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

Presented to:

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

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I. EXECUTIVE SUMMARY

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

1. **The Act requires the BPU to consider "the total level of subsidies to be paid by ratepayers."[2] Given that the requested starting OREC price is $[redacted]/MWh, and the estimated 2013 market price for energy and capacity is about $[redacted]/MWh, the subsidy will be quite high, and possibly much higher than industry standards suggest.**

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 projects over the life of the project. At a starting point of $[redacted]/MWh there is a significant amount of subsidy paid by ratepayers considering that the OREC price is [redacted] times higher than Applicant's own estimated electricity market price of $[redacted]/MWh for the first year of operation. The primary reason for such high OREC prices is the estimated capital costs of the Project, which is approximately $[redacted] or $[redacted]/kW.[3] The largest cost component (about [redacted]% of the total) is the procurement cost of the Project's five wind turbines plus the Project's constructions costs. The application lacked the necessary supporting documentation to demonstrate the validity of these costs. Typically these costs are supported by either contractual agreements with the turbine suppliers and with those key contractors performing construction activities, or if these are not available, by documentation such as memoranda of understanding, engineering reports, or a site feasibility study that provides a general range of costs for the Project.

While it is understood that costs vary from project to project, at $[redacted]/kW, the capital costs for the State Waters Project are [redacted] higher than the range seen in a study issued by NREL in which offshore wind projects announced for 2012 and beyond have capital costs, on a capacity-weighted basis, in a range between $4,000 and $4,500/kW in 2008 dollars.[4] In another report, issued by the Bureau of Ocean Energy Management Regulation and Enforcement (BOEMRE), four European projects with online dates in 2012 had capital costs ranging from

[1] P.L. 2010, c.57; signed into law on August 19, 2010.
[2] Ibid., section 3(b)(2)(a).
[3] See Excel spreadsheet "offshore wind Rate Impact ACTIVE Workfile v7.4a 5 Turbines No 1603," August 24, 2011, hereafter called "Financial Model"
[4] National Renewable Energy Laboratory, "Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers," September 2010, page 109. Available at http://www.nrel.gov/wind/pdfs/40745.pdf.

approximately $4,100 to $4,900/kW.[5] This suggests that the subsidy is higher than necessary. One culprit may be the small scale of the Project.

Another key input for the OREC price calculation is the projected annual electricity output for the next 20 years. The Application lacked the necessary supporting documentation to demonstrate the validity of the projected electricity output. Electricity output is primarily determined by wind speeds at the project site and by the wind turbine generators' ability to convert wind into electric power. Wind project developers typically contract an experienced wind energy consultant to develop a wind resource study. Developers, lenders and project evaluators rely on the wind resource study for its probabilistic analysis of electricity production and an assessment of the proposed wind turbine and wind farm layout. While Applicant indicates that they commissioned [redacted], a wind energy consultancy, to provide an assessment of the electricity production capability of the proposed turbines, a wind resource study was not provided with the Application.

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 of the project were not demonstrated because key underlying assumptions of Applicant's cost-benefit analysis were not adequately substantiated.

The Act requires that Applicant submit a cost-benefit analysis that demonstrates positive economic and environmental net benefits to the State.[6] Applicant's calculation of net benefits does not have the necessary level of substantiation to demonstrate that the Project meets this requirement of the Act.

Applicant estimates net benefits to be in the range of $[redacted] to $[redacted] on a net present value basis. Net benefits are calculated by offsetting the total costs that New Jersey ratepayers will pay for ORECs against benefits to these ratepayers, the economy and the environment. The high end of the range estimates that [redacted]% of the total benefits of this Project will be due to an increase in tourism for the State, [redacted]% to jobs and economic impact, [redacted]% to environmental impact, and [redacted]% to revenues realized from sales of energy and capacity to PJM. The low end of the range reflects a sensitivity that was conducted in which no tourism benefits were assumed.[7]

An increase in tourism accounts for the most significant benefit; however, the inputs to calculate this benefit were not adequately supported. Applicant seems to rely on two surveys of visitors to popular destinations, including the Atlantic City area, who were asked about the likelihood to return if an offshore wind farm were developed.[8] However, Applicant did not

[5] Bureau of Ocean Energy Management Regulation and Enforcement, "Offshore Wind Energy Installation and Decommissioning Cost Estimation in the U.S. Outer Continental Shelf," November 2010, page 135.
[6] Act, Section 3(b)(1)(b)
[7] See Excel spreadsheet "offshore wind Rate Impact ACTIVE Workfile v7.4a 5 Turbines No 1603," hereafter called "Cost-Benefit Model"
[8] [redacted]

make it clear how the results of these surveys were translated into: (a) the number of new tourists expected to visit because of the offshore wind project and (b) the average amount of money each new tourist was expected to spend. Without this direct quantitative link, Applicant did not adequately support the estimate of benefits.

Other key inputs to determine other Project benefits are the same as those used to calculate the OREC price and, as indicated above, capital costs and wind resource estimates have not been adequately substantiated. Until they are, the validity of the projected benefits cannot be demonstrated. For example, the Project's capital costs are used when determining job creation. The cost-benefit model starts with this cost and applies a set of multipliers to arrive at the total number of jobs that will be created during construction. Similarly, the Project's electricity output projection is a key input to calculate the environmental benefits since it is multiplied by emissions reduction factors for CO_2, SO_2, NO_X and others to arrive at the environmental benefits.

We also have a concern about something that is not included in the estimate of "benefits of job creation and economic impact." If, as expected, offshore wind projects require a price that is above the market price for electricity in some or all years, then the projects can have a negative job impact. The logic is simple. If New Jersey ratepayers have to spend say $300 million more per year for electricity than they would have in the absence of the above-market costs of offshore wind projects, then these ratepayers will have $300 million less to spend on other products and services – food, clothing, shelter, and so on. When ratepayers spend less on these other products and services, the businesses providing them will employ fewer people. Again, it is the above market prices for offshore wind projects that create the problem. Applicant does not but should address the possibility of a negative job impact caused by above market prices.

Finally, the Act requires that the filing be consistent with the New Jersey Energy Master Plan.[9] The 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. However, again, to be fully consistent with the plan it must demonstrate net benefits, and Applicant has not done so.

3. The Act requires there to be a fair balance of risks and rewards between ratepayers and shareholders.[10] The Project has significant technical risks that may impair its ability to perform as promised; the risks involve primarily the use of wind turbines that are not fully commercialized and a foundation concept that has not been used before for offshore wind turbines.

The Project will utilize 5 Darwind/XEMC DD115 5 MW turbines for a total nameplate capacity of 25 MW. This turbine is not commercially proven, as it will be the first turbine in the 5 MW class that uses direct drive (DD) technology. Direct Drive technology is a relatively new

[redacted]

[9] Act, Section 3(b)(1)(a); Adopted pursuant to section 12 of P.L. 1977, c. 146 (N.J.S.A. 52:27F-14).
[10] Ibid., Section 3(b)(1)(c).

trend in wind turbine generator drivetrains that replaces conventional gearbox technology and may result in increased reliability and performance. Other manufacturers have DD technology, but at smaller sizes (< 3 MW) and with short operating history (2 years). The XEMC wind turbine technology, however, is insufficiently backed up by an independent verification of the test turbine and/or technology assessment. Given that the turbine is not yet certified, a certified report about the test turbine, or an independent assessment of the technology should be provided. We note that, although owned by a Chinese company, the turbine is designed in the Netherlands with the latest European norms and regulations.

The proposed foundation design concept is of a type that has not been used before for offshore wind turbines. When combining the risks of a new turbine with the risks of a new foundation concept, the technology risks of the Project significantly increase.

4. The Act requires Applicant to demonstrate financial integrity and sufficient access to capital.[11] While securing financing from XEMC is a positive achievement; XEMC's financial strength was not demonstrated because its financial statements don't meet U.S. accounting standards.

The Act requires that the entity proposing the project demonstrates 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 XEMC New Energy Co., Ltd. (XEMC) to effectively purchase [redacted]% of the Project's equity. XEMC also intends to provide debt financing for all costs to develop, design, procure, and build the Project. Having this commitment to fund the Project is a positive achievement. However, the information that was provided about XEMC was not sufficient to demonstrate that they have the necessary financial strength to provide all of the funds that are necessary to fund this project. XEMC is a [redacted] company formed in [redacted]. Its largest shareholder is XEMC Group Co., Ltd, with about [redacted] of the shares. XEMC Group Co., Ltd. was established [redacted]. Its [redacted] owner is the People's Government of Hunan Province, China. While Applicant provided financial statements for XEMC Group Co., Ltd., we could not rely on them since they are presented based on Chinese accounting principles. These financial statements should either be presented in U.S. GAAP, or should be accompanied with an opinion from a recognized global accounting firm that attests to the financial statements and the strength of XEMC Group Co., Ltd.

Additionally, Applicant did not provide the debt terms for the long-term financing to be provided by XEMC. Furthermore, the financial model does not reflect XEMC's long-term debt. These financing costs need to be accurately reflected in the financial model before an OREC price can be calculated.

[11] Ibid., Section 3(b)(1)(d).

5. **The Act asks the Board to add criteria it "deems appropriate" to evaluate Applications. Demonstrated strength of management should be one criterion. While the addition of a [redacted] for Fisherman's Energy with offshore wind experience is a plus, Applicant did not name or demonstrate the relevant experience of key management that will be appointed by [redacted].**

In terms of Fishermen's Energy's relevant experience, they recently hired [redacted]. [redacted] brings 30 years of experience developing energy projects. Importantly, he brings 7 years of experience with the development of offshore wind projects. The information that was provided about other key employees did not demonstrate experience with the development of offshore wind facilities. Fishermen's Energy did, however, identify one other key employee with significant experience developing energy projects.

Once [redacted], it will appoint key management employees, such as the CEO and CFO. [redacted] will also have the right to review every appointment of senior personnel.

In terms of [redacted]'s management experience with offshore wind, the Application did not identify who [redacted] will appoint to key positions, such as CEO and CFO. Therefore, it did not demonstrate the extent to which [redacted]'s proposed key employees have relevant experience with the development of offshore wind facilities. [redacted] intends to provide development services for the Project and, once in operation, intends to provide asset management services, pursuant to Agreements to be executed.

Further, Applicant has identified contractors to: a) perform construction project management; b) supply the wind turbine generators; c) supply the foundations; d) build a substation to interconnect the Project to the grid; and e) perform turbine maintenance. Not enough information was provided about these contractors to demonstrate their financial strength or experience developing offshore wind projects.

6. **Permitting should be another added criterion. Applicant has demonstrated a good understanding of the necessary permits and is expected to have the required permits in place in a timely manner.**

Applicant provides a comprehensive list of the necessary permits to develop the facility. Importantly, Applicant has obtained necessary State permits for the placement of turbines and cable in State waters. At the Federal level, permits were pending as of September 2011 from: a) [redacted]; and b) [redacted].

II. PROJECT SUMMARY

A. Introduction

The New Jersey Offshore Wind Economic Development Act[12] (the "Act") calls for the development of an offshore wind renewable energy certificate ("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 New Jersey Board of Public Utilities (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.[13]

Boston Pacific Company, Inc. and OutSmart were selected by the BPU – 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.

By way of background, Boston Pacific is an energy consulting firm based in Washington, DC that specializes in the electricity and natural gas businesses. For 25 years, we have provided responsive and insightful advice to the full range of stakeholders in the energy industry on high-profile projects involving cutting-edge issues. Boston Pacific has served the BPU as the Board Advisor for New Jersey's annual Basic Generation Service (BGS) Auctions for each of the past six years. We have wide-ranging experience in power project evaluations for both renewable and conventional generation and have performed evaluations on a number of wind projects as independent evaluators to State commissions and as advisors to the U.S. Department of Energy's Loan Guarantee Program.

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.

On May 19, 2011, Fishermen's Atlantic City Windfarm, LLC (Fishermen's Energy) submitted a petition for the approval of the States Waters Project and for the authorization of

[12] P.L.2010, c.57; signed into law on August 19, 2010.
[13] Ibid., Section 3.b. (pages 22-23).

payments for ORECs during a 20-year period.[14] In late December 2011, BPU Staff asked Boston Pacific to perform an independent evaluation of Fishermen's Energy's application. The results of the assessment are contained in this report.

B. Project Description

The State Waters Project ("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 5 Darwind/XEMC DD115 5 MW turbines to generate a proposed [redacted] MWh 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], 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]

[14] In Re Petition of Fishermen's Atlantic City Windfarm, LLC for the Approval of the State Waters Wind Project and Authorizing Offshore Wind Renewable Energy Certificates, Submitted to the State of New Jersey Board of Public Utilities, May 19, 2011.

FIGURE ONE
OWNERSHIP STRUCTURE[15]

REDACTED

[15] XEMC Group Co., Ltd. is [redacted] owned by the People's Government of Hunan Province. Ownership percentages are consistent with Applicant's legal entities and relationship tables last updated 8/22/11.

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

A. Summary

The objective of this category of the Evaluation Framework is to assess the likelihood that the facility will actually get 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, EPC contractors, etc) is adequate in relation to the intended support of the Project.

For the first question above we conclude that the recent addition of [redacted] to Fishermen's Energy brings relevant offshore wind management experience to the team, which is essential to its role as developer of the Project.[16] However, extensive experience developing energy projects was not demonstrated for other employees identified as key members of the team. [redacted] will appoint key positions, such as CEO and CFO.[17] No indication was provided about who [redacted] will appoint to these and other key positions; therefore, we have no information to be able to assess the extent to which [redacted]'s proposed key employees have relevant experience with the development of offshore wind facilities.

For the second question, we view as positive the agreement that was reached with XEMC to provide debt and equity financing to develop the Project.[18] This eliminates a key hurdle that developers typically encounter, which is the ability to obtain financing for their projects. Our main concerns here are that we were unable to attest to the financial strength of XEMC and the terms of the long-term debt based on the information that was provided.

With regards to the third question, we note that Applicant expects to gain offshore wind experience by contracting with specialized firms to build different parts of the facility; however, not enough information was provided to be able to assess the expertise with offshore wind or the financial capability of the contractors that were identified.

[16] Pearlman, S., Letter concerning FACW's Key Employee Change, February 6, 2012.
[17] [redacted] Agreement [redacted] Hereafter called "[redacted] Agreement," page 23.
[18] See Exhibits B and H and Article IV of [redacted] Agreement.

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

1. Management's experience

The [redacted] Agreement entered into by [redacted] and Fishermen's Energy outlines management and governance terms for the Project. The most significant terms include:

i. [redacted][19]

ii. [redacted][20]

iii. [redacted][21]

iv. [redacted][22]

v. [redacted][23]

vi. [redacted][24]

[19] [redacted], Section 5.5.
[20] Ibid., Section 5.3.
[21] Ibid., Section 3.9.
[22] Ibid., Section 3.11 and Supplement to Exhibit E
[23] Ibid., Section 3.10 and page D-1 of Exhibit D.
[24] Letter from Ballard Spahr to President of Fishermen's Energy, July 12, 2011, page 3 and Exhibit One.

In terms of [redacted]'s management experience with offshore wind development, the Application did not identify who [redacted] will appoint to key positions, such as CEO and CFO. Therefore, we have no information to be able to assess the extent to which [redacted]'s proposed key employees have relevant experience with the development of offshore wind facilities.

In terms of Fishermen's Energy relevant experience, they recently hired [redacted]. [redacted] brings 30 years of experience developing energy projects. Importantly, he brings 7 years of experience with the development of offshore wind projects. His experience with offshore wind development comes from managing the development of a demonstration scale project in Lake Erie off the shoreline of Cleveland and from founding and working for [redacted], a developer of offshore wind projects in the U.S. The information that was provided in the Application about other key employees did not demonstrate experience with the development of offshore wind facilities. Fishermen's Energy did, however, identify one other key employee with significant experience developing non-offshore wind power projects. This was [redacted] who has over 27 years' involvement with the development of power projects.[25]

In addition to these two, Fishermen's Energy 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. [redacted] does not have any experience with the development of power projects.

2. Technical experience

Applicant relies on hiring contractors who have experience with the development of offshore wind projects. Rather than having a single contractor in charge of performing all engineering, procurement and construction (EPC) activities, Applicant will contract with multiple companies who will perform specific tasks under separate EPC contracts. Our understanding is that all of these subcontractors will be managed by Owner's Engineers [redacted]. 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 pieces together. Moreover, without a single, third-party EPC contract, the owners take on substantial project development risk.

[25] Petition, Exhibit A, Attachment 1a ([redacted]).

The following is a list of the key contractors that have been identified to date. Not enough information was provided about these contractors to fully demonstrate their financial strength or experience developing offshore wind projects.

i. **Construction project management:** [redacted] are the Owner's Engineers in charge of construction project management, scheduling, review and satisfaction of interfaces, and logistics in Atlantic City and at the receiving port. Specifically, [redacted] will coordinate overall project management, upland facilities, interfaces, and electrical design.[26]

[redacted] is a publicly traded U.S. based engineering and architecture firm with a global presence. [redacted] has experience in the development of energy projects, including wind, solar, and other renewable generation technologies.[27] However, it is unclear if the key members assigned to this Project have direct experience with the development of offshore wind projects based on the provided resumes, although the Application notes that [redacted] personnel have extensive experience working on offshore wind projects.[28]

[redacted] will coordinate marine and foundation issues, turbine generator selection, operations and maintenance, subsea cabling assistance, and issuance of initial bid packages. [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.[29]

ii. **Turbine Supply** – Applicant has selected XEMC Windpower Co., Ltd., a company based in Hunan Province, China, to be the turbine supplier for the Project.[30] The company will supply 5 Darwind/XEMC DD115 5 MW turbines through a turbine supply agreement (TSA).[31] Applicant indicates that a Turbine Supply Agreement is being finalized with XEMC Windpower Co.[32]

XEMC purchased Darwind, a Dutch wind turbine manufacturer, in 2009. The proposed turbines are based on a smaller-capacity turbine originally designed by Darwind.[33]

iii. **Foundation -** Applicant indicates that the foundation supplier has been identified as [redacted]. An EPC contract was being negotiated with the foundation supplier

[26] Ibid., page 7.
[27] Ibid., Attachment 1a, Description of Bidder's Organization, [redacted] (PDF pages 11-13).
[28] Ibid, page 7.
[29] Ibid, pages 9-10.
[30] Update – Designation of XEMC as turbine supplier, dated 7/12/11.
[31] Additional Supplemental Update – Impact of [redacted], August 1, 2011, page 1 and Cost/Benefit and Rate Impact Analyses of the State Waters Project with Five Turbines, November 7, 2011.
[32] Response to Rate Counsel Discovery Requests 2, July 27, 2011, page 28.
[33] Petition, Exhibit A, page 72.

which was scheduled to be completed by August 15, 2011;[34] however, the contract was not included in the application materials. Only limited supporting materials describing this contractor's technical experience developing foundations for offshore wind projects were provided. The contractor's website does show that they specialize in pipelines, both onshore and offshore, and subsea systems, but only highlights one offshore wind project in which they were responsible for designing the support structures.[35] The Application did not include financial background about this contractor.

iv. **Substation and Interconnection EPC Contractor –** [redacted] will perform the EPC work for the supply of a new substation that will be used to tie-in to Atlantic City's electric transmission system. According to the Application, an EPC contract is being negotiated.[36] The Application did not include financial background about this contractor.[37]

v. **Turbine Maintenance** - Applicant intends to enter into a turbine maintenance agreement with [redacted].[38] This is further discussed below.

Subcontractors for the following key areas have not been identified:

i. **Undersea Cable -** Applicant lists potential candidates, but it is unclear if they have selected a supplier for the undersea cable.

ii. **Turbine Erection and Heavy Lift Vessel –** Applicant lists potential candidates, but has not selected who will perform these services.

iii. **Maintenance for equipment other than the turbines –** Applicant does not identify candidates who will perform these services.

3. Operations and maintenance experience with offshore wind projects

Applicant intends to enter into a turbine maintenance agreement with [redacted]. In the [redacted] Agreement, Applicant provides a term sheet with material terms of the agreement.[39] Applicant indicates an intent to execute the agreement (referred to as the [redacted]) as soon as reasonably practicable following the [redacted] execution date of the [redacted] Agreement;[40]

[34] Response to Rate Counsel Discovery Requests 2, July 27, 2011, page 29.
[35] Renewables – [redacted].
[36] Response to Rate Counsel Discovery Requests 5, September 16, 2011, page 1.
[37] Petition, Exhibit A, page 11. [redacted].
[38] [redacted] Agreement, "[redacted]," Exhibit D
[39] [redacted] Agreement, Exhibit D
[40] [redacted] Agreement, Section 3.10.

however, a final agreement was not provided. Applicant does not specify which [redacted] company will actually perform the turbine maintenance and does not provide technical qualifications that demonstrate their ability to perform turbine maintenance for the proposed offshore wind facility.

As indicated above, Fishermen's Energy intends to enter into an [redacted] Agreement. However, Applicant does not provide details on how operations and maintenance will be performed for the undersea cable.

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 August 24, 2011 which reflects total project costs of approximately $[redacted] million and assumes that during construction this will be funded through [redacted]% debt and [redacted]% equity – that is, approximately $[redacted] and $[redacted] respectively.

After completion of construction, the construction loan will be taken out by a term loan of $[redacted] with a tenor of [redacted] years and an interest rate of [redacted]%. This results in a capitalization structure of [redacted]% debt and [redacted]% equity.

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

On June 24, 2011 Applicant entered into a [redacted] Agreement with XEMC New Energy Co., Ltd. (XEMC) whereby XEMC intends to effectively purchase [redacted]% of the Project for $[redacted]. XEMC also intends to provide debt financing for all costs to develop, design, procure, and build the Project.

In terms of equity, the [redacted] Agreement includes provisions for XEMC to purchase [redacted]% of the issued and outstanding units in [redacted] for $[redacted] upon executing an [redacted] Agreement. XEMC agreed to make three payments:[41]

a) A non-refundable payment of $[redacted] which was made on [redacted];
b) A non-refundable payment of $[redacted] to be provided by the [redacted] execution date of the [redacted] Agreement; and
c) A non-refundable $[redacted] to be paid on the date on which the [redacted] Agreement is executed.

[41] [redacted] Agreement, Exhibit B, [redacted] Agreement, page 6.

In term of debt financing, the [redacted] Agreement includes provisions for XEMC to fund all project costs incurred to develop, design, procure, and build the Project.[42] However, no further description is provided about the terms of XEMC's financing such as interest rate, length of the loan, re-payment 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. However, as explained in the Financial Analysis section, they do not appear to be reflected in the financial model.

Obtaining a commitment for equity and debt financing is a positive achievement, especially for a small offshore wind facility. 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. These financial statements should either be presented in U.S. GAAP, or should be accompanied with an opinion from a global accounting firm that attests to the financial strength of this company. We note that the [redacted] Agreement provides for the possibility that XEMC [redacted].[43]

The Addendum to the [redacted] Agreement also indicates that, within three business days after its execution on [redacted], XEMC was to provide a development loan in an amount of $[redacted].[44] The [redacted] Agreement indicates that the annual interest rate is [redacted]% and that [redacted].[45] [redacted].[46]

In terms of Fishermen's Energy's financial strength, Applicant states that the investors in Fishermen's Energy have commercial fishing operations that gross over $[redacted] per year in sales. These companies have maritime experience and assets, including ownership of over 100 commercial vessels. As of 12/31/10, Fishermen's Energy had raised over [redacted] for development activities through equity contribution and borrowings.[47]

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,[48] who in turn is [redacted] owned by XEMC Group, which is

[42] [redacted] Agreement, Section 4.3.
[43] [redacted] Agreement, Section 4.3(b), (c).
[44] Addendum to [redacted] Agreement.
[45] [redacted] Agreement, FACW Loan Agreement, Exhibit H, page 10.
[46] Addendum to [redacted] Agreement, page 2; [redacted] Agreement, page 1.
[47] Petition, Exhibit A, page 201.
[48] The company is listed in the Shanghai Stock Exchange. Nixon Peabody, July 11, 2011.

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. These financial statements should either be presented in U.S. GAAP, or should be accompanied with an opinion from a global accounting firm that attests to the financial strength of these companies.

[redacted][49]

These are all positive commitments, but again, we are not able to assess the financial strength of [redacted] with the financial information that was provided.

Applicant will use several contractors to perform key construction activities. We are unable to assess their financial strength for most of this since financial background information on these contractors was not provided and/or is not publicly available.

[49] Letter from the [redacted], August 3, 2011.

IV. FINANCIAL ANALYSIS

A. Summary

The objective of this category of the Evaluation Framework is to validate the key assumptions that are used in the financial model[50], which ultimately end up being 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 key revenue, cost, and financing assumptions used to calculate OREC prices are not adequately substantiated. Until they are substantiated, we cannot validate the OREC price proposed or the cost-benefit analysis.

We do conclude that the financial model accurately reflects the fact that the Project is no longer eligible to receive the U.S. Department of the Treasury's cash grant program. We note that if the Project starts construction before the end of 2012, it may qualify for the production tax credit (PTC); the PTC was not included in the financial model. Finally, we conclude that adequate funding was provided for decommissioning costs.

B. Key revenue assumptions

1. Electricity output projections

The projected electricity output for offshore wind farms is primarily determined by wind speeds and the wind turbine generators' ability to convert wind into electric power. A key document necessary to assess electricity output is a wind resource study. This study typically provides an assessment of the site and monitoring equipment, wind data, the proposed wind turbine and wind farm layout, and an analysis of energy production. Applicant indicates that they commissioned [redacted], a wind energy consultancy, to provide an assessment of the energy production capability of the proposed turbines[51]; however, they did not provide the actual wind resource study and performance assessment conducted by [redacted]. Instead, a few spreadsheets were provided with calculations that appear to be performed by [redacted].[52] Without the wind resource study, these calculations lack substantiation and cannot be validated. Furthermore, the inputs in the financial model do not match those provided in the spreadsheet calculations.

[50] See Excel spreadsheet "OSW Rate Impact ACTIVE Workfile v7.4a 5 Turbines No 1603," August 24, 2011. Hereafter called "Financial Model"
[51] Petition, Exhibit A, page 20.
[52] See Excel spreadsheets "111208_6v5WTGNetGeneration_REP" and "TruWinds OnPk OffPk Analysis"

Typically a wind resource study will provide several electricity output projections, each with an associated probability of being exceeded. For example, lenders typically base their analysis on a conservative electricity output projection that represents a 90% or 95% probability that the output projections will be exceeded. This is respectively referred to as a P90 or P95 projection. In our case, the net annual electricity production is estimated to be [redacted] MWhs[53]; however, we have no way of determining if the [redacted] MWhs of output that is projected in the financial model represent a P90, P95, P50 or other exceedance probability which would let us know how conservative the projections are.

The Project will utilize 5 Darwind/XEMC DD115 5 MW turbines for a total nameplate capacity of 25 MW. To arrive at the net annual electricity production estimated of [redacted] MWhs, [redacted] estimated that, on average, these wind turbines could generate electricity [redacted]% of their total potential generation in a given year. We refer to this as having an average annual capacity factor of [redacted]%. There are typically other factors that reduce the amount of electricity that is actually delivered from the facility. 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. Once these are factored in, the financial model calculates a net capacity factor of [redacted]%. The amount of energy produced from the facility displays a seasonal distribution with the greatest output in the winter months and lowest output in the summer months. The losses that are associated with the estimated production include [redacted]% for wake effect, [redacted]% for electrical losses, [redacted]% for turbine performance, and [redacted]% for environmental losses. In addition, output from the facility is expected to be curtailed in [redacted] months of a year and mechanical availability of the turbines is estimated to be [redacted]%. The net annual electricity production estimate of [redacted] MWhs is decreased by [redacted]% during the [redacted], to reflect the likelihood that issues may be encountered when the facility initiates operations that will be resolved [redacted] – this is typically seen in electricity output calculations for new projects.

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. In order to project the revenues from the sale of energy into PJM, [redacted] developed a model that forecasts wholesale energy prices in the relevant PJM zone for the Project.[54]

The wholesale energy forecast was based on futures prices for the PJM West Hub, which is the most liquid hub in PJM. These prices were then adjusted to reflect prices at the ACE transmission pricing point, which is the nearest pricing point to the Project. In order to adjust for the price differential between the PJM West Hub and the ACE zone, historic

[53] See Financial Model

[54] Responses to Rate Counsel Discovery Requests 2, July 27, 2011, page 10, RCR-PF-17. See Excel spreadsheet "Copy of Wholesale Energy w OSW Weighting - History Forecast 2010 (2)"

congestion was calculated between the two pricing points and applied to the PJM West Hub futures prices. These prices were used to calculate a forecast until 2014. To extend the forecast for the remaining years, an escalation rate was derived from EIA's 2010 Annual Energy Outlook forecast of electricity prices for the Mid-Atlantic Area Council and applied until 2033.[55]

In addition to calculating a wholesale energy price forecast, the model also calculates a price adder for CO_2 that accounts for some carbon policy that takes effect in 2015.[56] Lastly, an amount was subtracted for what the model calls "Renewable Energy Merit Order Effect."[57]

In terms of the methodology for producing the forecast, it is reasonable to use futures for the PJM West Hub as a starting point, as that is the most liquid pricing point in PJM. It is also reasonable to use historic congestion prices between PJM West Hub and the ACE zone to adjust the futures prices to more accurately reflect prices experienced in New Jersey. However, historic congestion data was available starting in 2004, but the congestion component is calculated using data from 2006 and later. Applicant did not make clear why the subset of congestion data relied on for the forecast was chosen.

While the application of the Renewable Energy Merit Order Effect is conceptually reasonable for developing an energy price forecast, as with the carbon price adder, we cannot determine the reasonableness of these forecasts. These values are sourced from Applicant's rate impact model and the corresponding assumptions and calculations for the Renewable Energy Merit Order and carbon price adder cannot be substantiated. [58]

The following table shows two final wholesale energy price calculations from the Applicant's model. The column with the header "v2010 Final Wholesale ($/MWh)" is the forecast that the model actually calculates, which differs from the column with the header "Original Filing Final Wholesale ($/MWh)," which is the forecast reflected in the financial model. However, that column contains hard entered values and we cannot validate how those values were determined. The final column with the header "v2011 Base Wholesale ($/MWh)" appears to be an update of the base wholesale values, but it is unclear where or how this updated forecast is used. Similar to other parts of the model, the updated base wholesale values are hard entered and cannot be substantiated.

REDACTED TABLE

[55] Responses to Rate Counsel Discovery Request 2, July 27, 2011, page 11.
[56] According to Response to the Division of Rate Counsel Discovery Request 1 Set No.1, July 1, 2011, pages 10-11, the carbon price adder was sourced from the EPA and Pacific Northwest National Laboratory.
[57] The Renewable Merit Order Effect assumes that renewable generation lowers wholesale spot prices. This occurs because renewable generation has a marginal cost of zero and displaces more expensive generation, effectively moving the supply curve to the right. If demand remains the same, then this shift of the supply curve will lower the wholesale clearing price.
[58] Applicant only states "[t]hese results are based on a Merit Order Effect of [redacted]% in 2014, climbing to [redacted]% in 2033, reflecting the affect [*sic*] of the New Jersey's statutory wind and solar goals." See Response to Rate Counsel Discovery Requests Set No. 1

3. Capacity revenues

In addition to selling energy, Applicant intends to generate revenues from the sale of capacity in PJM. For background, PJM has an established market by which owners of generation are paid for committing to produce electricity when it is demanded from the PJM system. The PJM market for capacity is based on a market model called the Reliability Pricing Model (RPM). RPM procures capacity for 3 years into the future and provides price signals for capacity at different locations in the PJM system.

The ability to sell capacity in PJM is determined by a generating unit's "Capacity Value," which is the total amount of capacity that can be sold by the unit. This is calculated by multiplying the unit's capacity factor by the unit's maximum capacity less station load. For intermittent resources, such as offshore wind, PJM deems resources with fewer than three years of operational data as "immature," and therefore, requires those resources to use a predefined capacity factor in their calculation of the unit's Capacity Value. Currently, the predefined capacity factor is set by PJM to be 13% for wind resources. Once three years of operational data is available, generation resources are able to exclusively use historical operating data in calculating their capacity factor. However, before three years, operating data can be averaged into the 13% predefined capacity factor as it becomes available. As a note, PJM does allow the substitution of an alternate capacity factor if the resource owner provides suitable documentation and receives approval from PJM. [59]

The financial model assumes a [redacted]% capacity factor in its calculation of the Capacity Value for the life of the Project (even during its first three years of operation). Applicant, in a response to a discovery request by the Division of Rate Counsel, indicated that [redacted] determined the unit specific capacity value of the Project to be [redacted]%, but used a [redacted]% based Capacity Value to be conservative and averaged the [redacted]% capacity factor with the 13% requirement for the second and third years.[60] While the financial model would be more accurate if the first three years included the averaged values instead of assuming a [redacted]% based Capacity Value for all years, we feel that this assumption is reasonable considering that it is still a conservative estimate. However, additional supporting documentation is needed to be able to validate [redacted] calculation.[61]

The Project's capacity revenues were calculated by multiplying the Project's Capacity Value by a forecast for capacity prices in PJM. The capacity price forecast was estimated from a report prepared for the BPU regarding the Long-Term Capacity Agreement Pilot Program (LCAPP) by Levitan & Associates.[62]

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[59] PJM System Planning Department, "PJM Manual 21, Rules and Procedures for Determination of Generating Capability," May 1, 2010, Appendix B.
[60] Response to Rate Counsel Discovery Request 3, August 9, 2011, page 13.
[61] See Excel spreadsheet "[redacted] Capacity Value Analysis"
[62] Levitan & Associates, Inc., "LCAPP Agent's Report, Long-Term Capacity Agreement Pilot Program," March 21, 2011, page 61.

C. Key cost assumptions

The financial model shows a total Project cost of $[redacted] million, which reflects the selection of the XEMC turbines. A high-level breakdown of the capital costs was provided that gives a general overview of the major budget categories. Turbine procurement and construction costs (EPC costs) make up the largest cost component of capital costs, around [redacted]% and totaling around $[redacted] million. The other major cost components include Other Construction, Development, Finance, and Reserves and Contingency, which are [redacted]% or $[redacted] million, [redacted]% or $[redacted] million, [redacted]% or $[redacted] million, and [redacted]% or $[redacted] million of the total capital costs, respectively.

In terms of judging the reasonableness of the capital costs, the total Project cost of about $[redacted] million which equals roughly $[redacted]/kW, is [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.[63] In another report, issued by BOEMRE, four European projects with online dates of 2012 had capital costs ranging from approximately $4,100 to $4,900/kW.[64]

In our review of the Application, we did not find any supporting documentation that would provide a basis for the estimates of the capital costs. Because turbine and construction costs typically make up the largest cost component of a wind project, we would expect these costs to be supported by a turbine supply agreement (TSA) or an EPC or Balance of Plant (BOP) contract, which were not included in the Application. If these documents cannot be furnished, we would expect to see documentation such as memoranda of understanding, engineering reports, or a site feasibility study that would provide a general range of indicative costs for the Project. Since these documents are not included in the Application, we cannot determine the reasonableness of these capital costs. Furthermore, several important cost items in the table below did not have dollar amounts. For example, costs for a meteorological tower, service vessels, and shoreside infrastructure were not provided. Overall, these deficiencies make it difficult to ascertain the credibility of the capital costs of the Project.

The following table provides a description of the Project's capital costs:

REDACTED TABLE

D. Financing costs

The Application provided scant detail on the financing assumptions for the Project. The [redacted] Agreement indicated that XEMC would be providing a $[redacted] loan for the development of the Project and will provide debt financing for the Project's total cost.

[63] National Renewable Energy Laboratory, "Large-Scale Offshore Wind Power in the United States, Assessment of Opportunities and Barriers," September 2010, page 109.
[64] Bureau of Ocean Energy Management Regulation and Enforcement, "Offshore Wind Energy Installation and Decommissioning Cost Estimation in the U.S. Outer Continental Shelf," November 2010, page 135.

However, this does not comport with the assumptions in the financial model. Applicant's financing assumptions are based on typical project financing for similar projects. Given the Agreement with XEMC, the model should reflect actual financing assumptions that are expected from XEMC. Without this, the model does not accurately reflect how this Project will be financed.

The financial model assumes that the capital expenditures cited above will be funded through [redacted]% debt and [redacted]% equity – that is, approximately $[redacted] and $[redacted] respectively during construction. After completion of construction, the construction loan will be partially taken out by a term loan of $[redacted] with a tenor of [redacted] years and an interest rate of [redacted]%. This results in a capitalization structure of [redacted]% debt and [redacted]% equity. The equity rate of return on the Project is [redacted]%.

During construction, a construction loan facility will provide the debt financing. This facility will provide up to $[redacted] at an interest rate of [redacted]%. The interest rate is based on a base rate of [redacted]% as a function of [redacted] and an assumed spread of [redacted]%. There is also an assumed unused facility fee of [redacted]%. On each drawdown of the loan, interest is accrued and factored into subsequent drawdowns. For unused funds in the loan facility, a fee is assessed on the remaining amount. The drawdowns are assumed to be done on a pari passu basis with equity based on the assumed capitalization structure.

Regarding permanent financing, once construction is completed, the financial model assumes that a term loan will be used to partially take-out the construction loan and capitalized interest. The remaining amount of the construction loan will be paid off by additional equity. The financial model shows the term loan being amortized with the goal of maintaining an amount of cash flow that is [redacted] times the debt service for a given period, or a debt service coverage ratio (DSCR) of [redacted]. The term loan is for [redacted] years and has a fixed interest rate of [redacted]% that is based on a base rate of [redacted]% and a spread of [redacted]%.

E. State and Federal incentives

The financial model does not assume that the Project receives any State or Federal incentives. This seems appropriate given that the two Federal incentives currently available for new wind power projects require that they be placed into service by the end of 2012, and there is uncertainty about when this Project will become operational. One such incentive, the investment tax credit (ITC), allows developers to obtain a one-time tax credit in the amount of 30% of eligible capital expenditures during the first year of commercial operation of the facility.[65] Since projects typically do not have taxable income during the first year of operation it is assumed that project developers will be able to monetize these by either selling them to investors or applying them against the taxable income from parent companies. The other Federal incentive available for wind power projects is the production tax credit (PTC). The PTC is a tax credit that is based on actual energy production for the first ten years of

[65] Database of State Incentives for Renewables & Efficiency (DSIRE). Available at http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F

operations. The PTC provides 2.2 cents/kWh and is indexed for inflation.[66] Similar to the ITC, the PTC is set to expire in the near term. In order to qualify for the PTC, wind power projects should be placed into service before December 31, 2012. When the American Recovery and Reinvestment Act of 2009 (ARRA) was passed by Congress, wind projects became eligible to elect to take the ITC instead of the PTC.

A major Federal incentive that is no longer available is the grant program established by the U.S. Department of Treasury that provided a cash payment in lieu of the ITC ("Treasury Grant").[67] Projects constructed and placed in operation by December 31, 2011 were eligible to receive the Treasury Grant. Projects would also qualify if they could demonstrate that the project made at least 5% "qualified investments" by December 31, 2011, with ongoing construction thereafter.[68] Fishermen's Energy provided two versions of the financial model (assuming the use of five turbines): one assuming receipt of funds from the Treasury Grant and one without the Treasury Grant. Since the Project did not start construction by the end of 2011, we have only considered the financial model without the Treasury Grant.

Under the current tax code, renewable energy projects may recover investments through depreciation deductions of certain property through the Modified Accelerated Cost-Recovery System (MACRS), a depreciation method. Wind property is classified under the 5-year MACRS depreciation schedule. Through Federal legislation, a bonus depreciation of 100% in the first year has been provided for projects that were placed into service between 2008 and 2012. However, for the year 2012, the bonus depreciation has reverted back to 50%. The bonus depreciation is applied by deducting 50% from the Project's basis in the first year and deducting the remaining 50% of the adjusted basis according to the 5-year MACRS schedule. The Project currently does not assume any bonus depreciation.[69]

Regarding State incentives, Applicant has not received any State grants or other subsidies from the NJ Economic Development Authority or other agencies.

F. Funding for project decommissioning

The Project plans to have a decommissioning reserve account to pay for the eventual decommissioning and removal of the Project. The proposed decommissioning reserve will have a target amount of $[redacted] at the end of commercial operations. This amount is based on a targeted base amount of $[redacted] with an annual escalation rate of [redacted]%. The financial model assumes that there will be a sinking fund to meet the targeted amount by contributing approximately $[redacted]/month to the fund from Project cash flows. The sinking fund will earn

[66] Ibid. Available at http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US13F&re=1&ee=1.
[67] Per the American Recovery and Reinvestment Act (ARRA) of 2009
[68] U.S. Department of Treasury, "Payments for Specified Energy Property in Lieu of Tax Credits under the American Recovery and Reinvestment Act of 2009, Program Guidance," Revised April 2011, page 7.
[69] Database of State Incentives for Renewables & Efficiency (DSIRE). Available at http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US06F&re=1&ee=1

interest of [redacted]% and together with the contribution is projected to have a balance of $[redacted] at the end of commercial operations.

Applicant has determined the $[redacted] base amount for decommissioning to be sufficient, which is [redacted]% of the total capital cost. Applicant states in a response to a discovery request from BPU that they used a study from the U.S. Department of Interior, Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) as a starting point, which provides a general estimate for decommissioning costs. The study indicates that decommissioning liabilities are roughly 5-10% of total capital costs.[70]

Applicant also supplemented their initial estimate with input from marine contractors, European wind farm experts, and metals salvagers. Additionally, Applicant analyzed the resources necessary to remove certain elements from the installation, such as the wind turbine generators, foundation structures, and submarine cables.

[70] Bureau of Ocean Energy Management Regulation and Enforcement, "Offshore Wind Energy Installation and Decommissioning Cost Estimation in the U.S. Outer Continental Shelf," November 2010, page 215

V. TECHNICAL ANALYSIS

A. Summary

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 operations and maintenance plans.

We conclude the following: Without a wind resource study we cannot assess the Project's electricity output assumptions. In terms of the adequacy of the turbine, we note that the proposed turbine will be the first turbine in the 5 MW class that uses direct drive (DD) technology. The turbine technology is insufficiently backed up by independent verification of the test turbine and/or technology assessment. In addition, the Project is insufficiently backed up by the right level of guarantees from XEMC. The proposed foundation concept is of a type that has not been used before for offshore wind turbines. When combining the risks of a new turbine with the risks of a new foundation concept, the technology risks of the Project significantly increase.

B. Electricity output assumptions

Applicant indicates that they commissioned [redacted], a wind energy consultancy, to provide an assessment of the energy production capability of the proposed turbines;[71] however, they did not provide the actual wind resource study and performance assessment conducted by [redacted]. A wind resource study typically provides an assessment of the site and monitoring equipment, wind data, the proposed wind turbine and wind farm layout, and an analysis of energy production. Without the wind resource study, we cannot fully assess the reasonableness of the electricity output assumptions.

C. Adequacy of proposed wind turbines

The Project will utilize 5 Darwind/XEMC DD115 5 MW turbines for a total nameplate capacity of 25 MW.[72] The XEMC turbine is the first turbine in the 5 MW class that uses Direct Drive (DD) technology. Direct Drive technology is a relatively new trend in wind turbine generator drivetrains that replaces conventional gearbox technology, which contain sets of gears and bearings that convert the slower rotational speed of the turbine's blades to a faster rotational speed that allows the generator to operate at grid frequency – this often requires a very high gear

[71] Petition, Exhibit A, page 20.
[72] Additional Supplemental Update, 8/1/2011; Cost-benefit and Rate Impact Analyses of the State Waters Project with Five Turbines, 11/7/2011.

ratio that causes stress to the gearbox, especially in higher wind speed and turbulence areas such as in offshore wind environments.[73] Direct drive technology, on the other hand, allows the generator to rotate at the same speed as the turbine blades, and with fewer moving parts. This results in increased reliability and performance. However, the tradeoff with direct drive technology is an increase in size of the housing (nacelle) of the generator due to larger dimensioned generators. In order to maintain similar electromagnetic characteristics of the generator, typically the diameter of the generator is increased in order to accommodate for slower rotational speeds[74]. Furthermore, the use of permanent magnets in direct drive generators can provide many performance benefits especially as costs come down.

Other manufacturers have DD technology, but at smaller sizes (< 3 MW) and with short operating history (2 years). The XEMC wind turbine technology, however, is insufficiently backed up by an independent verification of the test turbine and/or technology assessment. Given that turbine is not yet certified, a certified report about the test turbine or an independent assessment of the technology should be provided. We note that, although owned by a Chinese company, the XEMC turbine is designed in the Netherlands with the latest European norms and regulations.

There are two types of certifications that can be obtained for offshore wind projects. The first of these is the type certification. A type certification usually covers specific equipment, such as the turbine, blades, nacelle, and the tower.[75] The designs of such equipment are evaluated against certain accepted standards and codes by a certifying body. A project certification, on the other hand, is a more comprehensive certification that includes, not just the turbine and tower, but the foundation and other equipment as a whole in the context of the specific site.[76] Site-specific approval includes verification of external conditions such as soil, wind and wave conditions.

Our view of Applicant's commitment to obtain project certification with [redacted] is positive.[77] A letter submitted by [redacted] on October 3, 2011 stated that [redacted] is currently carrying out a "Site Specific Design Certification" for the Project. We also note that there are few offshore wind turbines in the market with type certification already in place (e.g. RePower, Siemens, Multibrid); therefore obtaining type certification often happens after installation. A number of offshore wind projects in Europe have received a type certification for their selected turbines even after two years of operations.[78] Since project certification is also provided after installation, we emphasize the importance of Applicant receiving a certified report of the XEMC turbines or an independent third party assessment of the technology.

Regarding additional risk mitigation, the Project should be backed up by the right level of guarantees from XEMC, including: a) a performance guarantee for timely delivery; b) a power curve warranty; c) an availability guarantee ([redacted]

[73] UpWind, "Integrated Wind Turbine Design," Revised April 12, 2007, page 5
[74] Ibid., page 12
[75] [redacted] dated 10/3/2011, page 1.
[76] Ibid., page 3.
[77] Response to Rate Counsel Discovery Requests 2, July 27, 2011, page 29.
[78] [redacted] Consulting Letter dated 10/3/2011, Table 1.

[redacted]); and d) a warranty bond. Only some of these guarantees were identified in the Application. In addition, the level of guarantees should reflect the level of damage that underperformance could harm ratepayers.

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

The proposed foundation design concept is of a type that has not been used before for offshore wind turbines. When combining the risks of a new turbine with the risks of a new foundation concept, the technology risks of the Project significantly increase.

With an understanding that we cannot ask for too much level of detail from a conceptual design,[79] Applicant should address the following key issues about the foundation design concept:

[redacted]

[79] See electronic file "RCR VE 7 Conceptual Jacket Foundation Design and Installation" provided through Response to Rate Counsel 2, July 27, 2011

[redacted]

In general, there is no issue with new concepts and technology being introduced in a project. That should, however, be done in a balanced mix with proven technology. This new jacket concept adds to the technology risk of the new DD turbine. Combining individual components with risk in a system only amplifies the total system risk, which is unnecessary for this project.

E. Technical viability of proposed interconnection plan

The interconnection plan is written as a logical process and covers all aspects of the required steps for grid interconnection.[80] Such details in the plan, like procurement and lead times need to be filled in at a later stage, but in general, what was provided is sufficient. The permitting consequences should be analyzed in more detail and described in Applicant's interconnection plan. The constraints of the permitting part should also be made visible in the Project schedule.

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

Lessons learned in European offshore wind projects show that the biggest risk to being able to have a project that comes on-line in time, with quality, and within budget is the strength of the project team. Applicant should provide a project organization chart that reflects the key employees that will manage the development of the Project. Corresponding resumes should be provided for those in the chart that demonstrate relevant experience. The chart should also reflect positions that are currently vacant, but that will be filled in the future. Applicant should demonstrate specifically how offshore wind experience will be brought to the Project. As indicated above, Applicant will rely on a number of contractors to bring offshore wind expertise. Applicant has identified contractors to: a) perform construction project management; b) supply the wind turbine generators; c) supply the foundations; d) build a substation to interconnect the Project to the grid; and e) perform turbine maintenance. Not enough information was provided about these contractors or suppliers to demonstrate their experience developing offshore wind projects or their manufacturing capacity. In addition, key terms and conditions of the agreements with these subcontractors should be provided.

Regarding the project schedule provided by Applicant,[81] the dates in the Gantt chart are not realistic and [redacted]. However, by taking into account permitting, negotiations, financing, certification and financial close, the realistic alternative would be [redacted]. In terms of detail, the schedule is very basic and should provide more depth. [redacted]

[80] Petition, Exhibit A, pages 178-190.
[81] We reviewed a Project Schedule dated September 8, 2011

G. Adequacy of operations and maintenance plan

The applicant did not provide an up-to-date operations and maintenance (O&M) plan that reflects the proposed XEMC turbines. Therefore, we cannot substantiate the reasonableness of the O&M plan. The only details that were provided about the scope of work for O&M are found in the term sheets for [redacted] Agreement and for [redacted] from the [redacted] Agreement. The term sheets only provide for O&M for the wind turbine generators, towers, and turbine based equipment, and for asset management.[82] There are no term sheets or details provided for the undersea cable and onshore facilities.

The O&M plan that was provided in the Application [redacted].[83] This O&M plan contains very little content. Again, we would not necessarily expect a great level of detail at this early stage of development, but a strategic outline has to be there at a minimum. An operations strategy should at a minimum be based on the organization of the operator, the organization of the wind turbine generator supplier/service organization and the type of wind turbine generator selected. [redacted]

[82] Participation Agreement, Exhibit D, pages D1-D2 and Exhibit E, Supplement to Asset Management Services.
[83] Fishermen's Energy Atlantic City Wind Farm (FACW) O&M Plan, June 8, 2011, page 7.

VI. COMPLIANCE WITH REGULATIONS

A. Summary

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) whether Applicant demonstrates an understanding of the environmental requirements to construct the proposed facility and provides a credible plan to meet them; 3) the ability of the Project to secure all necessary ocean leases and required land; and 4) whether the filing is consistent with the New Jersey Energy Master Plan.

We conclude that Applicant has made significant progress in obtaining all necessary permits. Importantly, Applicant has obtained necessary State permits for the placement of turbines and cable in State waters.[84] At the Federal level, permits were pending as of September 2011 from: a) [redacted]; and b) [redacted].[85] We have no reason to believe that these will not be obtained in a timely manner.

This Project is consistent with the New Jersey Energy Master Plan[86] 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 Project also needs to demonstrate net benefits in order to comply with the New Jersey Energy Master Plan. As discussed in our analysis of the cost-benefits of this Project, at this point we are unable to assess the validity of the projected benefits.

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

Applicant has provided a comprehensive list of the necessary permits to develop the facility.[87] As of September 2011, there were two pending permits at the Federal level. One was a permit from [redacted].[88] Applicant indicated that all public comment periods had expired without negative comments received from the public or otherwise. The other was [redacted].

[84] Fishermen's Energy Integrated Schedule, Rev 9.3, September 8, 2011; Permitting.
[85] Ibid. and Fishermen's Energy List of Permits: 25-MW Project, Revised July 6, 2011.
[86] Adopted pursuant to section 12 of P.L. 1977, c. 146 (N.J.S.A. 52:27F-14).
[87] Fishermen's Energy List of Permits: 25-MW Project, Revised July 6, 2011.
[88] Ibid. and Fishermen's Energy Integrated Schedule, Rev 9.3, September 8, 2011; Permitting

Status of Federal Level Permits[89]

Permit	Agency	Status
[redacted]	[redacted]	Pending Estimated 9/11
[redacted]	[redacted]	Pending Estimated 9/11
FAA Clearance: approval for construction of towers above 200 feet	Federal Aviation Administration (FAA)	Approved 3/16/11
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	National Oceanic and Atmospheric Administration (NOAA)	Approved 4/21/10

Applicant has obtained necessary State permits for the placement of turbines and cable in State waters. 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. The Tideland's Utility 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.[90]

Status of State Level Permits[91]

Permit	Agency	Status
Tidelands License: covers 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
Individual multiple permit application:	NJDEP-DLUR	Approved 3/29/11

[89] Ibid. and Fishermen's Energy List of Permits: 25-MW Project, Revised July 6, 2011.
[90] Initial Petition, Exhibit A, 10.iv (page 132).
[91] Fishermen's Energy Integrated Schedule, Rev 9.3, September 8, 2011; Permitting; Fishermen's Energy List of Permits: 25-MW Project, Revised July 6, 2011.; Exhibit A, pages 132-133.

CAFRA,[92] waterfront development, 401 water quality certification for placement of turbines/cables		
[redacted]	[redacted]	Pending Estimated Q3 2011
[redacted]	[redacted]	Pending - Final stages of negotiation

In addition to the Federal and State permits listed above, [redacted].[93]

[redacted].[94]

[redacted].[95]

Finally, there were a couple minor permits that were still being pursued which include: a) [redacted];[96] and b) [redacted]

[92] 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.
[93] June 29, 2011 response to discovery request; NUBPU-Econ-4. (Collection C)
[94] Ballard Spahr letter, July 12, 2011, pages 3-4.
[95] Memorandum from Ballard Spahr, LLP, October 12, 2011, page 2.
[96] Fishermen's Energy List of Permits: 25-MW Project, Revised July 6, 2011.

[redacted] for which Applicant already had a Memorandum of Understanding. [97]

C. Applicant's understanding of the environmental requirements to construct the proposed facility and credibility of the proposed plan to meet them.

Applicant has demonstrated an understanding of the environmental requirements to construct the proposed facility and provides a credible plan to meet them. We have summarized above the permits, including environmental ones, needed to develop the facility.

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

As stated above, Applicant has obtained necessary State permits for the placement of turbines and cable 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]

The Tideland's Utility 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. [redacted] [98]

As of September 2011 Applicant was pending receipt of a permit from [redacted]. [99] Applicant indicated that all public comment periods had expired without negative comments received from the public or otherwise. [100]

E. Filing is consistent with the New Jersey Energy Master Plan

The 2011 Energy Master Plan provides guidance for New Jersey's energy industry for the next ten years. 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

[97] Petition, Exhibit A, page 133.
[98] Ibid.
[99] Fishermen's Energy Integrated Schedule, Rev 9.3, September 8, 2011; Permitting; Fishermen's Energy List of Permits: 25-MW Project, Revised July 6, 2011.
[100] Petition, Exhibit A, page 177.

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.[101]

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 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, at this point we are unable to assess the validity of the projected benefits.

[101] Adopted pursuant to section 12 of P.L. 1977, c. 146 (N.J.S.A. 52:27F-14).

VII. COST-BENEFIT ANALYSIS

A. Summary

Applicant estimates net benefits for the Project to be in the range of $[redacted] to $[redacted] on a net present value (NPV) basis.[102] Net benefits are calculated by offsetting the total costs for the purchase of ORECs, which on a NPV basis are $[redacted], against an estimate of the benefits to ratepayers, the economy, and the environment.

The high end of the range estimates that [redacted]% of the total benefits of this Project will be due to an increase in tourism for the State, [redacted]% to jobs and economic impact, [redacted]% to environmental impact, and [redacted]% to revenues perceived from sales of energy and capacity to PJM. The low end of the range reflects a sensitivity that was conducted in which no tourism benefits were assumed. The following table shows the results of Applicant's cost-benefit analysis at the high end of the range (i.e., assumes the realization of "full tourism" benefits):

REDACTED TABLE

An increase in tourism accounts for the most significant benefit; however, the inputs to calculate this benefit were not adequately explained. Applicant seems to rely on two surveys of visitors to popular destinations, including the Atlantic City area, who were asked about their likelihood of returning if an offshore wind farm was developed. However, there is no explanation or support for how the results of these surveys translate into an expected future number of tourists attributable to the offshore wind Project or for the assumptions that were made about the average future spending for these tourists. Without that, we cannot even start to validate the Project's cost-benefit study.

Key inputs to determine the Project benefits are the same as those used to calculate the OREC price. As indicated above, key inputs for the Project have not been adequately substantiated. Until they are, we cannot assess the validity of the projected benefits. For example, the Project's capital costs are used when determining job creation. The cost-benefit model starts with this cost and applies a set of multipliers to arrive at the total number of jobs that will be created during construction. Similarly, the Project's electricity output is a key input to calculate the environmental benefits. This is because to calculate these benefits, the facility's projected electricity output is multiplied by emissions reduction factors for CO_2, SO_2, NO_X and others. As noted, without a credible wind resource study, output estimates cannot be validated.

B. Net Impact of the Project on New Jersey ratepayers

[102] See Excel spreadsheet "offshore wind Rate Impact ACTIVE Workfile v7.4a 5 Turbines No 1603," hereafter called "Cost-Benefit Model"

The benefits of the Project to New Jersey ratepayers are estimated to be $[redacted] on a net present value basis. These are attributable to: a) revenues from the sale of energy and capacity into PJM which will be paid to New Jersey ratepayers ($[redacted]); b) savings to ratepayers from not having to purchase Class I RECs since ORECs will offset the need to purchase Class I RECs ($[redacted]); and c) overall benefits to ratepayers as a result of lower electricity marginal prices that are caused by increasing amounts of renewable energy generation ($[redacted]).[103] Applicant refers to this last benefit as the "merit order effect."

As discussed in the Financial Analysis section, the energy revenues are based on the wholesale energy price forecast and the annual electricity output projections. Since there is no documentation, we cannot judge the electricity price forecast to be reasonable. We have indicated previously that the projected electricity output estimate lacks sufficient substantiation. Without this we cannot validate the reasonableness of the estimated revenues from PJM sales.

We also conceptually agree with the inclusion of the benefits resulting from savings from not having to purchase Class I RECs. However, we cannot validate the forecast of prices for Class I RECs because Applicant has not provided any documentation for the forecast it uses.

As to the merit order effect, we understand that this is meant to reflect the fact that, with increased supply to a PJM Market, the market price will fall. New renewable production, especially when bid at a zero price, is likely to do this and so could any other resource. Given this we have two points. First, the effect of new supply on market prices – what is called the merit order effect here – must be taken into account when forecasting market prices so the PJM Market revenues can be forecasted accurately. This market price effect is important in any commodity market. For example, recall that natural gas prices were above $10/MMBtu prior to the Shale Gas revolution – the big increases in American natural gas supply. Today, because of the increased shale gas supply, the market price for natural gas is below $4/MMBtu. To make sure that they accurately estimated the revenue to be earned if they invested in shale gas production and entered the market, investors would have to include the price effect of increased supply. So, we agree that the merit order effect should be taken into account when forecasting PJM revenue for the Project.

However, we do not believe that the effect of increased supply should be included as a "benefit" of the increased supply. Again, go back to the shale gas analogy. Despite the fact that those who invested in shale gas production significantly lowered the price of all natural gas from over $10/MMBtu to below $4/MMBtu, no one paid the investors a part of the $6/MMBtu price reduction. Natural gas consumers (homes and businesses) were allowed to enjoy the full $6/MMBtu price reduction. Commodity markets just work that way.

It does not make sense to claim a benefit from a pure policy perspective either. If it led to true net benefits, why not have the government cause oversupply in every market? To take an extreme but relevant example, we have an oversupply of houses today – some would say because of explicit government policy – does anyone think that led to a net benefit? And even if we decide to cause an oversupply, wouldn't we want to use the cheapest power technology for that purpose? And, can we agree that, at over $[redacted]/kW, the Project is unlikely to be the cheapest

[103] Ibid.

technology we could find? Again, all this goes to the point that the supply effect – the so-called merit order effect – should not be used in the benefit calculation.

C. Net Economic Impact

The primary economic benefit is expected to come from an increase in tourism due to the development of the offshore wind Project. In Applicant's base case scenario, tourism makes up roughly [redacted]% of the total benefits of the Project, at $[redacted] on a NPV basis.[104] In addition to benefits from tourism, Applicant estimates benefits to the New Jersey economy from the creation of [redacted] jobs during construction and [redacted] jobs during operations of the Project, which are estimated to result in about $[redacted] in compensation to workers during construction and $[redacted] annually during operations, and an additional $[redacted] in increased economic activity from construction and $[redacted] annually during operations of the facility to New Jersey.[105]

Tourism Benefits

The largest component of the benefits estimated by the cost-benefit analysis is tourism. In the full tourism scenario, tourism makes up roughly [redacted]% of total benefits or $[redacted] on a net present value basis. The tourism benefits are divided into the base benefits from tourism and indirect business taxes. On a NPV basis, the indirect business taxes account for about [redacted]% of total tourism benefits or $[redacted]. Applicant also performed several sensitivities on tourism benefits: a 50% tourism, a low tourism, and a no tourism case. Tourism benefits, on an NPV basis, are estimated to be $[redacted], $[redacted] million, and $[redacted] for each of these sensitivities, respectively.[106]

Applicant seems to rely on two surveys of visitors to popular destinations, including the Atlantic City area, who were asked about the likelihood to return if an offshore wind farm was developed. [107] However, it is not clear how the results of these surveys translate into an expected future number of tourists attributable to the Project and the assumptions that were made about the average future spending for these tourists. The model that was used to calculate tourism revenues provides no explanation of the sources for the numbers that are being used in the calculations. Therefore, we cannot validate the reasonableness of the presumed benefits.

Benefits from job creation and economic impact

Fishermen's Energy uses an input/output model developed by the United States Department of Energy's National Renewable Energy Laboratory (NREL) to determine the

[104] Ibid.
[105] See Excel spreadsheet "JEDI Model w GA offshore wind mod v3a 5 Turbines rel," hereafter called "JEDI Model"
[106] Cost-Benefit Model
[107] [redacted]

number of jobs and economic impact to a local area resulting from construction and operations of the Project. The input/output model, called the Jobs and Economic Impact (JEDI) model, allows the user to input variables such as capital costs, operations and maintenance costs, financing assumptions, and tax information. There are several versions of the JEDI model that have been customized for specific generation technologies. The specific JEDI model used for this Project is customized for wind projects; however, it is unclear whether offshore wind projects are taken into account.

Once the project assumptions are inputted in the model, they are applied to a set of multipliers that are used to calculate jobs, earnings, and economic output. The multipliers are derived from IMPLAN, a third party proprietary economic modeling software. The multipliers and default data contained within JEDI are also locked and cannot be manipulated. For project specific information, the user inputs data related to the construction costs of the project such as equipment and balance of plant costs. Likewise, the user enters information regarding operations and maintenance costs, financial parameters, and tax assumptions. In addition, for certain inputs, the user specifies a percentage share that will be spent in the local jurisdiction, in this case New Jersey.

While we do not have any major issues with the JEDI model itself, our primary concern with the analysis that was presented by Applicant is the lack of substantiation for key inputs to the model such as the capital and operating costs and financing assumptions, which was explained in other sections of this report. If these inputs cannot be substantiated, then we have no means of validating the outputs.

Based on the assumptions inputted by Fishermen's Energy, the following table shows the actual output from the JEDI model:

REDACTED TABLE

The output of the JEDI model shows the number of jobs, earnings or wage and salary compensation paid to workers, and output which is the value of production to New Jersey. These figures are displayed for the construction period and operating period of the Project. The earnings and output figures are shown in millions of U.S. dollars and in year 2012 dollars. The largest impact to New Jersey is attributable to the construction of the Project and, in particular, from turbine and supply chain impacts.

Another major concern we have with Applicant's inputs to the JEDI model is how each cost and financial input is deemed to be local to New Jersey. As mentioned above, the user is able to allocate a percentage of a cost or financial input to have a local effect. If the user inputs 0% for the local share, then that input is not reflected in any output calculations. This is an area that has significant implications for the outputs that are calculated. We have not seen sufficient substantiation on how the local share percentages are calculated.

With regards to consistency, it is difficult to see how some of the cost inputs in the JEDI model correspond to the capital cost breakdown in the financial model. For example, in the JEDI model, the construction costs include equipment costs and balance of plant costs. The balance of

plant costs are further subdivided into material, labor, and development/other costs. The total of the equipment and balance of plant costs is $[redacted]. It is difficult to see what the $[redacted] corresponds to in the financial model because of a lack of detail, but if you attempt to match the category descriptions, the financial model gives you a total of $[redacted].

We also have a concern about something that is not included in the estimate of "benefits of job creation and economic impact." If, as expected, offshore wind projects require a price that is above the market price for electricity in some or all years, then the projects can have a negative job impact. The logic is simple. If New Jersey ratepayers have to spend, say, $300 million more per year for electricity than they would have in the absence of the above-market costs of offshore wind projects, then these ratepayers will have $300 million less to spend on other products and services – food, clothing, shelter, and so on. When ratepayers spend less on these other products and services, the businesses providing them will employ fewer people. Again, it is the above market prices for offshore wind projects that create the problem. Applicant does not but should address the possibility of a negative job impact caused by above market prices.

Other potential benefits

Finally, we note that in the [redacted] Agreement entered with XEMC, XEMC indicates that [redacted][108] The Agreement indicates that [redacted] however, we are unaware if an actual agreement has been executed.

[redacted]

D. Net Environmental Impact

On a NPV basis, environmental benefits are estimated to be about $[redacted].[109] We have no general, conceptual problem with the methodology used to calculate these benefits. However, a

[108] [redacted] Agreement, page 1

[109] See Cost-Benefit Model

key input to the calculation is the Project's electricity output projection. As stated above, this has not been adequately substantiated. Without this we cannot validate the resulting environmental benefits calculation.

The environmental benefits arise from the reduction in CO_2 and other emissions such as sulfur dioxide (SO_2) and nitrogen oxides (NO_x). They are predicated on a social cost of $[redacted]/ton of CO_2, $[redacted]/ton of SO_2, and $[redacted]/ton of NO_x, which are derived from studies conducted by the EPA.[110] However, no citations are provided so the social cost estimates cannot be validated.

In order to determine the amount of emissions that are avoided, Applicant assumes emissions factors for each pollutant which are listed in the table below. These emissions factors are multiplied by the estimated annual electricity output of the facility of [redacted] MWh, which results in an amount of annual emissions avoided for each pollutant – these are displayed in the table below in both short tons and metric tons. The same problem with validation exists here.

REDACTED TABLE

The total benefit is calculated by multiplying the amount of annual emissions avoided by the social cost for each pollutant. These calculations are reflected in Applicant's base case cost-benefit table in the columns "Environmental Benefits CO_2" and "Environmental Benefits SO_2, NO_x, Hg, PM2.5." The CO_2 benefits escalate at [redacted]% annually and the other emission benefits escalate at [redacted]% annually.[111] We cannot validate these estimates because sufficient documentation was not provided by Applicant.

[110] [redacted]

[111] See Cost-Benefit Model

VIII. OREC PRICING

A. Reasonableness of OREC pricing

The NJ Rules require that an applicant propose a fixed, flat OREC price for the proposed term or a fixed price for every contract year.[112] OREC pricing will be on a pay for performance basis, with payments to be on a $/MWh basis, subject to any quantity caps. OREC pricing represents a project's revenue requirement, taking into consideration tax credits and other subsidies, minus the actual value of spot energy market prices and/or capacity prices.

The financial model is used to determine OREC pricing. Based on the Project assumptions, the starting OREC price is $[redacted]/MWh in 2013. The OREC price has a fixed annual escalation rate of [redacted]% and by 2033, the OREC price becomes $[redacted]/MWh. Since several key inputs that are used to determine the OREC price cannot be substantiated, including the electricity output estimates, capital costs, operations and maintenance costs, and financing assumptions, we cannot validate the proposed OREC price.

We also view the OREC price to be considerably high when compared to the effective price for PJM revenues, which in 2013 is assumed to be $[redacted]/MWh. That is, the proposed OREC price is [redacted] times higher than Applicant's own estimated electricity market price of $[redacted]/MWh for the first year of operation. The primary reason for such high OREC prices is the estimated capital costs of the Project, which is approximately $[redacted] or $[redacted]/kW.[113] More specifically, the amortization of such a high capital cost over the projected MWhs, while ensuring that debt service conditions and a targeted return on equity are met, is the main driver. The largest cost component (about [redacted]% of the total) is the procurement cost of the Project's five wind turbines plus the Project's constructions costs. The application lacked the necessary supporting documentation to demonstrate the validity of these costs.

[112] N.J.A.C. 14:8-6.5(a)(12)(iii).
[113] See Excel spreadsheet "offshore wind Rate Impact ACTIVE Workfile v7.4a 5 Turbines No 1603," August 24, 2011, hereafter called "Financial Model"