their own target, a goal of $[redacted] million. To achieve this, Fishermen's Energy and XEMC have agreed to cost reductions of about $[redacted] million and $[redacted] million on those areas of the capital cost budget [redacted].[11] [redacted]

[7] BOEMRE, "Offshore Wind Energy Installation and Decommissioning Cost Estimation in the U.S. Outer Continental Shelf," November 2010 ("BOEMRE November 2010 Report on Offshore Wind Energy Costs"), at page 135.
[8] See Amended Application, "FACW_Project Construction CAPEX_XEMC_120405 DETAILED BREAKOU" Excel file.
[9] Amended Application, Exhibit 4: Direct Testimony of [redacted], "Project Management Plan," April 2012 ("PMP"), at page 94.
[10] Amended Application, Exhibit 4: Direct Testimony of [redacted], at page 11.
[11] Amended Application, Appendix C: "Financing Plan," Exhibit G: "Second Addendum to [redacted] and Addendum of [redacted]" ("Second Addendum"), at Exhibit One.

[redacted][12] Applicant's willingness to enter into this agreement tells us that Applicant believes capital costs of $[redacted] million are attainable, and therefore, should be the basis for the OREC pricing.

Another key input for the OREC price calculation is the projected annual electricity output over the 20-year operating period of the Project; output is estimated to be [redacted] MWh annually.[13] This is based on a so called "P50" production estimate, which means that there is a 50% probability that the estimate will be exceeded.[14] This is a [redacted] higher estimate than the projected annual electricity output of [redacted] MWh in the initial application, which we understand to be a more conservative estimate (e.g. P90, P95, or P99).[15] Hence, one of the primary factors in the decrease in the OREC price in the current application is due to the ability of the Applicant to spread costs over a greater number of MWhs.

Finally, we note that Applicant did not provide a fixed OREC price as required by the Rules. In its OREC pricing methodology, Applicant proposes to adjust the OREC price if the final environmental permits cause curtailment by more than [redacted] hours per year. Applicant also proposes to adjust the OREC price with the interest rate that is achieved at financial closing, which will occur after the final OREC Order is issued.[16] Neither of the adjustments are acceptable under a fixed OREC price requirement.

2. The Act, as well as New Jersey's Energy Master Plan, requires that the Project demonstrate a net benefit to the State. Net benefits were not demonstrated.

The Act requires that the Applicant submit a cost benefit analysis that demonstrates positive economic and environmental net benefits to the State.[17] During our review of the initial application, we concluded that net benefits of the Project were not demonstrated because key underlying assumptions of Applicant's cost benefit analysis were not adequately substantiated. Applicant submitted a revised cost benefit analysis that shows an expected $[redacted] billion of net benefits on a net present value ("NPV") basis. A low case scenario reflects net benefits of $[redacted] million NPV.[18] The following table shows a breakdown of these benefits.

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[12] [redacted] See Second Addendum, at Sections 7 and 10.

[13] Amended Application, Appendix E: "Wind Speed and Energy Production Reports," at page 4.

[14] We note that lenders typically rely upon a conservative estimate of output of P90 or higher to determine the debt service capability of a wind farm.

[15] Fishermen's Atlantic City Windfarm, LLC's Verified Petition, filed May 19, 2011 ("Initial Application"), Excel spreadsheet "110824_FishWindMod_ForDistBPU_Case3NoGrant" ("Financial Model from Initial Application").

[16] Amended Application, Exhibit 19: Direct Testimony of [redacted] on Proposed OREC Pricing, Attachment 1: "OREC Pricing Plan, Policies, Goals & Mechanics," at pages 7 and 8.

[17] Act, at Section 3.b(1)(b)

[18] Amended Application, Appendix D: "Cost Benefit Analysis," May 31, 2012, at page 6. Also, see response to discovery request RCR-PF2-8 (dated July 19, 2012) in which Applicant says they had made a calculation error while estimating the tourism benefits from the Expected case and indicate that the correct NPV benefit should be $[redacted] million instead of the $[redacted] that was provided with the Application. Similarly, in response to discovery request RCR-PF2-9, Applicant says that there was a calculation error while estimating the tourism benefit for the Low case. The correct NPV benefit should be $[redacted] million instead of $[redacted] million.

Table 1
Net Benefit Breakdown

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We find that benefits were not demonstrated for the categories that are highlighted above: a) impact to the NJ economy from increased tourism, b) impact to the NJ economy from the construction and operation of the facility, c) environmental benefits, d) benefits to ratepayers from savings that would be realized by the construction of future offshore wind farms from the lessons learned through the Project ("lessons learned"). In addition, we disagree with the inclusion of benefits from the merit order effect for the same reasons we stated in our February 22, 2012 report.

Benefits to ratepayers were demonstrated from: a) the receipt of revenues from the Project's sale of energy and capacity in the PJM markets, and b) the offsetting of Class I REC purchases, needed to meet New Jersey's RPS, with ORECs. However, these benefits are not enough to offset the Project's costs. Based on what we can substantiate, the result is a *net cost* to ratepayers of about $[redacted] million NPV over the life of the project.

We also suggest that a sensitivity be performed on the cost benefit analysis that assumes a lower electricity output from the facility. This would show the net benefits that could be achieved if the facility does not perform as expected. The cost benefit analysis is based on an annual electricity output assumption of [redacted] MWh, which is based on a P50 output estimate. We suggest that the sensitivity assume a P90 output estimate, which is a lower level of output.

Section IV provides a detailed analysis of Applicant's cost benefit calculations. We provide a high level summary below.

Tourism Benefits

The tourism benefit was not demonstrated because key inputs to the benefit calculation were not adequately substantiated. For example, a key assumption is the number of tourists who will spend more money because of the Project. To calculate the number of visitors who are expected to spend more, Applicant assumes [redacted] million visitors visit Atlantic City annually and that [redacted]% of these visitors will increase their stay by [redacted] because of the Project. No substantiation was provided for the [redacted] million annual visitor assumption. The [redacted]% figure is based on a single survey question asking visitors if they would be more likely to visit Atlantic City if an offshore wind farm is built. The survey was not specifically designed to gauge additional time of stay or additional spending that could be attributed to the Project. Applicant's calculation implies that a significant number of visitors, [redacted] visitors per day, will extend their

stay by [redacted] because of the Project. Also, Applicant fails to show how the number of tourists who say they are more likely to visit equates to an increased [redacted] stay.

Applicant's calculation under the low case scenario assumes approximately [redacted] visitors per day, which is based on the number of tourists who visit [redacted].[19] A significant discrepancy in benefit estimates exists between these two methodologies. The first envisions current visitors extending their stay, while the second envisions attracting new visitors.

Benefits from constructing and operating the Project in New Jersey

Applicant used Rutgers University's macroeconomic model (R/ECON[20]) to calculate the benefits to the New Jersey economy from constructing and operating the Project. The R/ECON model adds credibility to the calculation; however, it relies on input assumptions that are provided by Applicant. Although Applicant provided more substantiation than what was provided in the initial application, this was not enough to demonstrate the assumptions for the following key inputs to the R/ECON model: a) New Jersey-based expenditures made during construction and operation of the project, b) direct jobs created during the construction and operations of the project, c) labor cost breakdown by job class, and d) an expenditure curve of materials and labor costs during construction.

Out of the $[redacted] million in total capital costs, the Applicant deemed that $[redacted] million would be used as eligible inputs into the R/ECON model. Applicant determined [redacted]% out of the $[redacted] million, or $[redacted] million, could be attributed to the New Jersey economy.[21] Regarding costs during operations, $[redacted] million per year are deemed to be eligible costs for inputs to the R/ECON model. Applicant determined [redacted]%, or $[redacted] million per year, to be New Jersey content. However, not enough explanation or supporting analysis was given to demonstrate how the New Jersey content and labor costs were estimated. For example, the turbine costs are $[redacted] million. Applicant assumes that [redacted]% of those costs, or about $[redacted] million, is New Jersey content. The corresponding note to support this claim states, "[redacted]." We cannot substantiate this claim for the following reasons: (a) no quote was provided for turbine costs, and (b) without an explanation, the [redacted]% assumption is an arbitrary number that is not supported. Another example of a claim without enough substantiation is with regard to the labor costs of fabrication and delivery of the transition pieces (a component of the foundation). In this case, Applicant's corresponding note states "[redacted]." The quote from [redacted] does not mention [redacted]

[19] The applicant cites [redacted]

[20] Economic impacts were calculated by the Bloustein School of Planning and Public Policy at Rutgers University. Rutgers University has developed a macroeconomic model of New Jersey's economy (R/ECON) that is used to provide quarterly forecasts to a variety of clients including the NJ Treasury, the NJ Association of Realtors, the NJ Department of Transportation and the NJ BPU.

[21] There is a discrepancy in the calculation of New Jersey content of $[redacted], which FACW acknowledges in the Capital Cost Breakdown Spreadsheet.

[redacted] and Applicant provided no accompanying explanation of how the [redacted]% was determined.

Another key input to the R/ECON model is an estimate of the number of jobs created by the Project. Applicant used another input/output model, NREL's Jobs and Economic Development Impact ("JEDI") model, to calculate these jobs: [redacted] direct jobs in the construction phase and [redacted] direct jobs in the operations phase. The key inputs to the JEDI model are New Jersey based capital and labor costs and wages. Again, not enough explanation or supporting analysis was given to demonstrate how the New Jersey content and labor costs were estimated. With regard to wages, which are used both in the JEDI model and the R/ECON model, Applicant developed wage data from a combination of prevailing wages for various job categories in New Jersey as well as specific rates from [redacted]. We note that the source for the prevailing wages for New Jersey was not explained.

For the labor cost breakdown by job class input, Applicant takes the New Jersey based labor cost assumptions and breaks down these costs into several labor cost components for each job class. These components are: a) contractor markup, b) direct wages, c) fringe benefits, and d) employer taxes. Applicant does not explain how the costs for these four components are calculated. Therefore, we cannot assess the reasonableness of this input.

Finally, no explanation or supporting calculations were provided for the assumptions that were made on how labor and materials costs are spent during construction.

Environmental Benefits

Environmental benefits were not demonstrated because they are based on an estimation of the social benefits of displacing CO_2, SO_2, and NO_x emissions from fossil-fuel generation, rather than a market price. To calculate social benefits, Applicant relies upon sources that estimate the health impacts of SO_2 and NO_x emissions, and attempts to calculate a social cost on a $/ton basis for these emissions. For the social cost of CO_2, Applicant relies on an inter-agency federal government report[22] that estimates the monetized damages associated with an incremental increase in carbon emissions in a given year. The report acknowledges the many uncertainties involved in determining these costs.

The calculation of environmental benefits should be tied directly to market prices because offshore wind is just one alternative way to cut emissions and its "benefit" occurs if, and only if, it is less expensive than the other alternative ways.

Benefits from Lessons Learned

[22] Amended Application, Appendix D: "Cost Benefit Analysis," Exhibit C-11: [redacted]

Applicant estimates a benefit from the realization of cost savings at future full-scale offshore wind projects by implementing lessons learned from the Fishermen's Energy project. The NPV of savings is estimated by [redacted][23] to be in the order of $[redacted] million for the expected case. The lessons learned benefit was not demonstrated for the following reasons:

A key driver in the methodology to calculate benefits from lessons learned is the quantification of the savings resulting from the Project's application of risk mitigation measures to three identified project risks. However, no supporting calculations for these quantified benefits are provided. As an example, current norms require that some construction activity be stopped when marine mammals are present. This limits construction activity to daylight hours due to the limited ability to see marine mammals at night. The Project will employ sonar listening devices and other sensors to detect whales and dolphins at night. If this works, the analysis estimates that future projects could realize savings in construction costs that will decrease capital costs by $[redacted]/kW. However, no substantiation is given for the calculation of the $[redacted]/kW saving.[24]

To quantify the total benefits for the expected case, the analysis assumes that the lessons learned from the three risk mitigation measures will be implemented in full-scale projects that would fill the balance of New Jersey's 1,100 MW offshore wind objective. At this time, there is no way to know if the full 1,100 MW will be developed. Also, it is unclear whether there will be a sufficient amount of time after the construction and operation of the Project to guarantee that any potential benefit of lessons learned will be transferred to subsequent projects.

From a broader perspective, we believe that there is a very high degree of uncertainty about the extent to which lessons learned from this Project could be applied by future projects. This is because every project has its own unique set of issues and characteristics. For example, future offshore wind projects in New Jersey are likely to be different than the Project in that they may not be near shore, in state waters, and will likely be of a significant larger scale. Additionally, these projects may be funded by more traditional banking sources as opposed to the financing arrangement that the Project has obtained from XEMC. This high degree of uncertainty makes it difficult to count lessons learned as a benefit of the Project.

3. The Act requires there to be a fair balance of risks and rewards between ratepayers and shareholders.[25] The proposed project poses significant technical risk because it will use wind turbines that have not been commercially proven.

During our review of the initial application we indicated that there were technical risks that may impair the Project's ability to perform as promised. The risks primarily involved the use of wind turbines that are not fully commercialized, and a foundation concept that has not been used before for offshore wind turbines.

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[23] [redacted] Report").

[24] [redacted] Report, at page 6.

[25] Act, at Section 3.b(1)(c).

In the amended application, Applicant proposes the use of the same XEMC DD115/5MW turbines specified in the initial application. We remain concerned with the proposed use of the XEMC turbines, which still pose significant risks to the Project's performance. The XEMC turbines employ direct drive technology which, unlike conventional turbines, have no gearbox, thus minimizing the number of moving parts in the drivetrain. Although direct drive technology may result in increased reliability and performance, the XEMC turbine has no commercial operating history. Further increasing the risk of the project, the turbines will be the first in the 5 MW class to use direct drive technology. In terms of mitigating risk, we believe there is no substitute for commercial operating experience to uncover design and manufacturing flaws and allow time for such flaws to be corrected.

In the amended application, Applicant states they are seeking to obtain industry standard certifications for the turbine (i.e. both type and project certifications). While this is a step in the right direction, these certifications have their limitations and do not guarantee desired performance. Even with certification, a turbine that is not commercially proven has the risk of technical issues, not detected during the prototype stage and testing, arising well after installation of the turbine. Again, this only emphasizes the importance of using commercially proven turbines.

Regarding the foundation design, Applicant has changed its design to a monopile type. Monopiles are the most commonly deployed foundation type in offshore wind projects, and therefore a less risky alternative when compared to the jacket foundation that was proposed in the initial application. The monopiles will be designed by [redacted], a Danish engineering firm, whose designs have been implemented on a number of currently operational European offshore wind projects. We note that while the design of the monopiles are in line with monopiles used in other projects, the industry has faced problems with the connection of the monopile to the transition piece, which secures the wind turbine and tower to the foundation. The adherence of the transition piece to the foundation via [redacted], is a risk that could be problematic if not resolved before installation.

4. The Act requires Applicant to demonstrate financial integrity and sufficient access to capital.[26] While securing financing from XEMC is a positive achievement; XEMC's financial strength was not demonstrated because its financial statements do not meet U.S. accounting standards.

The Act requires that the entity proposing the project demonstrate financial integrity and sufficient access to capital to allow for a reasonable expectation that the project's construction will be completed. The Project has obtained a commitment from [redacted]. XEMC also intends to provide financing for all costs to develop, design, procure, and build the Project. Having this commitment to fund the Project is a major positive achievement.

However, the information that was provided about XEMC was not sufficient to demonstrate that they have the financial strength to provide all of the funds necessary to fund this

[26] Act, at Section 3.b(1)(d).

project. This is because we could not rely on XEMC's financial statements since they were based on Chinese accounting principles. We raised this concern during our review of the initial application and suggested either that the financial statements be presented in U.S. GAAP, or that the Applicant provide an opinion from a recognized global accounting firm that attests to the financial statements and the financial strength of XEMC and its parent XEMC Group Co., Ltd. Applicant provided letters from their auditors confirming that they had audited the 2011 financial statements based on Chinese accounting principles. However, these were not enough for Applicant to demonstrate the financial strength of these companies under U.S. GAAP.

5. **The Act asks the Board to add criteria it "deems appropriate" to evaluate Applications. Demonstrated strength of management should be one criterion. Fishermen's Energy management does not have much direct experience with the development of offshore wind projects; however, they plan to contract with experienced third parties to develop the facility.**

Once [redacted] of the project, [redacted] would have the right to appoint key management for the project, including CEO and CFO positions. During our review of the initial application, we raised a concern that Applicant did not name or demonstrate the relevant experience of key management that will be appointed by [redacted]. To address this concern, Applicant has clarified that the intent is for [redacted] to delegate the day-to-day management activities of the project to [redacted]. This arrangement was reflected in the second addendum to the [redacted] Agreement that still has [redacted] approving key management positions, but states that a management team should be selected that is comparable to the existing [redacted]

Even if [redacted] key employees are managing the day-to-day activities of the project, [redacted][27] [redacted]

Information provided in the initial application submission about key Fishermen's Energy employees did not reflect much experience with the development of offshore wind facilities. This is not surprising, since no offshore wind projects have been developed in the U.S. In its amended application, Applicant identified additional key employees. [redacted] continues to be the only key employee with significant experience with offshore wind development. For the construction phase, the offshore wind expertise is largely expected to come from contractors. In the amended application, the project structure was reconfigured to better identify scopes of work for contractors. This included retaining [redacted], as owner's engineer, in the project management role to coordinate major construction-phase contractors, organize and track workflow, and manage contract interfaces.

[27] [redacted]

6. **Permitting should be another added criterion. Applicant has demonstrated a good understanding of the necessary permits and has obtained most significant permits for this project.**

During our review of the initial application we concluded that Applicant has obtained necessary state permits for the placement of turbines and cables in state waters. At the federal level, permits were pending from: a) [redacted]; and b) [redacted]

Applicant obtained the permit from the [redacted] The permit, however, is based on a design that includes six turbines and jacket foundations. The permit would have to be modified to reflect the installation of five turbines and the use of monopile foundations.

The Project is still pending receipt of [redacted]. Applicant expected to receive this in June 2012, but we are not aware if they did.[28]

[28] Amended Application, Appendix A: "Project Description & OREC Pricing," Exhibit D-1: "Fishermen's Energy List [*sic*] of Permit: State Waters Project – May 31, 2012" ("Permit Summary"), at page 2.

II. PROJECT SUMMARY

A. Introduction

The New Jersey Offshore Wind Economic Development Act[29] calls for the development of an OREC program to support at least 1,100 MW of generation from qualified offshore wind projects. The Act provides specific criteria which offshore wind developers must include in their applications to the BPU to be eligible to receive payment for the ORECs generated by their facility. The Act also states specific criteria upon which the Board must base decisions to accept or reject proposals for offshore wind projects.[30]

Boston Pacific and OutSmart were selected by the BPU's Office of Clean Energy to assist in evaluating the economic, financing, and technical feasibility of applications that were received under the OREC program. To this end, a set of procedures and an evaluation framework were defined with the purpose of making the evaluation process objective, fair and transparent.

Fishermen's Energy submitted an initial application last year. Boston Pacific and OutSmart evaluated that application and presented our findings in a report dated February 22, 2012. The evaluation was conducted in accordance with the Act and the BPU-adopted rules at N.J.A.C. 14:8-6 that codified new statutory requirements enacted through the Act.

Our evaluation of the initial application raised concerns about the significant subsidy that ratepayers would have to pay to develop the project. Further, we found that the Act's requirement to demonstrate net benefits was not met. The report also highlighted significant technical risk that could impair the Project's ability to perform as promised.

Fishermen's Energy submitted an amended application on June 1, 2012 and completed its submission on October 18, 2012. The amended application addressed some of the concerns that were raised in our February 22, 2012 report. This report contains Boston Pacific's and OutSmart's assessment and evaluation of the amended application in accordance with the Act and the Rules.

B. Project Description

The Project is a proposed 25-MW nameplate capacity wind farm that will be located approximately 2.8 miles offshore from the Atlantic City shoreline. The Project will utilize five Darwind/XEMC DD115 turbines, each with 5 MW capacity, to generate a proposed [redacted]

[29] P.L.2010, c.57; signed into law on August 19, 2010.
[30] Ibid., at Section 3.b.

MWh[31] of electricity annually. The turbines employ direct drive technology for the purpose of increasing performance and reliability. The total capital cost of the Project is anticipated to be $[redacted] million, or about $[redacted]/kW.

C. Ownership Structure

As seen in Figure One below, XEMC Group Co Ltd., through [redacted], will own [redacted] of the Project. [redacted]

FIGURE ONE
OWNERSHIP STRUCTURE[32]

REDACTED

[31] While last time the project's output was assumed to be [redacted] MWh, this time it was assumed to be [redacted] MWh. The difference comes from basing the projected output on a P-50 estimate (50% probability that output will be exceeded), as opposed to the P-90 or higher that was assumed in the initial application. We note that lenders typically rely upon a conservative estimate of output of P90 or higher to determine the debt service capability of a wind farm.

[32] From PMP, at page 62. XEMC Group Co., Ltd. is [redacted] owned by the People's Government of Hunan Province.

III. OREC PRICING

A. Introduction

The objective of this category of the Evaluation Framework is to comply with the Act's requirement that, when considering an application for a qualified offshore wind project, the Board consider the level of subsidies to be paid by ratepayers for the offshore wind projects over the life of the project. To achieve this, we assess the reasonableness of the proposed OREC price and whether it is an accurate representation of the project's revenue requirement. We conclude that, although the required subsidy decreased when compared to the initial application, it is still significant considering that the OREC price is [redacted] times higher than Applicant's own estimated electricity market price. Moreover, ratepayers would be subsidizing a project with significant technical risks. In addition, Applicant did not provide a fixed OREC price as is required by the Rules and some key capital cost assumptions that went into the revenue requirement calculation were not fully supported.

B. Reasonableness of OREC pricing

A major concern raised from our review of the initial application was that, at a starting point of $[redacted]/MWh, the requested OREC price represented a significant amount of subsidy paid by ratepayers considering that the OREC price was [redacted] times higher than Applicant's own estimated electricity market price of $[redacted]/MWh for the first year of operation. The amended application decreased the base OREC price to $[redacted]/MWh[33] for the first year of operations, which is assumed to be [redacted].[34] This OREC price is still [redacted] times higher than Applicant's own estimated electricity market price of $[redacted]/MWh. OREC prices will escalate annually at [redacted]%, with annual escalations commencing on [redacted].[35]

While Applicant has chosen to be more aggressive in their cost and performance assumptions in determining their OREC price, the subsidy that ratepayers will pay is still high. A key question that must be asked when assessing the size of the subsidy is what are ratepayers getting in return for such subsidy? The overarching concern is that ratepayers will be paying for a project with significant technical risks, that is – a 25 MW project that uses a turbine with no commercial operating history and which employs a technology that has not been used for this particular class of turbine. A key policy question is whether ratepayers would be better off subsidizing a less risky project that uses commercially proven wind turbines that are readily available in the market, rather than subsidizing a small scale "pilot" project using new technology. In contrast, for example, the proposed Cape Wind offshore wind project in

[33] See Financial Model, "Project Cash Flow" sheet.
[34] Based on Applicant's assumptions for electricity output, and energy and capacity revenues.
[35] Amended Application, Exhibit 19: Direct Testimony of [redacted] on Proposed OREC Pricing, Attachment 1: "OREC Pricing Plan, Policies, Goals & Mechanics," at page 8.

Massachusetts will require ratepayers to subsidize a full-scale project (468 MW) that uses commercially proven turbines.[36]

One reason for the decrease in OREC price is that the project's capital costs were decreased from $[redacted] million ($[redacted]/kW) to $[redacted] million ($[redacted]/kW). Even with a decrease to $[redacted]/kW, the capital costs for the Project are high as compared to the estimated cost for offshore wind elsewhere. We discuss capital cost assumptions in Section VI.

Another reason for the decrease in OREC price is that a higher electricity output was assumed for the project, which resulted in a lower cost per OREC.[37] In the amended application, the Project costs are divided by an estimated output of [redacted] MWh.[38] This is based on a P50 production estimate, which means that there is a 50% probability that the Project will produce more electricity than this output.[39] This is a [redacted] higher estimate than the projected annual electricity output of [redacted] MWh in the initial application, which we understand to be a more conservative estimate (e.g. P90, P95, or P99).[40] A P90 estimate means there is a 90% chance the project will produce more. Hence, one of the primary factors in the decrease in the OREC price in the current application is due to the ability of the Applicant to spread costs over a greater number of MWhs.

Another concern is that Applicant did not provide a fixed OREC price as is required by the Rules.[41] Applicant proposes to adjust the OREC price if:[42] a) the interest rate achieved at financial closing differs from the [redacted]% that is assumed for the proposed base OREC price of $[redacted]/MWh, and b) the final environmental permits result in curtailment by more than [redacted] hours per year. (If curtailment exceeds [redacted] hours, the OREC prices four years later shall be increased by the product of $[redacted]/MWh and the amount of curtailment greater than [redacted] hours shall be subject to interest accrued during the four years.)

Finally, Applicant proposes that it be allowed to recover specified cost increases if they are found to be eligible for recovery by the BPU.[43] This is inconsistent with the rule's requirement for a fixed OREC price. Costs include those caused by future actions of BPU, DEP, United States Army Corps of Engineers, Atlantic City or BOEMRE. Applicant proposes to recover costs from energy and capacity sales revenues from the project.

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[36] BOEMRE November 2010 Report on Offshore Wind Energy Costs, at pages 12 to 13.
[37] While last time the project's output was assumed at [redacted] MWh, this time it was assumed at [redacted] MWh. The difference comes from basing the projected output on either a P-50 or P-90 estimate.
[38] Amended Application, Appendix E: "Wind Speed and Energy Production Reports," at page 4.
[39] We note that lenders typically rely upon a conservative estimate of output of P90 or higher to determine the debt service capability of a wind farm.
[40] See Financial Model from Initial Application.
[41] "The Board requires a fixed, flat OREC price for the proposed term or a fixed price for every contract year. N.J.A.C. 14.8-6.5(a) 12.iii.
[42] Amended Application, Exhibit 19: Direct Testimony of [redacted] on Proposed OREC Pricing, Attachment 1: "OREC Pricing Plan, Policies, Goals & Mechanics," at pages 7 to 8.
[43] Ibid, at Section 6.3.

IV. COST BENEFIT ANALYSIS

A. Introduction

The objective of this category of the Evaluation Framework is to assess if the Project complies with the Act's requirement to demonstrate a positive economic and environmental net benefit to the state.[44] To achieve this, we evaluated 1) benefits to the New Jersey economy, 2) benefits to ratepayers, 3) benefits to the environment, and 4) other benefits. We conclude that net benefits were not demonstrated for the reasons explained in the following section.

B. Summary of Proposed Benefits

During our review of the initial application, we concluded that net benefits of the project were not demonstrated because key underlying assumptions of Applicant's cost benefit analysis were not adequately substantiated. Applicant submitted a revised cost benefit analysis that shows an expected $[redacted] billion of net benefits on an NPV basis. A low case scenario reflects net benefits of $[redacted] million NPV.[45] The following table shows a breakdown of these benefits:

Table 1
Net Benefit Breakdown

REDACTED

Benefits were not demonstrated for the categories that are highlighted above: a) impact to the NJ economy from increased tourism, b) impact to the NJ economy from the construction and operation of the facility, c) environmental benefits, and d) benefits to ratepayers from savings that would be realized by the construction of future offshore wind farms from the lessons learned through the Project ("lessons learned"). In addition, we disagree with the inclusion of benefits from the merit order effect for the same reasons we stated in our February 22, 2012 report.

[44] Act, at Section 3.b(1)(b).
[45] Amended Application, Appendix D: "Cost Benefit Analysis," May 31, 2012, at page 6. Also, see response to discovery request RCR-PF2-8 (dated July 19, 2012) in which Applicant says they had made a calculation error while estimating the tourism benefits from the Expected case and indicate that the correct NPV benefit should be $[redacted] million instead of the $[redacted] million that was provided with the Application. Similarly, in response to discovery request RCR-PF2-9, Applicant says that there was a calculation error while estimating the tourism benefit for the Low case. The correct NPV benefit should be $[redacted] million instead of $[redacted] million.

Benefits to ratepayers were demonstrated from: a) the receipt of revenues from the Project's sale of energy and capacity in the PJM markets, and b) the offsetting of Class I REC purchases—needed to meet New Jersey's RPS—with ORECs. However, these benefits are not enough to offset the Project's costs. Based on what we can substantiate, the result is a net cost to ratepayers of about $[redacted] million NPV over the life of the project.

In addition, we suggest that a sensitivity be performed on the cost benefit analysis that assumes a lower electricity output from the facility. This would show the net benefits that could be achieved if the facility does not perform as expected. The cost benefit analysis is based on an annual electricity output assumption of [redacted] MWh. This output level is based on a P50 output estimate. As explained above, P50 indicates that the output estimate has a 50% probability of being exceeded. We suggest that the sensitivity assume a more conservative P90 output estimate, which is a lower level of output which represents a 90% probability of being exceeded.

The following is a detailed analysis of Applicant's cost benefit calculations.

C. Benefits to the New Jersey Economy

Impact from Construction and Operation of the Project

Applicant estimates economic benefits to New Jersey of $[redacted] million on an NPV basis from the construction and operation of the Project.[46] These benefits are calculated by using a macroeconomic model of New Jersey's economy, called the R/ECON model, which was developed by Rutgers University. R/ECON is used to provide quarterly forecasts to a variety of clients including the NJ Treasury, the NJ Association of Realtors, the NJ Department of Transportation and the NJ BPU.

The R/ECON model was used to calculate the impact that construction and operation of the Project would have on the New Jersey economy. This was done by first running the model without the Project, and then running it again with the Project. The difference observed from both model runs is deemed to be the benefits of the project: a) $[redacted] million NPV increase in State's economy (Gross State Product) and b) $[redacted] million NPV increase in wages due to jobs created by the facility. According to the model, the project generates an estimated average of [redacted] jobs per year during the construction phase and [redacted] jobs in the operation phase.[47] Indirect business taxes of $[redacted] million NPV is calculated by applying tax rates of [redacted]% and [redacted]% to the R/ECON outputs for Gross State Product and wages, respectively.

[46] Amended Application, Exhibit 15: Direct Testimony of [redacted] on Cost Benefit Analysis, Attachment 1: "Cost-Benefit Analysis Tables," Table 3. This comes from R/ECON output found in Exhibit 17.
[47] Amended Application, Exhibit 17: Direct Testimony of [redacted], Bloustein Report, Paragraph below Table 4. Applicant excludes [redacted] for these calculations.

The R/ECON model adds credibility to the calculation of economic benefits to New Jersey. However, the R/ECON model relies on input assumptions that are provided by Applicant. Although Applicant provided more substantiation than what was provided in the initial application, this was not enough to demonstrate the assumptions for the following key inputs to the R/ECON model: a) New Jersey-based expenditures made during construction and operation of the project, b) direct jobs created during the construction and operations of the project, c) wages, d) labor cost breakdown by job class, and e) an expenditure curve of materials and labor costs during construction.

a) New Jersey-based expenditures made during construction and operation of the project

Out of the $[redacted]million in total capital costs, the Applicant deemed that $[redacted] million would be used as eligible inputs into the R/ECON model. Applicant determined [redacted]% out of the $[redacted] million, or $[redacted] million, could be attributed to the New Jersey economy.[48] This amount is divided into three categories: a) $[redacted] million are materials costs, b) $[redacted] million are labor costs, and c) $[redacted] million are certification and permit costs.

Not enough explanation or supporting analysis was given for how the New Jersey content was estimated. Also, not enough substantiation was provided for how labor costs were estimated. For each cost item in Applicant's capital cost breakdown, Applicant provides some notes that indicate what percentage of that cost is New Jersey content. For example, the turbine costs are $[redacted] million. Of those costs, Applicant assumes [redacted] percent, or about $[redacted] million, is New Jersey content. The corresponding note to support this claim states, "[redacted]." We cannot substantiate this claim for the following reasons: (a) no quote was provided for turbine costs, and (b) without an explanation, the [redacted]% assumption is an arbitrary number that is not supported. Another example of a claim without enough substantiation is in regard to the labor costs of fabrication and delivery of the transition pieces (a component of the foundation). In this case, Applicant's corresponding note states "[redacted]." The quote from [redacted] does not mention [redacted], and there is no accompanying explanation of how the [redacted]% was determined.

Regarding costs during operations, $[redacted] million per year are deemed to be eligible costs for inputs to the R/ECON model, out of which $[redacted] million per year are deemed to be New Jersey content. These costs include $[redacted] million per year non-labor operations and maintenance ("O&M") costs, and $[redacted] million per year labor O&M costs. Similar to construction costs, not enough support was given for how the New Jersey content and labor costs during operations were estimated.

b) Direct jobs created during the construction and operations of the Project

Another key input to the R/ECON model is an estimate of the number of jobs created by the Project. Applicant used another input/output model, NREL's JEDI model, to calculate these

[48] There is a discrepancy in the calculation of New Jersey content of $[redacted], which FACW acknowledges in the Capital Cost Breakdown Spreadsheet.

jobs: [redacted] direct jobs in the construction phase ([redacted] construction workers and [redacted] service jobs) and [redacted] direct jobs in the operations phase.[49] The key inputs to the JEDI model are New Jersey based capital and labor costs and wages. Again, not enough explanation or supporting analysis was given to demonstrate how the New Jersey content and labor costs were estimated. With regard to wages, which are used both in the JEDI model and the R/ECON model, Applicant developed wage data from a combination of prevailing wages for various job categories in New Jersey as well as specific rates from [redacted][50] We note that the source for the prevailing wages for New Jersey was not explained.

c) Wages

It is our understanding from the Application, that the wage assumptions for the R/ECON model are also sourced from the same underlying wage data used for the JEDI model. These wages are then categorized into specific job categories for R/ECON. As stated above, the applicant did not fully explain the sources used to arrive at the wages that were inputted into R/ECON.

d) Labor breakdown by job class

For this R/ECON input, Applicant takes the New Jersey labor cost assumptions described above and breaks down these costs into different components for each job class. For example, electrical labor during construction is estimated to be $[redacted] of New Jersey content. Applicant divides this cost into four different components: a) contractor markup, b) direct wages, c) fringe benefits, and d) employer taxes. No explanation is provided for how these separate labor cost components are calculated. Therefore, we cannot assess the reasonableness of this input.

e) Expenditure curve of materials and labor costs during construction.

There was no explanation or supporting calculations for the assumptions that were made on how labor and materials costs are spent during construction.

Tourism

Applicant calculates benefits of $[redacted] million and $[redacted] million on an NPV basis for the expected case and for the low case, respectively. However, Applicant did not sufficiently demonstrate tourism benefits because key inputs to their calculations were not adequately substantiated.

[49] Amended Application, Exhibit 17: Direct Testimony of [redacted], Attachment 1.
[50] Amended Application, Exhibit 15, Direct Testimony of [redacted] on Cost Benefit Analysis, at page 25.

The expected case is calculated by estimating that, because of the Project, about [redacted] million day-time visitors will spend $[redacted] per [redacted], and [redacted] million overnight visitors will spend $[redacted] per [redacted] during the initial year.[51] This results in an approximate $[redacted] million benefit for the initial year, which is then escalated by [redacted]% inflation for 20 years. Applicant assumes that after [redacted] years the novelty of the project will diminish and subsequently decreases the benefits for each year thereafter by [redacted]%.

A key assumption in Applicant's calculation of tourism benefits is the number of annual visitors to Atlantic City, which is assumed to be [redacted] million.[52] No substantiation was provided for this assumption.[53] To calculate the number of annual visitors that will increase their length of stay because of an offshore wind farm, the analysis multiplies the [redacted] million visitors by [redacted]%. The [redacted]% figure is based on a single survey question[54] conducted in 2009 which asked visitors if they would be more likely to visit if an offshore wind farm is built in Atlantic City. In the survey visitors were asked the question, [redacted] From this, the analysis infers that [redacted]% are more likely to visit.[55] Our central concern is that the survey simply did not ask the question 'would you stay longer and spend more?' That is, the survey was not specifically designed to gauge additional time of stay or spending that could be attributed to the Project. Applicant does not show how the number of tourists who say they are more likely to visit equates to an increased [redacted] stay. The analysis further breaks down the number of visitors by assuming that [redacted]% are day-time visitors and [redacted]% are overnight visitors. No substantiation was provided for this assumption. The expected case calculation does not take into account the possibility that tourists may choose to visit other offshore wind farms that may be built in New Jersey or other states. When the analysis assumes that [redacted]% of the [redacted] million annual visitors to Atlantic City will extend their stay to visit an offshore wind farm, Applicant seems to assume that their facility will be the only one to capture all of these tourists over the next 20 years.

In terms of tourist spending, the average spending of $[redacted] per [redacted] for day-time visitors was calculated by assuming that the average expenditures for these visitors is $[redacted]. Similarly, the average expenditure of $[redacted] for overnight visitors was calculated by assuming that the average expenditure for

[51] To substantiate the expected case benefits, Applicant relies on a report by [redacted]

[52] Tourism benefits are based on a report prepared by [redacted] (the "Report").

[53] The Report indicates that "[redacted]."

[54] Amended Application, Appendix D: "Cost Benefit Analysis," Exhibit B-6: [redacted] ("Survey").

[55] We get [redacted]%, but we assume Applicant performs some rounding that is not shown in the analysis.

these visitors is $[redacted]. These spending amounts come from a [redacted] report prepared for [redacted].[56]

Applicant's calculation implies [redacted] visitors per day will extend their stay by [redacted] because of the Project. This seems high considering that the Applicant's own calculation under the low case scenario assumes [redacted] visitors per day, which is based on the number of tourists [redacted].[57] A significant discrepancy in benefit estimates exists between these two methodologies. The first envisions current visitors extending their stay, while the second envisions attracting new visitors.

For the low case scenario Applicant assumes that each tourist will spend $[redacted] per visit in [redacted]. This is then escalated by [redacted]% per year. The average expenditure of $[redacted] per visit comes from a [redacted] report prepared for [redacted],[58] and is based on expenditures for overnight guests and first-time visitors. We note that the [redacted] category is different than the [redacted] category that was chosen for the expected case analysis. Applicant did not explain why a different category was chosen. Our main concern with this calculation is that when the Applicant uses the full $[redacted] to calculate benefits, the implied assumption is that these tourists will travel to New Jersey just to visit the Project.

D. Benefits to Ratepayers

Applicant estimates $[redacted]million NPV benefits to ratepayers. The main benefit to ratepayers comes from the sale of the Project's energy and capacity into the PJM market. This accounts for benefits of $[redacted] million NPV.

The sources used to estimate energy and capacity revenues are adequate. Energy prices are based on EIA wholesale prices for the Reliability First Corporation's east region, which includes the state of New Jersey.[59] Capacity prices are hard entered, but are based on a forecast provided in the 2011 Long-Term Capacity Agreement Pilot Program ("LCAPP") Agent's Report to the BPU. However, we note an inconsistency in Applicant's assumption of capacity prices in Section VI of this report.

Applicant calculates a benefit of $[redacted] million NPV from merit order effect. We disagree that this should count as a benefit for the same reasons we stated in our February 22, 2102 report.

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[56] Amended Application, Appendix D: "Cost Benefit Analysis," Exhibit B-1: [redacted]

[57] The applicant cites [redacted]

[58] [redacted] at page 5. Applicant averages $[redacted] average spent in [redacted] per visit for Overnight Guests and $[redacted] for First Time Visitors. This is then escalated to [redacted].

[59] See Amended Application, "Optimized Project C-B Analysis" Excel file.

Finally, Applicant calculates a benefit of $[redacted] million NPV from savings to ratepayers from being able to use the ORECs purchased to substitute for Class I RECs that they would otherwise have to purchase to meet New Jersey's RPS. Class I REC savings were calculated in the same manner from the initial submission. However, the prices for Class I RECs have changed. The starting price in the first year of operations has increased to $[redacted]/MWh from $[redacted]/MWh.

E. Benefits to the Environment

Environmental benefits of $[redacted] million NPV are calculated. Environmental benefits were not demonstrated because they are based on an estimation of the social benefits of displacing CO_2, SO_2, and NO_x emissions from fossil-fuel generation, rather than a market price for the emission. The calculation of environmental benefits should be tied directly to market prices because offshore wind is just one alternative to cutting emissions and its "benefit" occurs if, and only if, it is less expensive than the other alternative ways.

As an example, to calculate environmental benefits from CO_2, Applicant estimates the social cost of CO_2 to be $[redacted]/ton for [redacted]. To calculate this cost, Applicant relies on an inter-agency federal government report[60] that estimates the monetized damages associated with an incremental increase in carbon emissions in a given year. The report acknowledges the many uncertainties involved in determining these costs. The report provides several projections for the [redacted]. Applicant determined the [redacted]. Applicant assumed [redacted] from the EPA eGRID database for the NERC reliability area for New Jersey.

Applicant calculates a social benefit of $[redacted]/ton for SO_2 and $[redacted]/ton for NO_x. To calculate these costs, Applicant relies upon the EPA's [redacted] from the Clean Air Interstate Rule ("CAIR").[61] Applicant assumes that [redacted] due to CAIR by the year [redacted]. Applicant also assumes that a [redacted]. The basis for this assumption is not clear. Applicant then assumes that the health benefits from CAIR in [redacted].[62]

[60] Amended Application, Appendix D: "Cost Benefit Analysis," Exhibit C-11: Interagency Working Group on Social Cost of Carbon 2010 Report.
[61] See Amended Application, "Optimized Project C-B Analysis" Excel file. Also see Environmental Protection Agency, Office of Air and Radiation, "An Update on EPA's Clean Air Rules and Future Directions" ("EPA Update") and http://www.epa.gov/cair/charts_files/cair_emissions_costs.pdf.
[62] EPA Update.

Applicant also estimates environmental costs of $[redacted] million NPV from the construction of the project. Emissions costs from SO_2 and NO_x are calculated the same way as the benefits, but should also be based on market prices.

F. Other Benefits

Applicant estimates a benefit from the realization of cost savings of future full-scale offshore wind projects by implementing lessons learned from the Fishermen's Energy project.

The NPV of savings is estimated by [redacted][63] to be in the order of $[redacted] million assuming [redacted] MW of offshore wind projects are built in New Jersey.[64] For the Low Case, Applicant assumes [redacted] MW are built and takes the ratio of [redacted] MW to [redacted] MW to estimate benefits of $[redacted] million on an NPV basis.

To calculate the $[redacted] million savings, [redacted] uses a probabilistic model to determine the range of OREC costs for two cases: a) a range of $[redacted] to $[redacted]/MWh is determined for full-scale development (i.e. [redacted] MW) without lessons learned, and b) a lower range of $[redacted] to $[redacted]/MWh is determined for the Project and full-scale development with the benefit of lessons learned. After factoring in PJM revenues, [redacted] calculates a total lessons learned benefit to ratepayers of a NPV of $[redacted] million or $[redacted]/MWh.

The lessons learned benefit was not demonstrated for the following reasons:

A key driver in the methodology to calculate lessons-learned benefits is the quantification of the savings resulting from the Project's application of risk mitigation measures which correspond to a set of seven identified project risks. Out of the seven risk mitigation measures, only three of them have a quantified benefit. However, there are no supporting calculations for these quantified benefits. The three benefits that are quantified are:

- Shutdown for marine mammals: [redacted] However, no substantiation is given for the calculation of the $[redacted] saving.
- Aviation curtailment: [redacted]

[63] [redacted] Report.
[64] There is a discrepancy between the savings in the [redacted] Report of $[redacted] million, and Applicant's assumption of $[redacted] million.

[redacted]. However, no substantiation is given for this estimation.

- OREC program definition: [redacted]

To quantify the total benefits for the expected case, the analysis assumes that the lessons learned from the three risk mitigation measures will be implemented in full-scale projects that [redacted]. At this time, there is no way to know if the [redacted] will be developed. Also, it is unclear whether there will be a sufficient amount of time after the construction and operation of the Project to guarantee that any potential benefit of lessons learned will be transferred to subsequent projects.

From a broader perspective, we believe that there is a very high degree of uncertainty about the extent to which lessons learned from this Project could be applied by future projects. This is because every project has its own unique set of issues and characteristics. For example, future offshore wind project in New Jersey are likely to be different than the Project in that they may not be near shore, on state waters, and will likely be of a significantly larger scale. Additionally, these projects may be funded by more traditional banking sources as opposed to the financing arrangement that the Project has obtained from XEMC. The high degree of uncertainty makes it difficult to count lessons learned as a benefit of the Project.

V. ANALYSIS OF THE DEVELOPER'S EXPERIENCE AND FINANCING CAPABILITY

A. Introduction

The objective of this category of the Evaluation Framework is to assess the likelihood that the facility will actually be built. To achieve this, we evaluated: 1) Whether the developer's management, technical staff and/or contractors have the necessary experience and ability to successfully complete and operate the Project; 2) Whether Applicant has a viable financing plan for the facility; and 3) Whether the financial strength of key Project participants (e.g. turbine manufacturer, engineering, procurement and construction ("EPC") contractors, etc) is adequate in relation to the intended support of the Project. We conclude that Fishermen's Energy management does not have much direct experience with the development of offshore wind projects; however, they plan to contract with experienced third parties to develop the facility. The lack of offshore wind experience is understandable since no offshore wind projects have been developed in the U.S. In terms of the viability of the Project's financing plan, we view the fact that the Applicant has secured financing from XEMC as a positive. However, XEMC's financial strength was not demonstrated because its financial statements do not meet U.S. accounting standards. Finally, the Applicant did not provide financial statements for most of its key contractors; therefore, we could not assess their financial strength.

B. Developer team's experience and ability to successfully complete and operate the Project.

1. Management's experience with offshore wind projects

Once [redacted]% of the project, [redacted] would have the right to appoint key management for the project, including [redacted]'s CEO and CFO positions. A concern raised during our review of the initial application was that Applicant did not name or demonstrate the relevant experience of key management that will be appointed by [redacted]. To address this concern, Applicant has clarified that the intent is for [redacted] to delegate the day-to-day management activities of the project to [redacted]. This was reflected in an Addendum to the [redacted] Agreement that still has [redacted] approving key management positions, but states that a management team should be selected that is comparable to the existing [redacted].

The management team will operate the project on behalf of the owners, [redacted] Agreement.[65] The current draft of the [redacted] Agreement, however, states that the [redacted]

[65] Second Addendum, at Section 14.

[redacted][66] This would need to be made consistent with the second addendum to the [redacted] Agreement which states that [redacted]: (a) [redacted] or, (b) [redacted][67]

[redacted]

Even if [redacted] key employees are managing the day-to-day activities of the project, [redacted][68], [redacted][69].

The information that was provided about key Fishermen's Energy employees for the initial application submission did not reflect much experience with the development of offshore wind facilities. This is not surprising, since no offshore wind projects have been developed in the U.S. In its amended application, Applicant identified the following as key employees:[70]

[redacted]

[66] Amended Application, Appendix C: "Financing Plan," Exhibit E – Part 2, Exhibit A: [redacted] Agreement, June 24, 2011 ("[redacted] Agreement"), at Section 5.8.

[67] [redacted]

[68] [redacted]

[69] [redacted] Agreement, at Section 5.6.

[70] Amended Application, Exhibit 2: Direct Testimony of [redacted] on Business Information, at page 4.

[redacted] is the only key employee with significant experience with offshore wind development. He has over 29 years of experience in the energy industry, specifically geared toward managing the development of energy projects. Importantly, he brings seven years of experience with the development of offshore wind projects. This includes undertaking the management of demonstration scale projects both off the coast of New Jersey and Rhode Island, as well as the Great Lakes; none of which are built.

Applicant states that [redacted], brings decades of marine capabilities.[71] However, no resume was provided for [redacted] to assess his relevant experience. Applicant also highlights [redacted] experience, which includes over 27 years of involvement with the development of power projects, including wind power projects.

Applicant also identified two key employees who do not have experience with the development of power facilities, but bring to the Project expertise in certain required areas. [redacted] has over 20 years of ocean-based experience, including the planning and installation of large underwater power and telecom cables around the world. He has spent 14 years working in the offshore drilling industry. [redacted] is a civil engineer and oceanographer with over 25 years experience designing and implementing marine data acquisition equipment and programs in estuarine, coastal, and deepwater locations worldwide. Applicant also indicates that [redacted]. has direct local government and wind energy project experience as a result of his leadership role on [redacted].

2. Technical experience

Applicant relies on contracting with firms who have experience with the development of offshore wind projects. Rather than having a single contractor in charge of performing all EPC activities, Applicant will contract with multiple companies who will perform specific tasks under separate EPC contracts. We raised two concerns in our initial review. First, while we have seen this structure before, a risk with this subcontracting model is that each sub-contractor will focus on completing their specific assignment area, but if not properly managed there may be issues with interfacing all of the components together. Moreover, without a single, third-party EPC

[71] Ibid., at page 5.

contract, the owners take on substantial project development risk. Second, financial statements were not provided for contractors to fully demonstrate their financial strength and not enough information was provided about their experience developing offshore wind projects.

With regards to the first concern, Applicant reconfigured the project to better identify scopes of work. This included retaining [redacted] in the project management role to coordinate the following seven major construction-phase contracts, organize and track workflow, and managing contract interfaces.

- Turbine contract: XEMC Darwind BV[72]
- Foundation Design: [redacted]
- Foundation contract: [redacted]
- Hook-up Contract: [redacted]
- Cable contract: [redacted]
- Substation: [redacted]
- Ports contract: [redacted]

With regards to the second concern, Applicant identified all major subcontractors and provided details about their relevant experience. While the majority of key contractors do not have direct experience with offshore wind, which is expected since there are no U.S. offshore wind farms, they have relevant experience for their respective contract areas. However, financial statements were only provided for two of them.

Table 2
Relevant Experience and Financial Strength of Key Contractors

ROLE	CONTRACTOR	RELEVANT EXPERIENCE	FINANCIAL STRENGTH
• Project management	[redacted]	[redacted] is a design, engineering, and project management consultancy with experience with multiple offshore wind projects in Europe and has performed various engineering functions for these projects.	Financial statements not provided.
• Turbine supply	XEMC Windpower Co., Ltd.[73]	XEMC Windpower Co., Ltd acquired Darwind, a Dutch wind turbine manufacturer. The XEMC DD115 turbines are of European design.	Financial statements not provided.
• Foundation building and	[redacted]	[redacted] has conducted various marine-based construction projects that include wharf	Audited financial statements provided, year

[72] XEMC Darwind BV is [redacted]% owned by XEMC Windpower Co., Ltd. See PMP, at page 62.
[73] Amended Application, Appendix C: "Financing Plan," Exhibit H: draft of [redacted] Agreement.

installation • Turbine transportation and lifting		construction, oil and gas platforms, and pipelines. [redacted] has a Heavy Lift and Salvage division that utilizes a fleet of floating cranes, steel barges and tug boats to perform major lift projects.	ending December 31, 2011. Tangible Net Worth is ~$[redacted] million.
• Undersea cable supply and installation	[redacted]	[redacted] has over 150 years of project work that includes underwater power generation cables and underground power distribution cables. Previous projects include nuclear power cables and utility work with [redacted]. [redacted] has onshore and offshore project experience that includes underwater and subterranean power cables, including a major project near New York City that involved installation of [redacted]	Financial statements not provided.
• Foundation Design	[redacted]	Previous work includes transportation and erection of MAS modules, multi-deck production and quarters design, procurement and project management of an offshore platform; and design and fabrication of components of an offshore oil platform.	Financial statements not provided.
• Substation	[redacted]	[redacted] has previous project work including multiple solar array systems, utility plants, and energy distribution networks that reflect [redacted] skills essential for this segment of construction. [redacted] has [redacted] of electric project work that includes central energy centers and renewable energy systems.	Audited financial statements provided, year ending December 31, 2011. Tangible Net Worth is ~$[redacted] million.
• Ports Management, Engineering, and Logistics	[redacted]	[redacted] has over 40 years of complex of lifting and transportation project experience that includes renewable energy and power generation industries. [redacted] extensive equipment network provides equipment such as cranes and lift towers as well market experience in wind projects, transportation logistics and port evaluation and logistics planning.	Financial statements not provided.

3. Operations and maintenance experience with offshore wind projects

The project plans to enter into [redacted] Agreement that provides for service of the turbines as well as [redacted].[74] A draft of this agreement was provided.[75] The draft states that XEMC NE, which we assume to be XEMC New Energy Co. Ltd. (XEMC), is both the turbine supply agreement contractor [redacted] This is not consistent with the draft turbine supply agreement provided by Applicant, which lists XEMC Wind Power Co., Ltd. as the turbine supplier. The draft defines a scope of work that includes: a) providing all parts, labor, materials and tools to perform all scheduled and unscheduled maintenance services, b) a defects warranty, and c) an availability warranty of 95%, with an allowance of 90% for the first year of production.[76] If this is not achieved, XEMC NE must pay a penalty. XEMC NE is required to demonstrate sufficient financial strength to guarantee performance of its obligations under the contract. Otherwise, it must deliver a guarantee from a parent company. Applicant does not provide technical qualifications that demonstrate their ability to perform turbine maintenance for the proposed offshore wind facility.

Fishermen's Energy will perform remaining O&M for the project under an [redacted] Agreement.[77] Only a term sheet was provided for this agreement.

C. Viability of proposed financing plan.

1. Financial projections which clearly indicate equity contributions and the amount of debt to be financed

Applicant provided a financial model dated May 8, 2012 which reflects total project costs of approximately $[redacted] million, and assumes that the Project will have capital structure of [redacted]% debt and [redacted]% equity – that is, approximately $[redacted] million and $[redacted] million, respectively.

Applicant, in their financial model, did not include a construction schedule showing a drawdown of funds. Therefore, we cannot comment on the equity contributions and debt financing during construction.

2. Demonstration of sufficient financial capacity to ensure that the Project can be successfully completed as proposed.

[74] Amended Application, Exhibit 11: Direct Testimony of [redacted] on Operations and Maintenance Plan, at page 3.
[75] Amended Application, Appendix C: "Financing Plan," at page 18.
[76] Amended Application, Appendix C: "Financing Plan," Exhibit J: [redacted] at Section 11.
[77] Amended Application, Appendix C: "Financing Plan," Exhibit E - Part 1 ("[redacted] Agreement"), at Section 3.11.

The Project will receive debt and equity financing from XEMC. During our review of the initial application we indicated that we viewed as positive the agreement that was reached with XEMC to provide debt and equity financing to develop the Project. This eliminates a key hurdle that developers typically encounter, which is the ability to obtain financing for their projects. The Rules require that the Applicant demonstrate sufficient financial capacity to ensure that the project can be successfully completed. To satisfy this requirement, the Applicant must demonstrate that XEMC has the financial strength to provide the financing required to complete this project. We attempted to assess the financial strength of XEMC; however, we could not rely on the financial statements provided for XEMC since they are presented based on Chinese accounting principles. We raised this same concern during our review of the initial application and suggested that either the financial statements be presented in U.S. GAAP, or that the Applicant provide an opinion from a recognized global accounting firm that attests to the financial statements and the financial strength of XEMC and its parent company, XEMC Group Co., Ltd. Applicant provided letters from their auditors confirming that they had audited the 2011 financial statements based on Chinese accounting principles. However, these were not enough for Applicant to demonstrate the financial strength of these companies under U.S. GAAP.

XEMC's Equity Contribution

On [redacted] Applicant entered into a [redacted] Agreement with XEMC whereby XEMC intends to effectively purchase [redacted]% of the Project for $[redacted] million. XEMC also intends to provide financing for all costs to develop, design, procure, and build the Project.

In terms of equity, the [redacted] Agreement, including its amendments, provides for XEMC to purchase [redacted]% of the issued and outstanding units in [redacted] for $[redacted] million upon executing an [redacted] Agreement. XEMC will pay for the purchase of equity in a series of installments:[78]

a) A non-refundable payment of $[redacted] which was made on [redacted];
b) A non-refundable payment of $[redacted] million that was to be provided by the [redacted] execution date of the [redacted] Agreement;
c) A $[redacted] million payment for consideration of [redacted]% of the equity [redacted] days after the last to occur of: a) [redacted], or b) [redacted]
d) A $[redacted] million payment to be paid on the date on which the [redacted] Agreement is executed.
e) XEMC will deliver a $[redacted] million note to Fishermen's Energy on the date on which the [redacted] Agreement is executed. At the same time XEMC will

[78] Amended Application, Appendix C: "Financing Plan," Exhibit E – Part 2: [redacted] Agreement, at Section 2.2, and Second Addendum, at Section 5.

place the [redacted]. The note is due [redacted] years following the commercial operation date and earns annual interest of [redacted]%.

XEMC's Debt Financing

In term of debt financing, the [redacted] Agreement includes provisions for XEMC to fund [redacted] incurred to develop, design, procure, and build the Project.[79] As an incentive for Fishermen's Energy to minimize project cost overruns, the agreement calls for [redacted]. However, no further description is provided about the terms of XEMC's financing such as interest rate, loan tenor, repayment terms, etc. Given the significance of the term loan to the Project's overall costs, these terms should be reflected in the financial model that was provided for the Project.

D. Financial strength of Project participants (e.g., turbine manufacturer, EPC contractor) in relation to intended support of the Project.

The turbine supplier is XEMC Windpower Co., a company based in Hunan Province, China. This company is [redacted]% owned by a publicly-traded Chinese company, Xiangtan Electric Manufacturing Co., Ltd,[80] who, in turn, is [redacted]% owned by XEMC Group, which is owned by the People's Government of Hunan Province, China. In order to assess the financial strength of Xiangtan Electric Manufacturing Co., Ltd, XEMC Windpower, and XEMC Group, we would rely on a review of their financial statements and/or credit ratings assigned by one of the major credit rating agencies. In this case, we could not rely on the financial statements that were provided since they are presented based on Chinese accounting principles. During our review of the initial application we asked that these financial statements be either presented in U.S. GAAP, or be accompanied with an opinion from a global accounting firm that attests to the financial strength of these companies. In response, Applicant did not provide financial statements in U.S. GAAP, but provided letters from their auditors confirming that they had audited the 2011 financial statements based on Chinese accounting principles. However, these letters were not sufficient to demonstrate the financial strength of these companies under U.S. GAAP. The auditor for Xiangtan Electric Manufacturing Co.[81], the manufacturer of the turbines, provided a letter that only states that they conducted an audit of the 2011 financial statements. However, no information was provided about the financial strength of the company. XEMC Group was audited by [redacted]. This company provided a letter indicating that they had audited the 2011 financial statements; however, the letter did not provide enough information to demonstrate the financial strength of the company.

[79] [redacted] Agreement, at Section 4.3.
[80] The company is listed in the Shanghai Stock Exchange. Initial Application, Nixon Peabody letter re: XEMC business review, dated July 11, 2011.
[81] Amended Application, [redacted] letter, dated September 28, 2012.

Financial statements were only provided for two contractors: [redacted] and [redacted], both provided audited financial statements in U.S. GAAP. These firms, through tangible net worth calculations, demonstrate their solvency. We could not assess the financial strength of the other firms, as no financial statements were provided for them.

VI. FINANCIAL ANALYSIS

A. Introduction

The objective of this category of the Evaluation Framework is to validate the key assumptions that are used in the financial model,[82] and are ultimately reflected in the proposed OREC price and the cost benefit analysis. To achieve this, we evaluated: 1) key revenues assumptions; 2) key cost assumptions; 3) whether financing assumptions were adequately supported and correctly reflected in the pro forma; 4) whether state and federal incentives were correctly reflected in the pro forma; and 5) whether adequate funding was provided for project decommissioning. We conclude that most of the key revenue assumptions such as the project's electricity output and PJM energy prices were adequately supported. Regarding capital cost assumptions, while Applicant provided quotes to support the majority of assumed costs, no substantiation was provided to support turbine costs, which represent about [redacted]% of total capital costs. For financing costs, Applicant did not reflect the financing of construction costs in the financial model. We also note that the financial model in the current application assumes a P50 estimate for energy production as opposed to a more conservative estimate assumed in the initial application.

B. Key revenue assumptions

1. Electricity output projections

The projected annual electricity output of the Fishermen's Energy wind farm is [redacted] MWh. This is based on a P50 production estimate of five Darwind/XEMC DD115 5 MW turbines.[83] This is a [redacted] higher estimate than the projected annual electricity output of [redacted] MWh in the initial application, which we understand to be a more conservative estimate (e.g. P90, P95, or P99).[84] Hence, one of the primary factors in the decrease in the OREC price in the current application is due to the ability of the Applicant to spread costs over a greater number of MWhs. We note that lenders typically rely upon a conservative estimate of output of P90 or higher to determine the debt service capability of a wind farm. Lenders will look at debt repayment under various scenarios of estimated output when evaluating a borrower's pro forma financial model. While the ability to finance the Project may depend on the Project's output estimate, we note that ratepayers will not be affected by variations in performance. This is because ratepayers are only required to pay for those ORECs that are actually generated.

The annual output of [redacted] MWh is the net energy production of the facility, meaning that the number reflects all losses incurred during production.[85] These include losses inherent

[82] Financial Model.
[83] Amended Application, Appendix E: "Wind Speed and Energy Production Reports," at page 4.
[84] See Financial Model from Initial Application.
[85] Amended Application, Appendix E: "Wind Speed and Energy Production Reports," at page 4.

with turbine operations, losses resulting from the layout of the wind farm, electricity losses during transmission, the times that the facility is asked to decrease its output for reliability reasons (curtailment), and outages for turbine maintenance. These losses amount to [redacted] MWh a year, resulting in a net capacity factor of [redacted]%.[86]

In order to credibly support projections of a wind farm's output, we believe that having a third party wind resource study and performance assessment is necessary. In Applicant's initial application, they did not provide such report.[87] In the amended application, Applicant provided a wind study that was developed by [redacted].[88] The report is outdated and is based on a configuration of six XEMC turbines. However, Applicant also provided a memorandum which updated the output estimates of the wind study for the current configuration of five XEMC turbines.[89]

In addition, in response to our discovery request, Applicant provided supplemental data from [redacted] which included the power curve for the XEMC turbines that was not included in the original [redacted] report.[90] Although a new wind resource and production report for the current turbine configuration would have been ideal, we believe that the supplemental data provided by [redacted] is sufficient.

2. PJM energy prices

The Rules require that Applicants sell the Project's energy into the PJM day ahead and/or real-time markets. Proceeds from this sale are to be credited to New Jersey ratepayers. Applicant provided a forecast for PJM energy market prices based on EIA's 2011 Annual Energy Outlook reference case for power prices in the Reliability First Corporation's East region, which includes the state of New Jersey.[91] This is a departure from how energy prices were forecasted in the initial application, which used futures prices as a starting point.

Applicant's previous methodology used future prices for the PJM West Hub, and adjusted these prices to reflect pricing in the ACE zone by using historic congestion pricing between the two points. In order to project long-term energy prices, Applicant extended the future prices with an escalation rate, derived from EIA's Annual Energy Outlook forecast of energy prices. Applicant also adjusted the pricing both downwards and upwards for a merit order effect and a carbon price adder. We noted several issues with their methodology, including a lack of substantiation for several components of the methodology. [92]

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[86] Ibid.
[87] Boston Pacific Company, Inc. and OutSmart, "Evaluating the Economics of Offshore Wind Projects: Evaluation of the Application by Fishermen's Atlantic City Windfarm, LLC," February 22, 2012 ("Boston Pacific and OutSmart Initial Application Evaluation"), at page 17.
[88] Amended Application, Appendix E: "Wind Speed and Energy Production Reports," Exhibit C: "July 8, 2011 Report."
[89] Amended Application, Appendix E: "Wind Speed and Energy Production Reports."
[90] See Amended Application, Discovery Request RCR-PF2-113, XD-TD-174-RA Power Curve of XD115.
[91] See Amended Application, "Optimized Project C-B Analysis" Excel file.
[92] Boston Pacific and OutSmart Initial Application Evaluation, at pages 18 to 20.

The current methodology for projecting relevant PJM energy is a more straightforward approach than the previous methodology and does not include steps of adjusting for congestion, merit order effect, and carbon regulation. The only adjustment that Applicant makes to the EIA forecast is converting the forecast into nominal dollars.[93] In addition, the current energy forecast does not diverge significantly with the prior forecast; the average difference in prices over 20 years is [redacted]% or $[redacted]/MWh.[94]

3. Capacity revenues

In addition to selling energy, Applicant intends to generate revenues from the sale of capacity in PJM. Proceeds from this sale are to be credited to New Jersey ratepayers. Capacity revenues are based on the prevailing capacity prices in PJM and how much capacity the Project can sell. In order to calculate these variables, Applicant relies on the same methodology they used in the initial application. The capacity price forecast was derived from a report prepared for the BPU regarding the LCAPP by Levitan & Associates and the Capacity Value of the Project is estimated based on PJM rules.[95] The Capacity Value of the Project remains at [redacted]% or [redacted] MW, but the capacity price forecast has changed.[96] The 20-year average price of capacity is about [redacted]% or $[redacted]/MW-day higher than the previous forecast. We note that the amended application assumes a different start year. Also, for a few years, prices are different between the respective forecasts for the initial and amended application even though the same source is used for both forecasts.[97] The LCAPP report does not show exact year-by-year capacity prices in their projection, and instead only provides a graph by which prices can be interpreted.[98] Applicant does not provide an explanation for how prices were derived from the report.

C. Key cost assumptions

The total capital cost of the Project is approximately $[redacted] million.[99] This is a decrease of about $[redacted] million from the initial application with projected capital costs of $[redacted] million.[100] In terms of judging the reasonableness of the capital costs, the total Project cost, which roughly equals $[redacted]/kW, [redacted]. A report issued by NREL shows that, on a capacity-weighted basis, offshore wind projects announced for 2012 and beyond have capital costs in a range between $4,000 and $4,500/kW in 2008 dollars.[101] In another report, issued by BOEMRE,

[93] See Amended Application, "Optimized Project C-B Analysis" Excel file.
[94] Comparing both methodologies over the same 20 year period
[95] Levitan & Associates, Inc., "LCAPP Agent's Report, Long-Term Capacity Agreement Pilot Program," March 21, 2011 ("LCAPP Report"), at page 61.
[96] See Amended Application, "Optimized Project C-B Analysis" Excel file.
[97] Comparing both methodologies over their respective 20 year period
[98] LCAPP Report, at page 61.
[99] See Amended Application "FACW_Project Construction CAPEX_XEMC_120405 DETAILED BREAKOU" Excel file.
[100] Boston Pacific and OutSmart Initial Application Evaluation, at page 21.
[101] NREL September 2010 Report on Large-Scale Offshore Wind Power in the United States, at page 109.

four European projects with online dates of 2012 had capital costs ranging from approximately $4,100 to $4,900/kW.[102]

Applicant compares the Project's costs to [redacted]. The comparison is made on an overnight cost basis, which excludes financing costs. Applicant chose [redacted] as relevant benchmarks, and finds that the Project costs are [redacted] below these two benchmarks. We presume these were chosen because of their small size; however, there are other factors that do not make this an apples-to-apples comparison with the Fishermen's Energy project. Both of the [redacted] projects are located in greater water depths, and are a greater distance away from the shoreline than the Fishermen's Energy project.[103] Generally, an increase in these variables increases the cost of a project; therefore, we would expect a lower capital cost for the Fishermen's Energy project.

Applicant also provides a comparative analysis of capital costs performed by [redacted]. [redacted] finds that the marine installation costs are [redacted] higher than expected and says that this may be caused by the lack of competition in New Jersey. For example, wind turbine and foundation installation costs are about $[redacted] million higher than [redacted]'s internal cost benchmark, which is based on costs of [redacted] projects. [redacted]'s conclusion is that the Project may benefit from further negotiating these costs.[104]

Finally, Applicant concludes that the project costs are "[redacted]."[105] We disagree with justifying a project's high capital cost and ratepayer subsidy based on the development of a pilot or demonstration project. Rather than subsidizing a project that has as one of its purposes to demonstrate the proposed XEMC turbines, ratepayers are better off subsidizing a less risky project that uses commercially-proven wind turbines that are readily available in the market.

Applicant provides a breakdown of the capital costs of the project with major cost categories, including: foundations; turbines; cable system; substation; turbine transportation and lift; project management; engineering, project management, and soft costs; and other project costs including financing. Unlike in the initial application, Applicant provided quotes to support the majority of assumed costs. However, we have concerns with several of the cost items. The breakdown of capital costs are shown in Table 3 below.

Turbines

The turbine costs are the largest cost component of the Project, amounting to $[redacted] million or $[redacted]/kW, which is approximately [redacted]% of total capital costs. The EPC costs of the turbine are $[redacted] million or about $[redacted] million per turbine. Applicant did not provide third party

[102] BOEMRE November 2010 Report on Offshore Wind Energy Costs, at page 135.
[103] See [redacted]
[104] Amended Application, Exhibit 4: Direct Testimony of [redacted], at page 11.
[105] Amended Application, Appendix B: "Capital Expense Budget," at page 7.

documentation that could confirm these costs. Typically, we would expect a supplier quote or a term sheet associated with a turbine supply agreement that states the price and scope of services offered. Applicant's draft turbine supply agreement did not include pricing information. The contingency costs for the turbines are $[redacted] million, or [redacted]% of turbine costs.

Foundation

Foundation costs are about [redacted]% of total capital costs, and total approximately $[redacted] million or $[redacted]/kW. Applicant received quotes from [redacted] contractors who will perform the engineering, procurement, and construction of the foundations. [redacted] provided a quote for the engineering portion of the foundation work.[106] [redacted] provided a quote for the remaining foundation work, including the procurement and construction of the foundations.[107] However, for the scour protection, Applicant also received a separate quote from [redacted] for a lower cost than what it quoted from [redacted] and which Applicant assumes in its capital cost breakdown.[108] Applicant assumes a contingency of $[redacted] million which is [redacted]% of total foundation costs. Contingency costs for each cost category were developed by Applicant in consultation with [redacted], owner's engineer for Applicant.[109]

Cable System

Cable System costs are related to the supply and the installation of all cables that are necessary to bring power from the turbines to the onshore point of delivery. These costs are approximately $[redacted] million or $[redacted]/kW, representing about [redacted]% of total capital costs. Applicant received a quote from [redacted] to perform all the work under this cost category.[110] The total cost, excluding contingency, that is assumed for this work is $[redacted], which is based on the quote for 5 turbines and 30 MW of capacity. The quote also states a cost of $[redacted] for five turbines and 25 MW of capacity, which matches the total capacity of the wind farm. If the 25 MW cable system is assumed, then costs would decrease by approximately $[redacted].[111] Applicant should reflect the appropriate cable system capacity with the wind farm. Total contingency costs are approximately $[redacted] million or [redacted]% of cable system costs.

[106] Amended Application, Appendix B: "Capital Expense Budget," Exhibit A: "[redacted] Quote for Engineering Foundations."
[107] Amended Application, Appendix B: "Capital Expense Budget," Exhibit B: "[redacted] Quote for Fabrication and Delivery of Monopiles."
[108] Amended Application, Appendix B: "Capital Expense Budget," Exhibit B-1: "[redacted] Quote for Scour Protection."
[109] See Amended Application, "FACW_Project Construction CAPEX_XEMC_120405 DETAILED BREAKOU" Excel file.
[110] Amended Application, Appendix B: "Capital Expense Budget," Exhibit D: "[redacted] Quote for Cable Procurement and Installation."
[111] Ibid.

Substation

Substation costs are associated with the design, build, start-up, and testing of a [redacted] substation at the [redacted] in Atlantic City. Applicant received a quote from [redacted] to perform this work.[112] The quote for such work is approximately $[redacted] million. However, the quote, which is dated November 4, 2010, states that an interconnection application that was filed with PJM was based on a 20 MW wind farm. The quote further states,

> The Wind Turbine Generation capacity was increased from 20MW to 24MW. The existing Interconnection Study may need to be revised and PJM may require additional network-updates. [redacted][113]

Our concern with this quote is that it is based on outdated information, and it is unclear how this cost will be affected with up to date information. Applicant assumes a contingency of $[redacted], or [redacted]% of substation costs.

Turbine Transport and Lift

Regarding turbine transport and lift costs, Applicant received tender pricing from [redacted] to provide the transport and lift of all wind turbine generator units, including the towers, nacelles, hubs, generators, and blades onto the pre-installed foundations.[114] Their proposal also includes services for bolting, connecting, and installing cable for all wind turbine generator units and to supply portable power for energizing the units from electrical completion to final commissioning. Their proposed price is $[redacted] million for these services. However, Applicant prorates the price down to $[redacted] million to "[redacted]." It is unclear how this reduction in price is obtained as Applicant did not provide any supporting material to justify the reduction.[115] Applicant assumes approximately $[redacted] million in contingency costs which is [redacted]% of turbine transport and lift costs.

Project Management

[redacted] is the owner's engineer for Applicant and the costs for their services are reflected in the cost item for Owner's Engineer, PM Services in the Project Management cost category. [redacted] provided pricing for their services of $[redacted], which is less than

[112] Amended Application, Appendix B: "Capital Expense Budget," Exhibit E: "[redacted] Quote for Substation."
[113] Ibid.
[114] Amended Application, Appendix B: "Capital Expense Budget," Exhibit F: "[redacted] Quote for Turbine Transport and Lift."
[115] See Amended Application, "FACW_Project Construction CAPEX_XEMC_120405 DETAILED BREAKOU" Excel file.

the $[redacted] million assumed by Applicant.[116] There is no explanation for the mismatch in pricing except that Applicant noted in their capital cost breakdown that a new proposal was forthcoming on March 23, 2012.[117] We have not seen a newer proposal from [redacted] in the current application. Furthermore, pricing was provided in January 2011, which acknowledges the use of [redacted].

Port Staging Area costs are $[redacted]. Applicant received a proposal from [redacted] for the receipt, intra-port transport, storage, sub-assembly and load out of wind turbine components.[118] However, [redacted] proposal states that their services are for six turbines. In addition, it is not clear if the assumed price of $[redacted] was provided by [redacted]. At the end of the exhibit, there is a page that includes [redacted] proposal and an RFP that contains a price list for six work areas. [redacted] price is associated with the second work area; it is not clear how the other costs are accounted for. The remaining $[redacted] of the Port Staging Area cost is port leasing costs, which is not supported by a quote.

The remaining cost item in this category is for the Atlantic City Laydown Yards. This cost is not associated with a quote, but is estimated to be $[redacted] by Applicant. Applicant bases this estimate on the amount of square footage needed and the annual rent for vacant land in Atlantic City, for which Applicant does not provide sources.[119]

Overall, Project Management costs are approximately $[redacted] million, or $[redacted]/kW, which makes up about [redacted]% of total capital costs. Contingency costs are approximately $[redacted] million, which is [redacted]% of Project Management costs.

Engineering, Project Management, and Soft Costs

This cost category includes various cost items, such as interconnection, owner's management, development costs, development capital recovery, interest during construction, and a certification agent. The estimate for the interconnection cost of $[redacted] was provided by PJM in a Generation Interconnection Facilities Studies Report regarding interconnection at the [redacted] substation.[120] For Owner's Management costs, Applicant provides a budget for their management team for the period between January 1, 2012 and commercial operations.[121] The budget is based on the amount of hours required by key employees and their corresponding hourly rate, which includes benefits. Two of the key positions, outside accounting and tax filings, are charged on an annual basis. In total, Owner's Management costs are estimated to be approximately $[redacted] million.

[116] Amended Application, Appendix B: "Capital Expense Budget," Exhibit G: "[redacted] Proposal for Owners Engineer Services."
[117] See Amended Application, "FACW_Project Construction CAPEX_XEMC_120405 DETAILED BREAKOU" Excel file.
[118] Amended Application, Appendix B: "Capital Expense Budget," Exhibit H: "[redacted] Quote for Turbine Staging."
[119] Amended Application, Appendix B: "Capital Expense Budget," Exhibit I: "Estimate for Laydown Yard Costs."
[120] Amended Application, Appendix B: "Capital Expense Budget," Exhibit J: "PJM Interconnection Facilities Study Report."
[121] Amended Application, Appendix B: "Capital Expense Budget," Exhibit P: "Owners Management Costs."

Development Costs, according to Applicant, are all the costs incurred to date and future costs for the development of the Project, including interest costs, wind resource measurement, permitting, engineering, bidding, regulatory compliance, project management, etc. Applicant provided income statements showing development expenses incurred from January 1, 2007 to December 31, 2011, which accounts for approximately $[redacted]million.[122] However, no budget was provided for the remaining $[redacted] million.

Development Capital Recovery[123] costs, according to Applicant, are a return of and on Founder's equity. [124] Applicant assumes $[redacted] million for this cost. Applicant does not provide any explanation of how this cost is calculated. In any case, it is unclear if this should be a cost that ratepayers should have to pay.

The remaining two cost items are "Insurance During Construction" and "Certification Agent." These costs are estimated to be $[redacted] million and $[redacted], respectively. For insurance, [redacted] provided Applicant with a quote for two premium options, one for approximately $[redacted] million and the other for approximately $[redacted] million.[125] It is not clear how Applicant arrived at $[redacted] million for the cost of insurance. Regarding the Certification Agent cost, [redacted] provided Applicant with proposals to conduct a project certification of the wind farm.[126] From [redacted] proposals, the entire quoted fees sum to $[redacted], which is $[redacted] less than what Applicant assumes. While the quotes are not far off of Applicant's assumption, we note that [redacted] proposals appear to be outdated and refer to a jacket type foundation, which is not being proposed by Applicant.

Overall, total Engineering, Project Management, and Soft Costs are estimated to be about $[redacted] million or $[redacted]/kW, representing about [redacted]% of total capital costs. Contingency costs are about $[redacted] million or [redacted]% of all Engineering, Project Management, and Soft Costs.

Other Project Costs Included in Financing

This cost category includes various finance related costs such as reserve accounts, interest during construction, legal and finance closing costs, and other capitalized project costs. Total estimated cost for this category is $[redacted] million, or $[redacted]/kW, accounting for approximately [redacted]% of total capital costs. We note that the majority of the cost items in this category are either not supported by quotes or analysis.

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[122] Amended Application, Appendix B: "Capital Expense Budget," Exhibit Q: "Historical Development Cost Accounting."
[123] Referred to as "Development Fee" in [redacted]Agreement
[124] See Amended Application, "FACW_Project Construction CAPEX_XEMC_120405 DETAILED BREAKOU" Excel file.
[125] Amended Application, Appendix B: "Capital Expense Budget," Exhibit N: "[redacted] Quote for Contractors All Risk Insurance."
[126] Amended Application, Appendix B: "Capital Expense Budget," Exhibit O: "[redacted] Quote for Project Certification."

Some of the key issues we found in Applicant's assumptions are related to Interest During Construction and the Decommissioning Reserve set up. The interest during construction is capitalized, and is assumed to be $[redacted] million. However, we cannot verify this calculation because Applicant did not provide a construction schedule with a drawdown of funds for the Project. As for the decommissioning reserve set up, it is not clear why there is such a reserve set up if Applicant is posting $[redacted] million in cash security in an escrow account for decommissioning costs. Applicant did not provide an explanation for such costs.

Table 3
Capital Cost Breakdown

REDACTED

D. Financing costs

Similar to the initial application, the financial model does not fully reflect the terms and conditions found in the [redacted] Agreement with XEMC. The [redacted] Agreement does not provide any explicit information on the construction financing of the Project. However, in a response to our discovery request, Applicant states that:

[redacted][127]

We note that Applicant did not include a construction schedule showing a drawdown of funds for the Project in the financial model. Therefore, we cannot evaluate the construction financing phase of the Project.

A major change from the financial model in the initial application is the use of a P50 estimate for energy production in the current financial model. As mentioned above, lenders typically assess debt repayment with more conservative output estimates. In the financial model, Applicant includes a P99 case, which shows that debt service coverage ratios ("DSCRs") would be [redacted]. This means project cash flows [redacted]. This

[127] Response to Discovery Request NJBPU-Econ-17.

is not consistent with Applicant's statement of "[redacted]"[128] If Applicant sized the debt according to a P99 DSCR, then the leverage of the Project would change, resulting in an increase in OREC price.[129] We also note that the financial model does not show the use of the [redacted].[130]

Without the construction drawdown schedule, we can only comment on the financial model, post-commercial operation date. The financial model assumes a capital structure of [redacted]% debt and [redacted]% equity. The debt has a term of [redacted] years and an interest rate of [redacted]%. Amortization of the loan is based on [redacted] and [redacted]. The cost of equity for XEMC and Fishermen's Energy is assumed to be [redacted]% and [redacted]% respectively. The after-tax internal rate of return for XEMC is [redacted]%. Cash distributions to investors are made [redacted], [redacted]% and [redacted]%, respectively.[131]

E. State and Federal incentives

As indicated in our February 22, 2012 report, no state and federal incentives were assumed. These assumptions have not changed in the current application. Accordingly, the financial model does not show the use of any tax credits, grants, or loan guarantees.

F. Funding for project decommissioning

Applicant plans to have $[redacted] million in cash security deposited in an interest bearing account for the eventual decommissioning of the Project.[132] In the "Operating Expenses" sheet of the financial model, Applicant shows $[redacted] million in an escrow account earning interest and growing to $[redacted] million at the end of commercial operations. However, in the same sheet, Applicant shows $[redacted] in annual operating expenses for "[redacted];" both of which are being paid out of project cash flows. The intended purpose of these cash flows is not apparent, considering there are [redacted][133] In addition, no explanation is provided for the Decommissioning Reserve Set Up of $[redacted] which is a capitalized expense.[134]

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[128] Amended Application, Appendix C: "Financing Plan," at page 8.
[129] Based on assumption that debt service would need to be covered by project cash flows
[130] See Financial Model
[131] Ibid.
[132] Amended Application, Exhibit 13: Direct Testimony of [redacted] on Decommissioning Plan, at page 5.
[133] See Financial Model
[134] See Amended Application, "FACW_Project Construction CAPEX_XEMC_120405 DETAILED BREAKOU" Excel file.

Applicant estimates decommissioning costs to be between approximately $[redacted] million and $[redacted] million.[135] We note that this is a significant departure from the targeted base amount of $[redacted] million Applicant indicated in their initial application. Applicant has now provided calculations to obtain their estimates, which are based on two different methodologies that use a BOEMRE cost analysis [redacted] as a starting point: (a) [redacted] and (b) [redacted]. However, Applicant did not provide the actual calculations for these estimates. Therefore, we cannot determine the reasonableness of the estimates.

[135] Amended Application, Appendix C: "Financing Plan," at pages 16 to 17.

VII. TECHNICAL ANALYSIS

A. Introduction

The objective of this category of the Evaluation Framework is to validate the technical viability of the proposed facility. To achieve this, we evaluated: 1) whether the electricity output assumptions are consistent with NJ's offshore environment; 2) the adequacy of the proposed wind turbines; 3) the adequacy of other significant equipment; 4) the technical viability of the proposed interconnection plan; 5) the ability of the Project to come on-line within the proposed construction schedule; and 6) the adequacy of O&M plans. We conclude that the project poses significant technical risk because it will use wind turbines that have not been commercially proven. Regarding the foundation design, Applicant has changed its design to a monopile from a jacket type foundation. Monopiles are the most commonly deployed foundation type in offshore wind projects, and therefore a less risky alternative when compared to the jacket foundation that was proposed in the initial application.

B. Electricity output assumptions

The projected annual electricity output of the Fishermen's Energy wind farm is [redacted] MWh. This is based on a P50 production estimate of five Darwind/XEMC DD115 5 MW turbines.[136] The annual output of [redacted] MWh is the net energy production of the facility, which means that the number reflects all losses incurred during production.[137] These include losses inherent with turbine operations, losses resulting from the layout of the wind farm, electricity losses during transmission, the times that the facility is asked to decrease its output for reliability reasons (curtailment), and outages for turbine maintenance. These losses amount to [redacted] MWh a year, resulting in a net capacity factor of [redacted]%.[138]

Applicant relied on a wind resource study, performance assessment, and other calculations by [redacted] to estimate the electricity output of the Project. Based on our review of these documents, we found their estimates to be reasonable. However, we point out several issues regarding the assumptions and analysis behind the output estimates. In the wind study regarding the wind resource characteristics, the measurement for turbulence intensity ("TI") is [redacted]%.[139] This does not comport with the class rating of the XEMC turbine, which is based on international standards regarding wind turbines. The XEMC turbines are an International Electrotechnical Commission ("IEC") Class 1C turbine, which according to the

[136] Amended Application, Appendix E: "Wind Speed and Energy Production Reports," at page 4.
[137] Ibid.
[138] Ibid.
[139] Ibid., at page 19.

technical specifications of the turbine, [redacted].[140]

Figure 3 depicts an annual wind rose, which shows prevailing wind speeds from the onsite buoy, and Figure 4 shows the location of the five XEMC turbines. It is not clear why the turbines are aligned [redacted]. This proposed turbine layout would cause wake effects and associated losses and fatigue loads. This does not seem consistent with the Gross MWh/yr calculations and the total turbulence intensity per turbine as shown in Figure 5 with the arrows. Based on the [redacted]. However, the calculations in Figure 5, as indicated by the arrows, show the contrary.

Figure 3
Annual Wind Rose

REDACTED

Figure 4
Turbine Layout

REDACTED

Figure 5
Electricity Output Estimate

REDACTED

[140] Amended Application, Appendix A: "Project Description & OREC Pricing," Exhibit C-1: "DD115/5 MW Technical specifications," at page 6.

C. Adequacy of proposed wind turbines

In the amended application, Applicant proposes the use of the same XEMC DD115/5MW turbines specified in the initial application. We remain concerned with the proposed use of the XEMC turbines, which still poses significant risks to the Project's performance. The XEMC turbines employ direct drive technology which, unlike conventional turbines, has no gearbox; thus, the number of moving parts in the drivetrain is minimized. Although direct drive technology may result in increased reliability and performance, the XEMC turbine has no commercial operating history. Furthermore, it will be the first turbine in the 5 MW class that uses direct drive technology, which increases the risk of the project. In terms of mitigating risk, we believe there is no substitute for commercial operating experience, which can uncover design and manufacturing flaws and allow time for such flaws to be corrected.

In the amended application, Applicant states they are seeking to obtain industry-standard type and project certifications for the turbine. Applicant states that they plan to obtain type certification in [redacted], and have received a quote from [redacted] to perform the project certification. While this is a step in the right direction, these certifications have their limitations and do not guarantee desired performance. Even with certification, a turbine that is not commercially proven has the risk of technical issues arising well after installation that cannot be detected during the prototype and testing stages. Again, this only emphasizes the importance of using commercially proven turbines.

Our review of the turbine and other components has uncovered additional risky areas that could become a concern if not addressed. These, among others, include components such as the rotor, blades, and blade bearings. For instance, the rotor diameter (115m) of the XEMC turbine is relatively small for a turbine with a 5 MW capacity as compared to competitors like Repower (126m) and Areva (135m). As such, the rotational speed of the rotor on the XEMC turbine is high for a rotor of its size and can cause erosion of the leading edges of the blades from contact with sand and dust particles in the air. Regarding the blade bearings, these are lubricated by an automatic greasing system. We point out that the automatic greasing system that lubricates the blade bearings can cause overpressure between the inner and outer seals that may result in a leakage of the lubricant to the environment.

Regarding additional risk mitigation, the application is insufficiently backed up by the right level of guarantees from XEMC. These guarantees normally include: a) performance guarantee for timely delivery, b) power curve warranty, c) availability guarantee ([redacted]), d) warranty bond. The level of guarantees should reflect the level of damage that underperformance could harm ratepayers.

D. Adequacy of other significant equipment (other than turbines)

Regarding the foundation design, Applicant has changed its design to a monopile type. This is the most commonly deployed foundation type in offshore wind projects and therefore is a less risky alternative when compared to the jacket foundation that was proposed in the initial

application. The monopiles will be designed by [redacted], a [redacted] engineering firm, whose designs have been implemented on a number of currently operational European offshore wind projects. We note that while the design of the monopiles are in line with monopiles used in other projects, the industry has faced problems with the connection of the monopile to the transition piece, which secures the wind turbine and tower to the foundation. The adherence of the transition piece to the foundation via [redacted] is a risk that could be problematic if not resolved before installation.

If the issues with the [redacted] are not resolved, [redacted] and cause deterioration in the connection between the transition piece and the monopile. In some cases, [redacted], which may result in the transition piece shifting from its intended connection point and loosening from the monopile.

E. Technical viability of proposed interconnection plan

The interconnection plan in the amended application is written in sufficient detail and covers all aspects of the required steps for grid interconnection. We believe that the proposed interconnection plan is reasonable.

F. Ability of the Project to come on-line within the proposed construction schedule

Applicant provided a comprehensive and detailed Project Management Plan ("PMP") written by [redacted]. Seven different major work packages were identified, and each will be performed by a contractor specialized in such work area (i.e. foundation). However, due to the limited offshore wind experience of these contractors, [redacted]. Based on the PMP and the project schedule that was provided, we do not see any problems with the proposed timeline for development and construction.

G. Adequacy of operations and maintenance plan

Applicant provided an O&M budget and analysis. We compared this with our internal database of O&M costs for other European projects and found Applicant's O&M budget to be reasonable and not out of line with our benchmark. The database is based on a 100 MW offshore wind farm, using wind turbines with a conventional drivetrain concept. The average O&M cost for this configuration is $[redacted]/MWh. This compared with the XEMC O&M budget that equates to $[redacted]/MWh,[141] resulting in a difference of [redacted]%. The underlying reason behind the difference is most likely caused by the higher number of turbines from our database.

[141] Amended Application, Appendix C: "Financing Plan," Exhibit C1: "O and M Budget – XEMC - REVISED."

VIII. COMPLIANCE WITH REGULATIONS

A. Introduction

The objective of this category of the Evaluation Framework is to assess the Project's ability to comply with all necessary permitting and environmental requirements to construct the facility in a timely manner. To achieve this, we evaluated: 1) whether Applicant demonstrates an understanding of all necessary permits and provides a realistic schedule of when they are likely to be obtained; 2) the ability of the Project to secure all necessary ocean leases and required land; and 3) whether the filing is consistent with the New Jersey Energy Master Plan. We conclude that Applicant has demonstrated a good understanding of the necessary permits and has obtained most of the significant permits for this project. We also find this project to be consistent with New Jersey's Energy Master Plan.

B. Applicant's understanding of permitting requirements and viability of the proposed schedule to obtain them

During our review of the initial application, we concluded that Applicant had made significant progress in obtaining all necessary permits. Importantly, Applicant has obtained necessary state permits for the placement of turbines and cables in state waters. At the federal level, [redacted][142].

A final permit is still pending from [redacted]. Applicant was expecting to receive this in June 2012[143] but we are not certain if they did.

[142] [redacted]

[143] Permit Summary, at page 2, and Amended Application, Exhibit 20: Direct Testimony of [redacted] on Approvals, Permits and Authorizations, at page 4.

Table 4
Status of Federal Level Permits[144]

PERMIT	AGENCY	STATUS
[redacted]	[redacted]	Draft obtained 5/31/12; sent back to [redacted] on 6/8/2012
[redacted]	[redacted]	Draft received on 5/29/12
FAA Clearance: approval for construction of towers above 200 feet	Federal Aviation Administration ("FAA")	Approved 3/16/11 Extension required before 9/12/12
NWP-5/NWP-6: Geotech/placement of buoy	US Army Corps of Engineers	Approved 4/14/10
MMPA Letter of Concurrence: Geotech/placement of buoy	NOAA	Approved 4/21/10

Applicant has obtained the main state permits for the placement of turbines and cables in state waters.

Table 5
Status of State and Local Level Permits[145]

PERMIT	AGENCY	STATUS
Tidelands Licenses: cover placement of the turbine array, export cable and inter-array cable in open waters	NJDEP-DLUR	Approved 5/4/11
Green Acres: allows for placement of the cable under the beach at the foot of Tennessee Avenue	NJDEP	Approved 5/2/11
Waterfront Development Permit: Geotech/placement of buoy	NJDEP-DLUR	Approved 10/26/09 Expires 10/26/14
Individual multiple permit application:	NJDEP-DLUR	Approved 3/29/11

[144] Permit Summary and Amended Application, Exhibit 20: Direct Testimony of [redacted] on Approvals, Permits and Authorizations.
[145] Permit Summary and Amended Application, Exhibit 14: Direct Testimony of [redacted] on Approvals, Permits and Authorizations.

CAFRA,[146] waterfront development, 401 water quality certification for placement of turbines/cables		Expires 3/29/16
[redacted]	[redacted]	Permission for easement granted; discussions underway concerning documentation
[redacted]	South Jersey Transportation Authority	Pending completion of engineering drawings.
[redacted]	Atlantic City Soils Conservation	Permit will be applied for after final construction details are completed.

As noted in the table above, there are a couple minor local permits that still need to be pursued. Applicant plans to obtain these after final project details are completed. These include:

[redacted]

[redacted][147]

[redacted][148]

[146] Coastal Area Facility Review Act ("CAFRA") (N.J.S.A. 13:19). Applies to projects near coastal waters in the southern part of the State. The CAFRA law regulates almost all development activities in residential, commercial, or industrial development.

[147] Permit Summary, at page 3, and Amended Application, Exhibit 21: Direct Testimony of [redacted] on Electrical Interconnection Plan.

[148] Initial Application, Ballard Spahr letter, dated July 12, 2011, at pages 3 to 4.

[redacted][149] [redacted][150].

C. Ability of the Project to secure all necessary ocean leases and required land

Applicant has also obtained necessary state permits for the placement of turbines and cables in state waters which include securing the required NJ DEP Bureau of Tidelands Management licenses for the project turbine array, export cable and inter-array cable.

The Tideland's New License is for the turbine area and includes a circle around each spot in the ocean where the foundation will be placed out to a diameter equal to the width of the turbine blades. It covers every appurtenance at the location (turbine foundation, scour protection, and cable lay). [redacted]

A [redacted] Tideland's Utility License was issued [redacted]. This license covers a corridor 10 feet wide where the cables will be placed. It runs from a point about where the upland transition point is (where the cable goes from upland to marine cables), out to the turbine string, then between the turbines. It stops at the point where the new license picks up at each turbine.[151]

D. Consistency of filing with the New Jersey Energy Master Plan

The 2011 Energy Master Plan provides guidance for New Jersey's energy industry for the next 10years. The guidance is centered around strengthening the economy and protecting the environment, and is exemplified in the following goals: 1) drive down the cost of energy for all customers, 2) promote a diverse portfolio of new, clean, in-State generation, 3) reward energy efficiency and energy conservation and reduce peak demand, 4) capitalize on emerging technologies for transportation and power production, and 5) maintain support for the renewable energy portfolio standard of 22.5% of energy from renewable sources by 2021.[152]

This Project is consistent with the plan in that it: 1) promotes a diverse portfolio of new, clean, in-state generation; 2) capitalizes on an emerging technology for power production; and 3) supports New Jersey's renewable portfolio standard. The Plan discusses benefits of offshore

[149] Initial Application, Ballard Spahr memorandum re: [redacted], dated August 18, 2011, at pages 1 to 2.
[150] Initial Application, Ballard Spahr memorandum re: Resolution [redacted], dated October 12, 2011, at page 2.
[151] Permit Summary, at page 1, and Amended Application, Exhibit 14: Direct Testimony of [redacted] on Approvals, Permits and Authorizations, at pages 5 to 6.
[152] Adopted pursuant to section 12 of P.L. 1977, c. 146 (N.J.S.A. 52:27F-14).

wind development; however, it also states that for these projects to be executed in New Jersey, it must be shown that the economic benefits outweigh the costs. As discussed in our analysis of the cost-benefits of this Project, net benefits have not been demonstrated at this point.