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March 27, 2024

Board of Public Utilities
44 South Clinton Avenue
Trenton, New Jersey 08625

Re: *IN THE MATTER OF THE OPENING OF NEW JERSEY'S FOURTH SOLICITATION FOR OFFSHORE WIND RENEWABLE ENERGY CERTIFICATES (ORECs)*
Docket No. Q024020109

Dear Commissioners:

On behalf of Long Beach Township, Beach Haven, Ship Bottom, Barnegat Light, Surf City, Harvey Cedars, Brigantine, and Ventnor City (the Shore Municipalities) we submit this comment letter on the draft solicitation guidance for the Board of Public Utilities' (BPU) fourth offshore wind solicitation (Fourth Solicitation).

The Shore Municipalities focus their comments on those portions of the draft solicitation guidance that invite rebidding from projects previously accepted as qualified projects. This section appears to be targeted at permitting Atlantic Shores Offshore Wind, LLC (Atlantic Shores) to rebid its project to obtain increased OREC pricing and thus increased subsidies at the expense of New Jersey's ratepayers.¹ And indeed, Atlantic Shores commented orally at the BPU's March 20, 2024 stakeholder meeting, strongly suggesting that it does intend to rebid.

The Shore Municipalities object to any such rebidding, and believe that, if Atlantic Shores is to be permitted to construct its proposed offshore wind project, it should be held to the original deal.²

¹ The other potential rebid applicant, Ørsted, previously canceled its Ocean Wind 1 and 2 projects. But to the extent Ørsted were to seek to revive them in response to the Fourth Solicitation, the comments raised herein would apply with equal force to that application.

² The Shore Municipalities object to the Atlantic Shores project as a whole because of the drastic impacts that turbines so close to shore will have on their economies and way of life, and thus have opposed the project in other venues.

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Therefore, and for the reasons detailed herein, the Shore Municipalities believe the BPU should remove any references to applications from projects previously selected as qualified projects from the Solicitation Guidance, and not consider any such applications in making awards under the Fourth Solicitation.

First, the Shore Municipalities believe it would be the definition of arbitrary, capricious, and unreasonable for the BPU to voluntarily permit Atlantic Shores to walk away from the OREC pricing it agreed to and allow it to seek a greater subsidy from New Jersey's ratepayers. Atlantic Shores is a highly sophisticated company owned by global energy conglomerates. Atlantic Shores was fully capable of making its own economic projections concerning inflation and the global supply chain, and pricing such risks into its initial application. Atlantic Shores – not New Jersey's ratepayers – should bear the cost of any mistakes it made. Atlantic Shores' ultimate parent companies – Shell plc and EDF Group – earn hundreds of billions in annual revenues and are more than capable of making good on their word. If they refuse to honor their obligations and the initial OREC pricing agreed to, Atlantic Shores should not be viewed as a reliable company trusted to construct a project of such scale that will permanently alter New Jersey's coastal ecosystems and coastal economy and way of life.

Indeed, OWEDA requires the BPU to find that “the entity proposing the project demonstrates financial integrity and sufficient access to capital to allow for a reasonable expectation of completion of construction of the project.” N.J.S.A. 48:3-87.1(b)(1)(d). The BPU's rules plainly place the risk of increased costs on the developer, not the ratepayers. See N.J.A.C. 14:8-6.5(a)(iv) (“[T]he offshore wind developer [will be] responsible for any cost overruns. Ratepayers will not be responsible for any cost overruns and for costs associated with nonperformance.”). If Atlantic Shores now claims it needs higher OREC pricing to support the project, it is conceding the BPU's earlier findings were in error, and that Atlantic Shores does not have financial integrity to be entitled to an award. The BPU should not permit any rebidding in the Fourth Solicitation. To the extent it does, it should not approve any rebid submitted by Atlantic Shores.

Second, the Shore Municipalities have received, reviewed, endorse, and provide herewith an economic analysis of a potential Atlantic Shores rebid prepared by Whitestrand Consulting, LLC. See Exhibit A hereto. As discussed therein, assuming Atlantic Shores were to receive OREC pricing at a level comparable to those awarded by the BPU in its third solicitation – if not higher – an award to Atlantic Shores under a rebid application would increase the present value of added ratepayer costs to \$10 billion, as compared to \$3.7 billion under the prior award to Atlantic Shores. Id. at 5.

As discussed by Whitestrand, the inflation adjustment included in the Fourth Solicitation was not included in the original award to Atlantic Shores, and the Shore Municipalities object to this

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further handout to Atlantic Shores. It is a near-certainty that the maximum inflation adjustment would be added onto future OREC pricing. See Id. at 3-4. And such an inflation adjustment is not permitted by the BPU's rules, which require a "**fixed, flat OREC price** for the proposed term or a **fixed price** for every contract year" and provides that "[r]atepayers will not be responsible for any cost overruns." N.J.A.C. 14:8-6.5((a)12)(iii) and (iv); N.J.A.C. 14:8-6.6(b)(12) (emphasis added). Should BPU wish to permit inclusion of inflation adjustments rather than flat pricing, it must amend its rules to do so. Metromedia, Inc. v. Division of Taxation, 97 N.J. 313 (1984).

Again, Atlantic Shores is a sophisticated company and is fully capable of including its own inflation projections into its proposed pricing in any application. It and other developers should not be permitted to obfuscate the projected cost of their projects to New Jersey and its ratepayers and then receive further handouts in the form of an inflation adjustment. The inflation adjustment should thus be removed from the Fourth Solicitation.

Third, the Whitestrans report also discusses mistakes the BPU has made in its prior awards, and the Shore Municipalities urge the BPU not to make the same mistakes here. Those include using improper discount rates to minimize and understate the cost to ratepayers – using a discount factor of 7% rather than the discount factor of 3% that is appropriate for consumers of power input – and then using a much lower discount factor of 2% to overstate the value of reduced CO2 omissions. Id. at 2. The BPU has also erred in understating the cumulative impact on ratepayers of other projects, and Whitestrans anticipates a successful Atlantic Shore rebid would result in a 19.6% rate increase on the residential ratepayers – and a 22% increase if the inflation adjustment is permitted. Id. at 14-15. The BPU additionally erred in its prior awards by considering the global benefit to CO2 omissions, when OWEDA limits the consideration of the "positive economic and environmental net benefits **to the State**." N.J.S.A. 48:3-87.1(b)(1)(b) (emphasis added).

Moreover, the BPU's 2022 approval of Atlantic Shores discussed only purported economic benefits of the project, but failed to acknowledge or compare them against the clear economic costs from it. But OWEDA requires a **net** economic and environmental benefit, N.J.S.A. 48:4-87.1(b)(1)(a), and thus the BPU cannot discharge its duties without analyzing the economic downsides of offshore wind projects. If Atlantic Shores is permitted to rebid, the BPU must engage in a much more searching economic analysis of its proposals.

And that analysis will reveal there are indeed real economic costs from the project that will be felt by the Shore Municipalities and others. The Shore Municipalities discussed these in detail in their comment letters to the New Jersey Department of Environmental Protection on Atlantic Shores pending request for a federal consistency certification. See Exhibit B and C, attached hereto and incorporated herein by reference. The BPU's prior analysis completely disregarded the visual impacts of the projects and their resulting adverse impacts on tourism, property values,

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and property tax receipts. Whitestrand estimates the negative economic impacts on tourism and the shore and fishing communities to be in excess of \$350 million annually. See Exhibit A at 6. A separate and thorough analysis performed by Tourism Economics on behalf of the Shore Municipalities estimates this loss to be even higher, with a projected economic to Ocean County as a result of diminished visitors totaling \$668.2 million annually, and causing an associated loss of 6,729 full-time and part-time jobs. See Exhibit D hereto. Additional negative economic impacts would be felt by Brigantine, Ventnor City, and other municipalities in Atlantic County as well. The BPU must take these impacts into account in its economic analysis, and when it does, must conclude that there will not be a net economic and environmental benefit from the Atlantic Shores Project. Rather, the costs of a rebid will exceed the benefit by an estimated \$27.29 billion. See Exhibit A at 9.

Fourth, the BPU's prior award also cursorily discussed and diminished other economic and environmental impacts of the projects on commercial fishing, whales, and avian species. But the Department of Environmental Protection's own analyses reflect that there will be permanent impacts to ocean habitats, and that there is not yet scientific literature on the impact of removing these habitats. See Exhibit C at 3. The BPU should exercise a precautionary approach in the absence of definitive science, and observe the impacts from the construction of the projects it has already awarded before rushing to approve the construction of additional projects through the Fourth Solicitation.

Fifth, during its March 20, 2024 stakeholder meeting, the BPU stated its weighted evaluation criteria for applications received. These percentages are not stated in OWEDA or BPU's rules concerning offshore wind projects. See N.J.A.C. 14:8-6.1, et seq. The Shore Municipalities believe that if BPU wishes to establish such weighted criteria for application evaluation, it must do so through formal rulemaking, so that the public can evaluate and comment on those criteria. See Metromedia, 97 N.J. 313 (1984).

Finally, as a matter of due process and good governance, the Shore Municipalities request that the BPU disclose and entertain public comment on the specific applications it receives, whether from Atlantic Shores or other developers. For example, the public should be permitted to review and comment on the analyses and projections submitted by Atlantic Shores and other developers, so that the public may specifically address those proposals rather than speculate on what may be submitted. The manner in which these solicitations have been conducted, and in particular the rebidding offered in this solicitation, leaves the clear impression of backroom handshake deals and that additional subsidies for Atlantic Shores are predestined, regardless of the negative impact on New Jersey's economy, environment, and ratepayers. The BPU should attempt to regain the public's trust and engage in a full and open process throughout this solicitation.

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Very truly yours,

/s/ Frank Huttle III

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EXHIBIT A

**Economic Analysis
of a Potential Re-Bid of the
Atlantic Shores One Offshore Wind Project**

by

Edward P. O'Donnell



March 2024

Executive Summary

As part of its Second Offshore Wind Solicitation, in June 2021 the NJ Board of Public Utilities (BPU) approved the Atlantic Shores Offshore Wind One (AS1) Project as a qualified offshore wind facility and deemed it eligible to receive payments for Offshore Renewable Energy Credits (ORECs) for 1510 MW of electrical generating capacity.

On March 6, 2024 the BPU announced a proposed Fourth Solicitation seeking bids for an additional 1200-4000 MW of offshore wind capacity. In this solicitation, BPU proposes to allow companies who were awarded ORECs in the First or Second Solicitations to re-bid those projects and receive new awards which would supersede the existing OREC prices. Since this will undoubtedly result in higher ratepayer subsidies than those already associated with the existing OREC prices, it is appropriate to estimate the ratepayer impact of this unprecedented Re-Bid proposal and whether such an action by BPU would comply with the Offshore Wind Economic Development Act (OWEDA) which imposes mandates on the BPU meant to protect ratepayers. That is the purpose of this report.

The following are the major findings and conclusions which are detailed in the report:

Ratepayer Impacts

- On a successful AS1 Re-Bid NJ ratepayers will be required to pay **triple** the market price for power from the AS1 facility, from **\$101-174/MWH** higher. This represents a much higher ratepayer subsidy than that associated with the existing AS1 OREC prices.
- The AS1 Re-Bid ratepayer subsidy will total \$16 billion over the life of the facility and the 2023 present value (PV) of these above market ratepayer costs is **\$10 billion** compared with \$3.6 billion for the existing AS1 contract.

Benefit-Cost Analysis

- The increase in OREC prices in an AS1 Re-Bid far outweigh any economic or environmental benefits of the project by an even wider margin than for the existing project.
- BPU's estimate of economic benefits ignores the offsetting negative economic impacts of the project on beach tourism and on shore and fishing

communities, which is estimated to be in excess of \$350 million/year or over **\$4 billion** on a PV basis.

- The increases in retail electric rates will have a substantially larger negative impact of the state economy resulting in significant job and wage losses equivalent to a PV of **\$16 billion**.
- The values used by BPU to represent the environmental benefits are highly subjective and are intended to reflect global impacts of greenhouse gas emissions and are thus inappropriate for representing only state-wide impacts, as required by law.
- Using the methodology employed by the BPU's consultant, the costs of an AS1 Re-Bid far outweigh its purported benefits with a benefit-cost ratio estimated to be no more than **0.25 (i.e., costs outweigh benefits by a factor of 4 to 1)**.
- Net positive economic or environmental benefits and benefit-cost ratio of greater than 1.0 cannot be achieved at OREC prices resulting from an AS1 Re-Bid and thus would fail to comply with OWEDA.

Developer's Return on Investment

- If allowed to re-bid, the Atlantic Shores owners will realize a **21%** internal rate of return (IRR) on its investment which would increase to **25%** if they qualify for and are allowed to retain the additional 10% bonus Investment Tax Credit (ITC).
- The IRR is well in excess of that which is reasonable for its level of financial risk in the project or that allowed regulated utilities which is about 9%.
- A fair balance of financial risks and rewards between ratepayers and shareholders at OREC prices resulting from an AS1 Re-Bid cannot be achieved and thus would fail to comply with OWEDA.

Cumulative Impacts

- The total impact of an AS1 Re-Bid, together with projects approved in the Third Solicitation will burden ratepayers with above market subsidies ranging from \$1.4 billion in 2032 to over \$3 billion by 2047. The total subsidy over the operating period of these projects has a 2023\$ PV of **\$31 billion**.
- Electric bills will increase by **22%** for residential, **27%** for commercial and **32%** for industrial customers.

Conclusions

The AS1 project as currently approved imposes ratepayer subsidies and costs which have not been demonstrated to meet the cost-benefit requirements nor provide a fair balance of financial risk and rewards between ratepayers and the shareholders of the developer as required by OWEDA¹. We have also shown conclusively that the projects awarded in the Third Solicitation also fail to meet the requirements of OWEDA².

This report demonstrates that allowing Atlantic Shores to re-bid the existing AS1 contract will exacerbate these deficiencies and burden ratepayers with significantly higher above market power prices and subsidies. The cumulative impact of this, in combination with the other approved projects, will raise rates by more than 20% for all classes of retail customers.

It is important to note that the costs involving the direct ratepayer subsidies and the effect of those higher electric rates on NJ economy in the form of lost jobs and lower wages, as well as lost tourism dollars, all fall disproportionately on lower income residents and communities who can least afford them. Accordingly, it is strongly recommended that no opportunity be provided for a re-bid of the Atlantic Shores One contract.

¹ Economic Analysis of the Atlantic Shores Offshore Wind Project, Whitestrand Consulting, August 2023.

² Economic Analysis of the Attentive and Leading Light Offshore Wind Projects, Whitestrand Consulting, March 2024.

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Economic Analysis of a Potential Re-Bid of the Atlantic Shores One Offshore Wind Project

1.0 Introduction

As part of its Second Solicitation of offshore wind bid, the NJ Board of Public Utilities (BPU), in its order of June 30, 2021³, has approved the Atlantic Shores One (AS1) offshore wind project as a qualified offshore wind facility and deemed it eligible to receive payments for Offshore Renewable Energy Credits (ORECs) for 1510 MW of electrical generating capacity. The BPU concluded that the project will not impose unreasonable costs on NJ ratepayers and that a cost-benefit analysis demonstrates a net positive economic and environmental outcome to the state. These conclusions were examined and challenged in a prior report by this author⁴ which was submitted as the basis of a petition⁵ for review of the BPU order. This petition was dismissed by BPU on the grounds of untimely filing, without consideration of the merits of the filing.

In its proposed Fourth Solicitation Guidance Document⁶, BPU has included provisions allowing projects previously awarded ORECs in the First or Second Solicitations to re-bid those same projects and potentially receive even higher OREC prices than currently approved. Since such a re-bid has the potential to significantly increase ratepayer subsidies and developer returns on investments, it is the purpose of this report to examine the magnitude of such potential increases and to determine whether they would allow BPU to make those awards in compliance with the requirements of the Offshore Wind Economic Development Act (OWEDA) by which BPU is bound.

2.0 Methodology

In the June 2021 AS1 award, as in all of its solicitations, the BPU has relied in large part on the evaluations by its consultant, Levitan & Associates, Inc. (LAI) of the proposed bids submitted by developers⁷. In this study of a potential AS1 Re-Bid, we have used the same input values reported and applied in the most recent LAI evaluation of bids in the Third Solicitation⁸ wherever available and

³ BPU Order of June 30, 2021 Docket Nos. Q020080555 and Q021050824

⁴ Economic Analysis of the Atlantic Shores Offshore Wind Project, Edward O'Donnell, Whitestrand Consulting, August 2023.

⁵ Save LBI Verified Petition, Docket Nos. Q020080555 and Q021050824, August 7, 2023

⁶ NJ Offshore Wind Fourth Solicitation Guidance Document, BPU, March 6, 2024

⁷ Evaluation Report New Jersey Offshore Wind Solicitation #2, May 25, 2021, Levitan and Associated Inc.

⁸ Evaluation Report New Jersey Offshore Wind Solicitation #3, January 10, 2024, , Levitan and Associated Inc.

deemed reasonable. Where key factors and assumptions have been redacted or unstated, we have used publicly available sources for comparable projects.

However, there are several items where we disagree with the LAI methodology which significantly affect the results. These include:

- LAI has failed to analyze the ratepayer impact of BPU's new inflation adjustment factor which can automatically result in a 15% increase in ratepayer burden and have a significant additional impact on ratepayer costs.
- In determining ratepayer costs, LAI has used an inappropriately high 7% discount factor. A 7% discount factor reflects the developer's weighted average cost of capital and is appropriate for calculating its Internal Rate of Return (IRR) in support of investment decisions and financial risk to the owners. However, ratepayers are not investors in these projects but are consumers of the power output. Their view of the present value (PV) of future costs to them is much different and they view future dollars as having more value than investors. For ratepayers, standard economic theory would dictate use of a 3% consumption discount rate which is generally used to value future dollars from their perspective⁹.
- Levitan's Benefit-Cost analysis methodology, upon which the BPU relies, is flawed in a number of important respects including:
 - The monetization of environmental benefits is based on avoiding hypothetical harm to future global populations from greenhouse gas (GHG) emissions rather than confining consideration of such benefits to those accruing to the state as required by the NJ Offshore Wind Economic Development Act (OWEDA)¹⁰.
 - The factor most recently used by LAI to value CO2 emissions of \$190/ton is based on a 2% discount factor which vastly overstates this value and is inconsistent with the 7% value used by them to estimate ratepayer costs. The \$/ton value is highly sensitive to the discount rate since it is applied to hypothetical harm to worldwide populations over several centuries in the future. NJ law¹¹ requires that BPU use the Social Cost of Carbon (SCC) associated with a 3% discount factor. A 3% discount rate reduces that value to \$51/ton and the purported global benefit by a factor of 3.8.

⁹ Discounting for Public Benefit-Cost Analysis, Resources for the Future, Qingran Li and William A Pizer, June 2021.

¹⁰ OWEDA, N.J.S.A. 48:3-87.1 to -87.2, L. 2010, c. 57, eff. Aug. 19, 2010; amended by 2019 c. 440, §2,

¹¹ NJSA 48:3-87.d(2).

- Levitan has failed to include any costs associated with harm to shore tourist economy, commercial fishing or the impact of higher electric rates on the state economy in terms of lost jobs and wages.
- No consideration is given to the added costs of transmission upgrades which are a direct result and necessary cost of the projects.
- Levitan has not included the lost revenue from reductions in Regional Greenhouse Gas Initiative (RGGI) allowances that will be a direct result of displacing in-state fossil generation.

In our analysis of an AS1 Re-Bid we present ratepayer impacts based on more appropriate and inclusive assumptions regarding these matters and contrast our results with those presented by LAI for the original AS1 OREC award.

3.0 Ratepayer Impacts

An independent analysis and review of the BPU consultant's evaluation of the original AS1 proposal reveals that New Jersey ratepayers already will bear a substantial and inordinate burden of additional costs through the lifetime of the proposed generation facility. This additional cost is in the form of above market prices for power embedded in the guaranteed ORECs proposed by the bidder and approved by the BPU. In any Re-Bid it is expected that these prices will be significantly higher and in this section we compare the ratepayer impacts of the original OREC prices with those likely to result from a AS 1 Re-Bid.

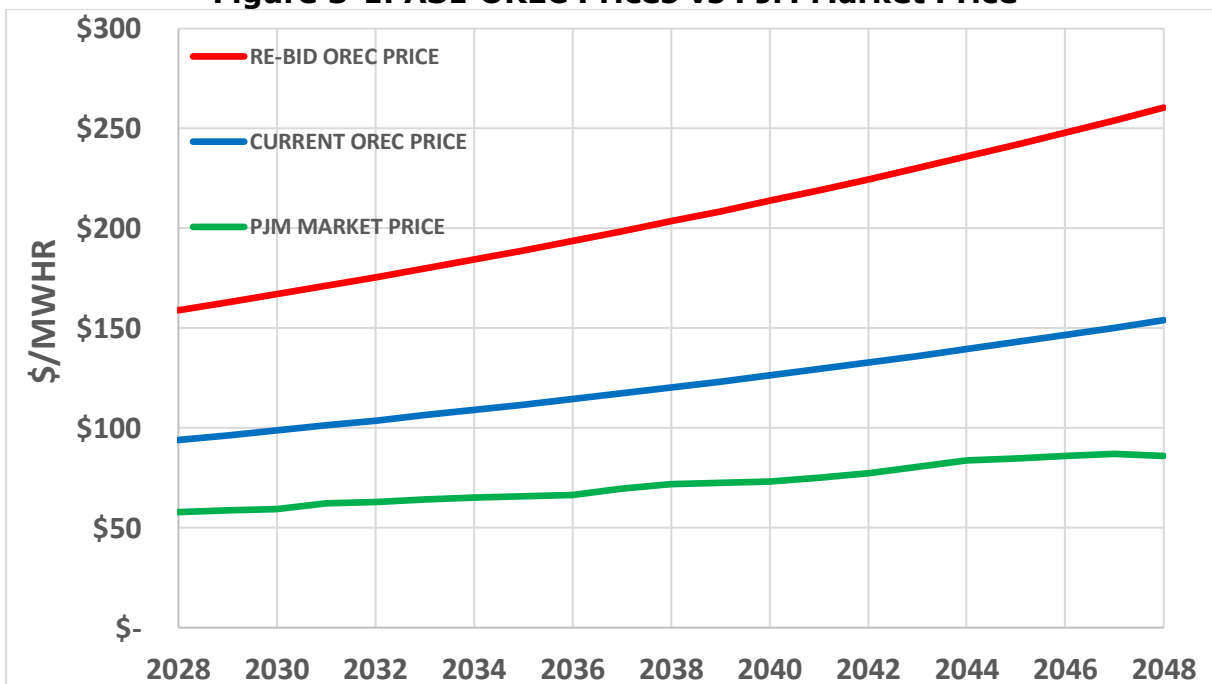
The existing BPU order entitles AS1 to collect fees for ORECs produced at \$86.62/MWH beginning in 2028 and increasing to \$141.92/MWH in 2048. Transmission upgrade costs will add another \$6-10/MWH to these guaranteed prices. The levelized cost of energy (LCOE) associated with these existing OREC prices is \$106.16/MWH before transmission cost and \$114.03/MWH with transmission cost.

If AS1 is allowed to re-bid these prices, it is assured that they will be much higher, matching or exceeding the OREC prices awarded by BPU to Attentive Energy and Leading Light Wind in January 2024. The LOCE of the Attentive Energy award, without any transmission costs, is \$165/MWH. As this project is of a comparable size (1342 MW) to AS1 (1510MW) it is a likely benchmark which an AS1 Re-Bid will equal or exceed. Furthermore, the proposed terms of the Fourth Solicitation allow these OREC prices to be adjusted up or down by as much as 15% based on a defined inflation adjustment mechanism which does not apply to the existing AS1 contract.

The inflation adjustment is based on recognized official Federal inflation indices for labor, fabrication, steel and fuel prices and allow the base OREC price to be adjusted up or down depending on how much they deviate from the prices at time of a bidder’s best and final offer (BAFO) and a time three years prior to commercial operation. This time period is estimated to be 2-4 years. If the BPU approved inflation adjustment formula was calculated over the most recent available three years (2021-2023) the resulting inflation adjustment would be in excess of 26%. In the three month through February 2024, since the Third Solicitation BAFOs were submitted, the calculated index has increased by 2.2% and on that basis the 15% cap would be reached in less than two years. Given the recent and long-term historical trends in these indices, it is highly likely that the adjustment calculated over such a period will exceed 15%, and result in an increased ratepayer subsidy.

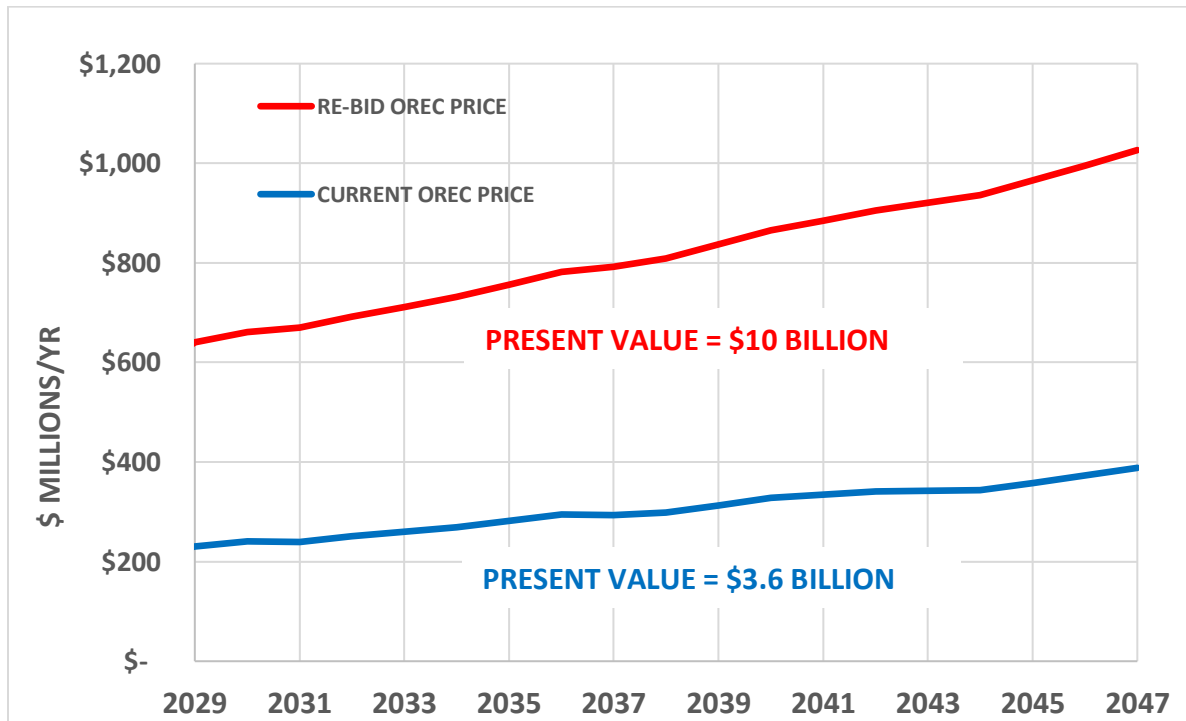
Thus with the inflation adjustment the OREC pricing on an AS1 Re-Bid will most likely be as much as \$190/MWH, and with the transmission cost adder, \$198/MWH, or an increase of 67% over the corresponding existing OREC price of \$114/MWH. As an offset, the market revenue received from PJM for energy, capacity and Renewable Energy Credits (RECs) will be credited back to the ratepayers. Figure 3-1 below displays how the existing and projected Re-Bid OREC prices compare with the PJM market price of the offsets based on LAI projections in its evaluation of the Third Solicitation bids.

Figure 3-1. AS1 OREC Prices vs PJM Market Price



As can be seen from Figure 3-1 above, on an AS1 Re-Bid, ratepayers will be required to pay **triple the PJM market price, 67% higher than even existing OREC prices and from \$101-174/MWH over and above the market price** for power from the AS1 facility. This in essence represents a ratepayer subsidy for offshore wind generation. As shown in Figure 3-2 below, this added cost burden is substantial on an annualized and lifetime basis.

Figure 3-2. Added Ratepayer Cost for AS1 Project



In a AS1 Re-Bid the ratepayer subsidy almost triples that due to the current OREC price and would range from over \$600 million in the first full year of operation (2029) to over \$1 billion million in 2047, totaling \$16 billion over the life of the facility. **The 2023 present value (PV) of these above market ratepayer costs is \$10 billion, increasing from the current OREC subsidy of \$3.6 billion.** These values are calculated using an appropriate ratepayer discount factor of 3%. By contrast, LAI calculates the PV of the same current OREC price as \$2.5 billion using a 7% discount factor which is not valid for that purpose.

4.0 Benefit-Cost Analysis

The NJ Offshore Wind Economic Development Act (OWEDA) requires that all proposed projects demonstrate positive economic and environmental net benefits to the state to be considered for an OREC award, but the act does not provide details on how to determine the benefit-cost ratio (BCR). LAI has calculated this ratio as:

$$\text{BCR} = \frac{(\text{Ratepayer Offsets} + \text{Economic Benefits} + \text{Environmental Benefits})}{\text{OREC Costs}}$$

In its evaluation of the existing AS1 contract LAI concluded that the AS1 wind project has a BCR of 1.246 (an unduly precise number given the enormous uncertainties involved) but has redacted the specific values for each of the factors comprising the calculation. Using their described methodology we have reconstructed the components of their BCR calculation which are displayed on Table 4-1 below and compared with our analysis of the same factors.

Per our analysis, for the existing OREC prices, on a PV basis OREC Costs would be \$9.16 billion and the value of Ratepayer Offsets (PJM energy, capacity and RECs) would be \$5.6 billion. Thus, before including the projected Economic and Environmental Benefits, the BCR is about 0.6, well below a positive outcome.

Economic Benefits and Costs

The project as approved claims to have positive Economic Benefits in terms of NJ GDP growth and jobs created in the state. These are detailed in the LAI report. However, no consideration is given to the significant negative economic impacts of the project on beach communities or commercial fishing. The negative impact on tourism and on our shore and fishing communities, is estimated to be in excess of \$350 million/year¹² ¹³. Over 20 years this has a 2023 PV of \$4.36 billion. This would totally offset any Economic Benefits claimed to contribute to the BCR.

In addition to the negative impact on the NJ tourism and fishing economy, raising electric rates will have a damaging effect on the overall state economy by reducing employment and wages, similar to the effect of raising taxes. A

¹² University of Delaware, Atlantic Offshore Wind Energy Development: Values and Implications for Recreation and Tourism, sponsored by the Bureau of Ocean Energy Management (BOEM), March, 2018

¹³<https://espis.boem.gov/final%20reports/5662.pdf>

2011 study¹⁴ determined that raising electric rates by 2% as a result of offshore wind ratepayer subsidies would result in the loss of 2219 jobs and reduce average wages by \$111 per year. This in turn would reduce total disposable income in the state by \$330 million/yr. The Present Value in 2023 of this lost income over 20 years is \$4 billion. Since the ratepayer subsidies for the existing AS1 OREC prices would raise rates by 5%, the PV of that cost impact is \$10 billion. An AS1 Re-Bid would raise rates by 8% for a PV cost of \$16 billion. Thus, the economic harm caused by raising retail electric rates is a very significant additional indirect economic cost of the project.

Environmental Benefits and Costs

With respect to the Environmental Benefits, LAI has applied the US EPA's Interagency Working Group (IAWG) social cost of carbon (SCC)¹⁵ and Technical Support Document¹⁶ to estimate the value of perceived benefits. The use of these reports in economic or regulatory decision-making is highly controversial and the subject of court challenges in several states. Indeed, the IAWG document provides for a wide range of values, depending on very subjective judgements of factors such as the rate at which potential social costs to future generations of present-day carbon emissions should be discounted to current dollars.

As a result, the value derived from the IAWG document as applied by the Federal Environmental Protection Agency (EPA) has varied from \$2/Ton during the Trump administration to \$190/Ton now being proposed by the current administration – a near hundred-fold increase, reflecting the reality that putting a monetary value on the social cost of carbon is a political rather than a scientific exercise.

The factor most recently used by LAI to value CO2 emissions of \$190/ton is based on a 2% discount factor which vastly overstates this value and is inconsistent with the 7% value used by them to estimate ratepayer costs. The \$/ton value is highly sensitive to the discount rate since it is applied to hypothetical harm to worldwide populations over several centuries in the future. This use of a 2% discount factor violates NJ law¹⁷ which requires that BPU use the Social Cost of Carbon (SCC) associated with a 3% discount factor.

¹⁴ "The Cost and Economic Impact of New Jersey's Offshore Wind Initiative", Beacon Hill Institute at Suffolk University, June 2011

¹⁵ "Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances" U.S. Environmental Protection Agency, November 2023.

¹⁶ U.S. EPA, "Technical Support Document Estimating the Benefit per Ton of Reducing Directly-Emitted PM2.5, PM2.5 Precursors and Ozone Precursors from 21 Sectors," January 2023

¹⁷ NJSA 48:3-87.d(2).

A 3% discount rate reduces that value to \$51/ton and the purported global benefit by a factor of 3.8.

Furthermore, and most importantly, the OWEDA mandates that, in order to approve an offshore wind project for OREC award, the BPU must find that the cost-benefit analysis for the project “demonstrates positive economic and environmental net benefits to the State” (emphasis added). Therefore, any consideration of Environmental Benefits of the AS1 project of avoided carbon emissions must be confined to those affecting NJ residents, businesses, or institutions. The values proposed by the IAWG are intended to reflect global impacts of carbon emissions and are thus inappropriate and not suitable in any case for representing only state-wide impacts. If we scale these purported global benefits down to state-wide benefits only, by using any reasonable measure of relative impact on the state to the entire world (GDP, population, land area, shoreline miles, carbon emissions, etc.), the total averted state social cost of emissions reduced by AS1 is far less than 1% of the global benefit.

Table 4-1 below is a comparison of the benefit-cost analysis as presented by LAI for the existing AS1 OREC contract with our own analysis of both the existing contract and of an AS1 Re-Bid. Our analysis includes the economic impact of the project and only the maximum state-wide environmental benefits as mandated by OWEDA, which we have conservatively assumed that 0.12%¹⁸ of global values accrue to the state of NJ. This insignificant value of \$10 million is more than offset by lost revenue accruing to the state from auctions of RGGI allowances from the emissions displaced by AS1. Along with the social cost of direct NJ environmental emissions associated with the manufacture, construction, operation and decommissioning of the wind turbines, we estimate the PV of these environmental costs to be to be \$550 million. There is therefore a net environmental emissions related PV cost of more than \$540 million for the project.

¹⁸ The population of NJ is 9.3 million (or 0.12%) compared with over 7.9 billion worldwide..

Table 4-1 Benefit-Cost Comparison

	<u>LAI Existing</u>	<u>AS1 Existing</u>	<u>AS1 Re-Bid</u>
Benefits (\$PV Billions)			
Energy and Capacity Credits	1.98	3.82	3.82
RECs	0.52	1.78	1.78
Economic Benefits	1.46	3.40	3.40
Avoided Emissions (per IAWG)	<u>2.47</u>	<u>0.01</u>	<u>0.01</u>
Total Net Benefits	6.43	9.01	9.01
Costs (\$PV Billions)			
OREC Payments	5.16	9.16	15.59
Impact on Tourism	0.00	4.36	4.36
Impact of Higher Electric Rates	0.00	10.00	16.00
Lost RGGI Emissions Revenue	<u>0.00</u>	<u>0.55</u>	<u>0.55</u>
Total Costs	5.16	24.07	36.50
Net Benefits/ (Costs) (\$PV Billions)			
	1.27	(15.06)	(27.49)
Benefit/Costs Ratio	1.246	0.37	0.25

As indicated the LAI calculation overstates the BCR for the existing AS 1 project by a large margin and, when economic costs are included and purported environmental benefits limited to the state, **the costs of a AS1 Re-Bid project exceed any potential benefits by \$27.29 billion** on a present value basis. Instead of 1.246 as calculated by LAI, **the true BCR is no more than 0.25.**

Even without including the economic cost of the project, the AS1 Re-Bid OREC payment costs alone exceed any benefits by more than \$6.5 billion and the BCR would be no more than 0.58. Thus, a BCR less than 1.0 cannot be achieved. Furthermore, there is neither a net economic nor a net environmental benefit as required by OWEDA.

5.0 Project Developer Economics

A developer of a power generation project is entitled to realize a reasonable rate of return on its investment. However, the magnitude of the return is a function of the risk assumed by the developer. The greater the risk, the higher the expected return, and vice versa – the lower the risk, the lower a return expected or allowed.

The NJ legislature has recognized that the financial risk of offshore wind projects must be limited, in order to attract developers to bid on such projects. A key feature of this risk mitigation is the guarantee of revenue for power delivered through the establishment of OREC prices throughout the operating life of the facility. We have previously shown that the OREC prices approved by the BPU for the AS1 project are well in excess of market prices. Thus, they substantially reduce the risk to the developer. This price guarantee allows the developer to secure equity investors and project financing at a reduced cost of capital, lowering their up front and debt service costs throughout the life of the project.

In addition to this, the Federal government has provided financial incentives through tax credits which greatly enhance the potential for positive returns on investment for such projects. The Inflation Reduction Act (IRA) enacted in 2022 offers offshore wind projects an Investment Tax Credit (ITC) of 30% of the capital cost of the project to be collected when the facility becomes operational. In addition, a developer may qualify for additional ITC bonuses of 10% each for using domestically sourced materials and siting onshore facilities in economically disadvantaged communities.

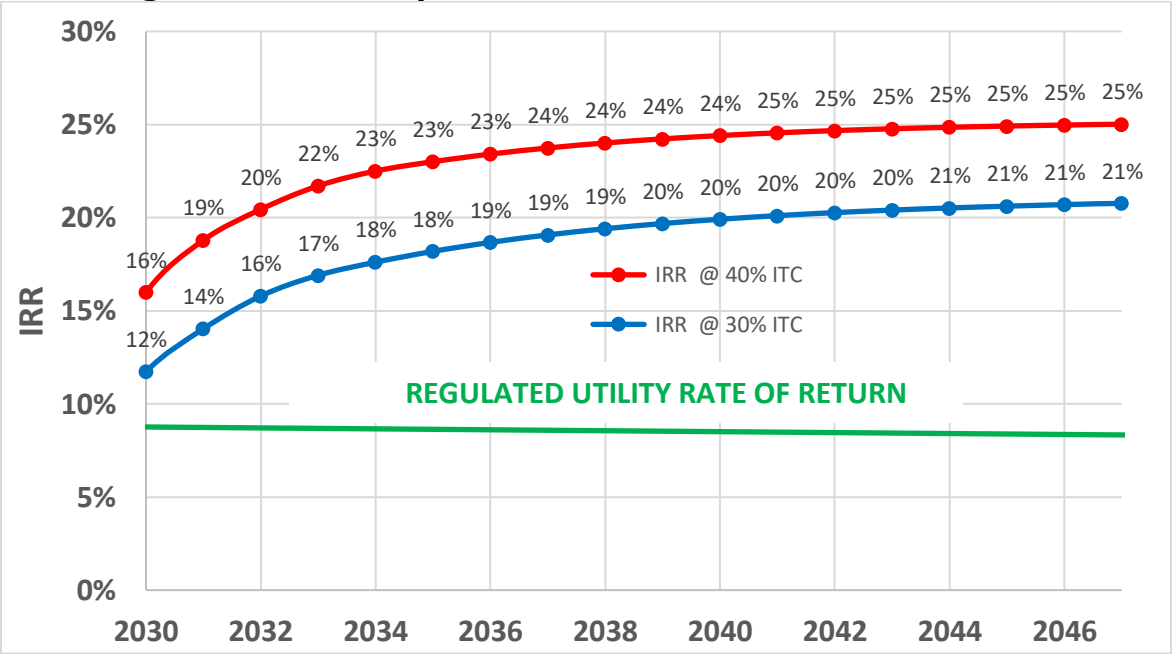
In its bid AS1 was required to submit detailed information on its projected costs of the project and its resulting Internal Rate of Return (IRR) which represents its return on investment. This information is necessary to determine whether the approved OREC prices are reasonable given the projected developer's costs and assumed financial risks.

However, these project financial details detailed have been redacted from the LAI evaluation, so we are unable to review and comment on whether they are in fact reasonable and justify the large ratepayer subsidy built into the OREC pricing. We therefore have no alternative than to conduct an independent financial analysis, based on available information for similar projects.

Using expected current capital costs, financing terms, operating, maintenance and decommissioning costs and the revenue streams resulting from OREC production and tax credits, we calculated the IRR based on the expected cash

flow over the life of the project. The result of our analysis is presented in Figure 5-1 below for a potential AS1 Re-Bid.

Figure 5-1. Developer’s AS1 Re-Bid Internal Rate of Return



We have assumed, as does LAI in its bid evaluation, that available Federal tax credits have been included as an offset to capital costs of the project, and thus passed through to ratepayers as reflected in the proposed all-in OREC prices for the project. With the passage of the Inflation Reduction Act (IRA) in 2022, a 30% Federal ITC is in effect for offshore wind projects. As indicated in Figure 5-1 above, with a 30% ITC, an **AS1 Re-Bid will realize an increasing return, rapidly approaching 21%** by the end of its economic life and through decommissioning.

The IRA provides for an additional bonus ITC of 10%, for meeting domestic content requirements or having onshore facilities in an energy community. **If AS1 does in fact qualify for the 10% bonus ITC, their IRR will increase to 25%.** Under current NJ law such an increase in available tax credits must also be passed through to ratepayers and not contribute to greater return to the developer.

The BPU limits returns to regulated utilities for similar projects to about 9%. In view of the OREC price guarantees and tax credits available, we believe that a return of over 20% is unduly generous and that the developer is being too richly rewarded for the level of risk assumed at expense of ratepayers who are bearing

billions in present value of added costs to support the developer's return on investment.

6.0 Cumulative Impacts

As discussed, each project approved by BPU for award of ORECs involves subsidized costs that incrementally increase ratepayer costs and bills for all classes of retail customers. While BPU provides an estimate of the ratepayer impact of each individual project, it has not acknowledged or made known the cumulative impact of the combined projects together with prior awards under earlier solicitations. In this section we examine the cumulative impact of all such projects awarded to date, and of a potential AS1 Re-Bid.

Of the prior awards in the First and Second Solicitations, only the 1510 MW AS1 project has an active OREC award. In January 2024 the Third Solicitation awarded an additional 3742 MW to Attentive Energy (1342 MW) and Leading Light Wind (2400 MW).

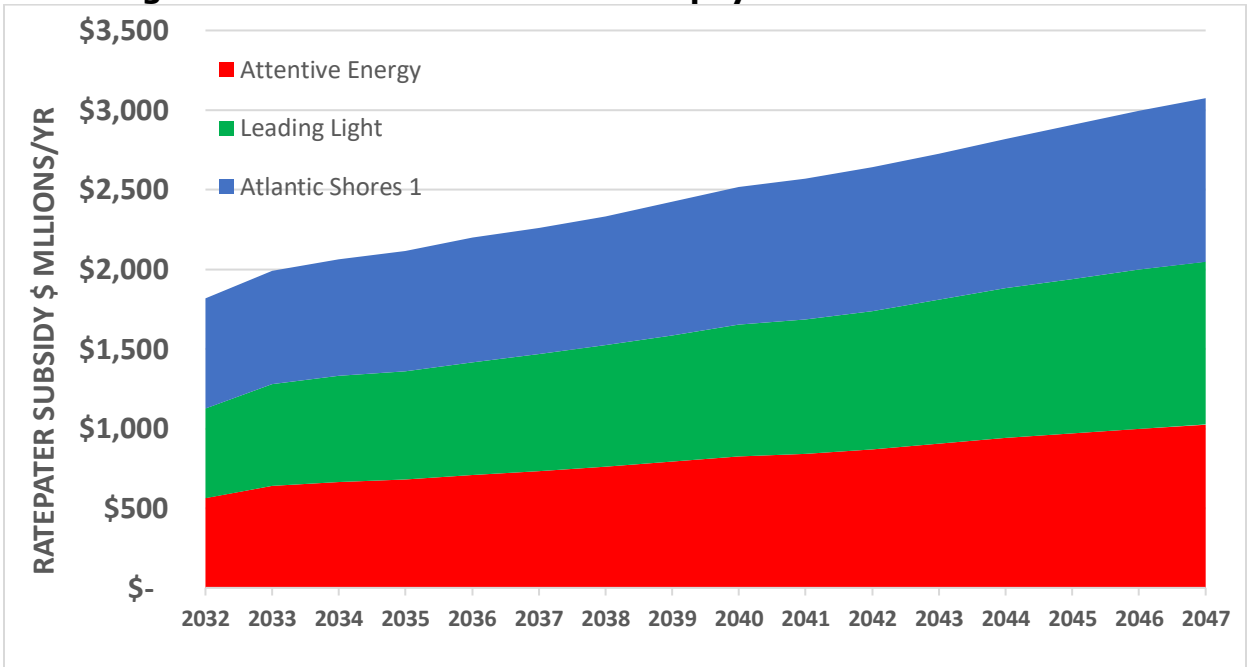
The following sections present the combined impact of the total 5252 MW of offshore wind projects approved to date by BPU in terms of total and PV ratepayer subsidies and increases in retail electricity bills for residential, commercial and industrial customers over the period 2028-2047.

6.1 Ratepayer Subsidies

Based on our analysis of the BPU approved OREC prices for Attentive Energy and Leading Light Wind Projects¹⁹ together with the corresponding results for an AS1 Re-Bid project, including the 15% inflation adder, Figure 6-1 shows the cumulative annual ratepayer subsidy.

¹⁹ Economic Analysis of the Attentive and Leading Light Offshore Wind Projects, Whitestrand Consulting, March 2024.

Figure 6-1 Cumulative Annual Ratepayer OREC Subsidies



As indicated, the combined ratepayer cost embedded in the OREC prices for these three projects increases from \$1.4 billion in 2032 to over \$3 billion by 2047. The total subsidy over the operating period of these projects over **\$53 billion**, which has a 2023\$ PV of **\$31 billion**.

6.2 Customer Bill Impacts

The rate subsidies embodied in the above market OREC prices will progressively impact retail customers bills as the offshore wind projects begin operation in 2028 and 2032. In its evaluation of bid proposals for the Second and Third BPU Solicitations, LAI has estimated the increase in average monthly customer bills for residential, commercial and industrial customer for the three approved projects.

Using the same methodology as LAI, but applying the higher subsidy costs we have discussed and provided in the previous sections, we have also estimated the monthly bill increase for each of the approved projects. Table 6-1 below presents the results of our analysis as compared with that of LAI. We have also displayed the combined increase in monthly bills in \$/mo and on a percentage increase basis.

Table 6-1 ECONOMIC IMPACT OF NJ WIND PROJECT OREC COSTS ON RETAIL CUSTOMER BILLS

	<u>Attentive</u> <u>Energy</u>	<u>Leading</u> <u>Light Wind</u>	<u>Atlantic</u> <u>Shores 1</u>	<u>Combined</u>	<u>Percent</u> <u>Bill</u> <u>Increase</u>
LAI Analysis (Approved OREC Prices)					
Ratepayer Bill Impact (\$/mo)					
Residential	\$ 3.71	\$ 3.13	\$ 2.21	\$ 9.05	7.9%
Commercial	\$ 31.86	\$ 26.87	\$ 20.18	\$ 78.91	9.8%
Industrial	\$ 278.42	\$ 234.80	\$ 172.25	\$ 685.47	11.5%

This Report (Base OREC Prices including AS1 Re-Bid)

Ratepayer Bill Impact (\$/mo)					
Residential	\$ 7.87	\$ 6.64	\$ 7.85	\$ 22.36	19.6%
Commercial	\$ 67.58	\$ 57.00	\$ 67.30	\$ 191.88	23.9%
Industrial	\$ 590.59	\$ 498.06	\$ 567.10	\$ 1,655.75	27.7%

This Report (Base OREC Prices Plus 15% Inflation Adder)

Ratepayer Bill Impact (\$/mo)					
Residential	\$ 9.05	\$ 7.64	\$ 8.84	\$ 25.53	22.4%
Commercial	\$ 77.72	\$ 65.55	\$ 75.84	\$ 219.11	27.3%
Industrial	\$ 679.18	\$ 572.77	\$ 639.06	\$ 1,891.01	31.7%

As shown, even without adjustment, the estimates provided by LAI demonstrate that the cumulative impact of these three projects result in significant increases in customer bills ranging from about 8% for residential, 10% for commercial and 11.5% for industrial customers. These values are above that permitted by NJ law²⁰ for other renewable energy generation sources which are limited to no more than a 7% increase in customer rates.

However, because LAI has significantly undervalued the OREC subsidies for all projects, these values also significantly understate the actual customer bill increases.

As shown, at the Base OREC prices (without the 15% inflation adder) following an AS1 Re-Bid the increase will be more than twice the LAI estimates, and reach about **20%** for residential, **24%** for commercial and **28%** for industrial customers.

²⁰ NJSA 48:3 – 18.d(2)

In the highly likely event that the 15% inflation adjustment is added to the Base OREC prices, these values increase further to **22%** for residential, **27%** for commercial and **32%** for industrial customers.

7.0 Conclusions

The AS1 project as currently approved imposes ratepayer subsidies and costs which have not been demonstrated to meet the cost-benefit requirements nor provide a fair balance of financial risk and rewards between ratepayers and the shareholders of the developer as required by OWEDA. It has also been conclusively shown that the projects awarded in the Third Solicitation also fail to meet the requirements of OWEDA.

This report demonstrates that allowing Atlantic Shores to re-bid the existing AS1 contract will exacerbate these deficiencies and burden ratepayers with significantly higher above market power prices and subsidies. The cumulative impact of this, in combination with the other approved projects, will raise rates by more than 20% for all classes of retail customers.

It is important to note that the costs involving the direct ratepayer subsidies and the effect of those higher electric rates on NJ economy in the form of lost jobs and lower wages, as well as lost tourism dollars, all fall disproportionately on lower income residents and communities who can least afford them. Accordingly, it is strongly recommended that no opportunity be provided for a re-bid of the Atlantic Shores One contract.



The Author

Edward P. O'Donnell is a principal in Whitestrand Consulting LLC. He has spent 35 years in the nuclear power industry as an engineer, manager and executive with responsibilities for design and licensing of numerous plants in the US and abroad. He was also responsible for corporate planning and rate matters for a NJ nuclear utility and has testified in utility rate proceedings before the NJ BPU.

He was responsible for managing the successful sale of nuclear units in NJ and PA and as a consultant for advising clients on the sale and purchase of nuclear plants. In this role he forecasted future costs and performance of plants for re-financing as merchant power suppliers in a de-regulated electrical energy market and performed analyses of the economic viability of nuclear plants in comparison with alternative fossil and renewable energy facilities.

Mr. O'Donnell holds an M.S. in Nuclear Engineering from Columbia University and has been a licensed Professional Engineer in NJ. He is also a registered Enrolled Agent, authorized to represent individual and business entities before the IRS on tax matters.



EXHIBIT B

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June 29, 2023

Janet Stewart, Manager
Bureau of Coastal Permitting
P.O. Box 420, Code 501-02A
Trenton, New Jersey 08625

Re: *Atlantic Shores Offshore Wind, LLC*
Public Comments on Request for Federal Consistency Certification

Dear Ms. Stewart:

On behalf of Long Beach Township, Beach Haven, Ship Bottom, Barnegat Light, Surf City, and Harvey Cedars (the LBI Municipalities), we submit these comments on the pending request by Atlantic Shores Offshore Wind, LLC (Atlantic Shores) for a Federal Consistency Certification. As detailed herein, the LBI Municipalities submit that the application violates New Jersey's enforceable coastal policies as set forth in its Coastal Zone Management Rules, N.J.A.C. 7:7-1.1, *et seq.*, and thus the Department of Environmental Protection (DEP) should decline to issue the consistency certification.

To be clear, the LBI Municipalities are not opposed to developing wind power and recognize the urgent need to transition towards clean energy sources. Nor are these simply "Not In My Backyard" objections. Rather, the impacts of a project of this size and scope this close to shore – the closest large-scale project in the country – on the shore economy as well as environmental resources are simply too great and would destroy the coastal resources upon which the LBI Municipalities rely and that New Jersey's Coastal Zone Management regulations were designed to protect.

The LBI Municipalities are aware of an alternative lease location, known as Hudson South, which they understand is available for development of an offshore wind project. Should Atlantic Shores or another applicant submit an application for that site, the LBI Municipalities would look forward to supporting it. But for the reasons detailed below, the project Atlantic Shores has proposed cannot be permitted to be developed.

The LBI Municipalities also wish to express that they have significant concern about DEP's ability to impartially review Atlantic Shores' request and objections thereto in light of Governor

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Murphy's executive orders directing DEP and other state agencies to facilitate the development of offshore wind projects. See Executive Order 8 and Executive Order No. 92. For that reason, the LBI Municipalities plan to request that the application be referred for an adjudicatory hearing in the Office of Administrative Law to ensure it is reviewed by a neutral party. Nonetheless, the LBI Municipalities submit these comments to DEP in the hope that DEP prioritizes its charge to protect the State's coastal resources and, after considering the comments and all other relevant aspects of the proposal, denies Atlantic Shores' request for a consistency certification.

The LBI Municipalities specific objections to the Atlantic Shores Project are detailed below.¹

I. There will be major visual impacts from the siting of large-scale offshore wind turbines, which is not permitted by DEP's rules.

a. The Atlantic Shores Project would cause a drastic visual impact on LBI.

LBI ranges from a national wildlife refuge at one end to a historic state park at the other, with pristine beaches in between. It is difficult to imagine coastal development that would have a more significant adverse impact on these arguably unmatched scenic resources of Long Beach Island (LBI) than one proposing to dominate vast amounts of natural ocean landscape with several hundred massive turbine structures – each nearly the height of the Eiffel Tower and as wide as they are tall² – in close proximity to the shoreline. The Atlantic Shores proposal is comprised of two projects spanning over 100,000 acres of undeveloped ocean with the nearest turbine located less than 12 miles off LBI's beaches (and less than 9 miles from other shore locations). It will include construction of 200 wind turbines, each 1,064 feet tall with blade spans over 900 feet in diameter. If approved, the Project will be the first of its kind in the United States; it will be the largest and tallest wind farm that comes closest to shore.

Of significant note, at the time offshore wind was initially studied for the New Jersey coastline and lease areas designated, wind turbines were significantly shorter. BOEM's environmental studies were prepared in 2006-2008, a time when rotor diameter was well under 100 meters. *See* Atlantic Shores Construction and Operations Plan (COP) 1-12 to 1-13; COP 3-16

¹ We note that we are currently awaiting the completion of DEP's response to an Open Public Records Act request filed by this firm concerning the Atlantic Shores Project. The LBI Municipalities reserve their right to supplement these comments after receiving the outstanding documents.

² <https://www.tou Eiffel.paris/en/the-monument/key-figures> (indicating that the current height of the attraction is 1,083 feet).

to 3-17 & Figure 3.5-1. Const Turbines today are three times the size. The visual impacts of wind turbines from the lease were thus not adequately assessed at the time the lease area was designated and awarded to Atlantic Shores. Visual impacts cannot simply be hand-waved away by DEP because the proposed project is in a designated lease area.

Atlantic Shores cannot dispute the scale or severity of the visual impact (among other related environmental impacts) that the Project, as proposed in its Construction and Operations Plan (COP), will have not only on LBI, but will span miles of New Jersey's scenically renowned shoreline.³ The results of the visual impact assessment (VIA) performed on behalf of Atlantic Shores as part of its COP are alarming, particularly as those findings relate to LBI.

As part of the VIA, a panel of credentialed landscape and architectural planners compared the aesthetic character of views based on photo simulations from 22 selected key observation points⁴ (KOP), with and without the Project in place, and rated its visual impact accordingly. 7 of those KOPs are located on LBI, which, along with their proximities to the nearest turbine, are as follows: Barnegat Lighthouse State Park (27.3 miles), Beach at Long Beach Island Arts Foundation (24.9 miles), Ship Bottom Borough Municipal Beach (19.4 miles), Beach Haven Historic District (13.5 miles), Centre Street, Beach Haven (13.5 miles), Holyoke Avenue, Beach Haven, and Edwin B. Forsythe National Wildlife Refuge (NWR) at the Holgate Nature Conservatory (11.8 miles).

Views from Centre Street in Beach Haven on LBI received **the highest** visual impact rating of any other KOP at -5.3 and a visual threshold level of 6, with the visual impact labeled as "**significant.**" COP, Appendix II-M1, at 98-99. For context, a visual threshold level of 6 was the highest achievable score and means,

An object/phenomenon with strong visual contrasts that is so large that it **occupies most of the visual field**, and **views of it cannot be avoided except by turning one's head more than 45 degrees from a direct view of the object**. The object/phenomenon is the major focus of visual attention, and its large apparent size is a major factor in its view dominance. In addition to size, contrasts in form, line, color, and texture, bright light sources and moving objects associated with the study subject may contribute substantially to drawing viewer attention. **The visual prominence of the study**

³ However, Atlantic Shores bewilderingly ignores the visual impact of the turbines in its consistency submission.

⁴ Key observation points were selected to represent "individuals or groups of people who may be affected by changes in views and visual amenity." Draft EIS, at 3.6.9-25.

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subject detracts noticeably from views of other landscape/seascape elements.

Attachment E to COP, Appendix II-M1 (Photo Simulations Centre Street Beach Haven), at 58 (emphasis added); *see also* COP, Appendix II-M1, at 98.

Centre Street, Beach Haven (13.4 miles from nearest turbine)



In other words, the massive turbine structures, organized in a dense, stacked array as proposed, will be an unavoidable, unsightly and uncharacteristic component of the existing serene ocean views enjoyed from this viewpoint by the many residents and tourists who frequent the Beach Haven beachfront, which Atlantic Shores acknowledges is a “very popular stretch of beach” and that “the ocean is an integral part of their beach experience” for various forms of recreation, ranging from stationary sunbathing and swimming to walking and running along the coast. As a result, the presence of the structures will directly interfere with utilization and enjoyment of the pristine, undeveloped ocean environment for those engaging in beach recreation.

The visual impacts of the Project at five other selected KOPs located on LBI are no less concerning, likewise being classified as “significant” from views at Forsythe NWR in Holgate, Holyoke Avenue in Beach Haven, Beach Haven Historic District, Ship Bottom Beach and the Beach

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at the LBI Arts Foundation in Long Beach Township. Those observation points received visual impact ratings ranging from -4.2 (LBI Foundation) to -5.0 (Holgate) and each received a visual threshold level score of 5 (the object/phenomenon “contrasts with the surrounding landscape elements so strongly that it is a major focus of visual attention, drawing viewer attention immediately and tending to hold that attention”). *Id.* at 99. Consequently, the VIA indicates that the scenic quality of the views from each of these locations under the proposed conditions will be “modified” and the existing views only “partially retained.” *Id.* at 99-100 (Table 3.2.1).

At an undeveloped beach such as the Forsythe NWR at the southern tip of LBI in Holgate, which is one of the closest land-based viewing opportunities of the Project, Atlantic Shores acknowledges there are “a large number of beach goers and associated beach and ocean activity” during the summer season who would “consider the ocean the character defining element of the beach and the focus of their activities typically relies on the presences of the ocean and ocean views.” *Id.* at 27 (emphasis added). As such, the VIA plainly indicates that presence of the turbines “changes the undeveloped character of the ocean horizon by adding large, manmade infrastructure which would be visible from shore **during most clear days** and **some partially obscured days.**” *Id.* at 119 (emphasis added).

Holgate (11.8 miles from nearest turbine)



The character of views from residential beach areas such as Ship Bottom beach will be fundamentally altered by the expansive addition of “large, manmade infrastructure” along the

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ocean horizon. *Id.* at 119. The panel determined that “the quantity and placement of the turbines creates an industrial feel to the view” in an otherwise residential zone and “[a]lthough portions of the WTGs are screened by curvature of the earth at a distance of 19.4 miles, they are still large enough to attract viewer attention under clear conditions.” Attachment E to COP, Appendix II-M1, at 30. The presence of turbines “stacked” on each other as proposed will be “clearly visible as dark features against an otherwise featureless blue sky and horizon line.” *Id.*

Ship Bottom (19.4 miles)



The view from another residential beach area at the LBI Arts Foundation on the northern part of the island with the proposed Project in place would be likewise “dominated by a large, highly organized, and visible array of [wind turbines] that extend across a large portion of the ocean view to the southeast-south from this location.” Attachment E to COP, Appendix II-M1, at 25. The turbines’ “expansive layout and dense appearance on the horizon dominates and clutters the view.” *Id.* As a result, “[t]he sense of a pristine ocean horizon is no longer a component of the view with the Project in place under these exceptional viewing conditions.” *Id.* (emphasis added). Residents and vacationers to LBI who enjoy, among other forms of ocean-centered recreation, “a serene and simple view of the open ocean meeting the sky” from this “family-oriented beach” will assuredly experience an even more pronounced adverse impact. VIA, at 110. The VIA acknowledges that “[t]he ocean is a significant contributor to the visual character and sense of place” associated with residential beachfronts such as this beach and that “[h]omes were placed here for the purpose of the oceanfront setting.” COP, Appendix II-M1, at 119.

Atlantic Shores admits that even the view from LBI's northernmost point, at the famed, historic and landmarked Barnegat Lighthouse, will experience a "somewhat significant" impact. *Id.* at 99. The VIA correctly notes that the lighthouse is a major tourist attraction on the island, with "tourist and vacationers who visit this region in droves every summer." *Id.* at 109. In addition to picnicking, bird watching and walking, a major and unique form of recreation at the Lighthouse for those who visit includes climbing to its peak and admiring the impressive panoramic views from the bay to the ocean.⁵ *Id.* Notably, the photosimulation from this LBI mainstay portrays the view under overcast conditions, which unmistakably reflects the presence of "the towers and full rotors of most of the turbines." Attachment E to COP, Appendix II-M1, at 20. Under clear conditions, the turbines would appear even "more prominent on the horizon, thus increasing their magnitude of impact" and with one of the primary views being the ocean, will "undoubtedly attract view attention." COP, Appendix II-M1, at 99. That is especially so given that, as the VIA notes, visitors to the lighthouse are there specifically for an extended and expansive view of the ocean horizon. Attachment E to COP, Appendix II-M1, at 20.

To the extent the VIA suggests that ocean views from the Barnegat Lighthouse (Old Barney) are "not pristine" due to development on LBI such that the turbines "may become secondary components" in the background, the LBI Municipalities strongly disagree. *Id.* at 110. Barnegat Lighthouse is a historic state park with some of the largest beaches, dunes, and pristine ocean views in New Jersey, with parts of the dune system having looks and feel akin to Martha's Vineyard. Nowhere on the beaches do you see the homes as illustrated in the photo simulation relied upon and, in any event, a residential development differs in orders of magnitude in scale and character from the proposed array of 1,000-foot industrial turbines.

Atlantic Shores repeatedly attempts to downplay the magnitude of visual impact by characterizing the photo simulations as representative of the "worst case in terms of atmospheric clarity and, in many cases, the high contrast lighting conditions." *Id.* at 107. The essence of Atlantic Shores' position is that the admitted visual impact while "significant" in many cases, will be infrequent. *Id.* at 102. Relying on historical metrological data from 2019 to predict visibility up to certain distances throughout the year, the VIA posits that clear conditions comparable to those in the photo simulations are rarer in the summer, with atmospheric perspective potentially screening the turbines to a greater extent. *Id.* at 110-111. In other words, under "more typical" viewing conditions, accounting for variable factors such as weather and lighting, Atlantic Shores claims that the turbines will not be as visible as the photo simulations illustrate. *Id.* at 107.

⁵ <https://www.longbeachislandjournal.com/attractions/barnegat-lighthouse>; see also <https://nj.gov/dep/parksandforests/parks/barnegatlighthousestatepark.html>.

That position is flawed in at least three respects. For one, researchers conducting a study commissioned by BOEM acknowledged the existence of evidence suggesting that “even well-executed simulations may sometimes **under-represent** project visibility.” Sullivan, R.,G., et. al, *Assessment of Seascape, Landscape, and Visual Impacts of Offshore Wind Energy Developments on the Outer Continental Shelf of the United States*, Bureau of Ocean Energy Management (April 2021) (emphasis added).

Moreover, a field study of the visual impact threshold of offshore windfarms in the United Kingdom (co-funded by BOEM and which is relied upon by Atlantic Shores), with turbines ranging from 377 to 449 feet from blade to tip, determined that “**under favorable but not exceptional viewing conditions, moderately sized** offshore wind facilities may frequently be visible at distances exceeding 35 km (22 mi); in this study, they were visible at a maximum distance of 44 km (27 mi)” and that “regardless of facility size or lighting conditions, on days with **good** visibility conditions, offshore wind facilities were judged to be a major foci of visual attention at distances of 16km (10 mi) or less.” Sullivan, R.,G., et. al, *Offshore Wind Turbine Visibility and Visual Impact Threshold Distances*, Bureau of Ocean Energy Management (2013).⁶ This Project proposes constructing turbines that would dwarf those in the study – being at least **double** in height, rotor diameter and number in a comparable proximity to shore. If “moderately sized” turbines more than 50% shorter than those currently at issue were “frequently” visible under imperfect viewing conditions, Atlantic Shores would be even more visible under similarly favorable, but not exceptional conditions. The study attributes greater visibility to blade movement, and “[c]ontrary to expectations, lighting conditions, sun angle, and apparent contrast between the turbines and the sky backdrop **did not** substantially affect the likelihood of observing blade motion.” *Id.* at 12 (emphasis added); see also *Visual Impacts of Offshore Wind Energy Developments*, supra at 19 (noting studies showing “that blade motion was a significant visibility of wind farms”).

⁶ Last year, BOEM issued a procurement proposal seeking updated research on this frequently cited study because “the height of wind turbines proposed in recently submitted studies . . . [are] two to three times the height of the original study.” The proposal notes that, “[a]s the U.S. begins large-scale deployment of offshore wind energy facilities, accurately representing potential visual effects is critical to facilitating proper public understanding of the size and scale of offshore renewable energy development and produce defensible assessments of visual impacts.” <https://www.boem.gov/sites/default/files/documents/environment/environmental-studies/AT-23-06.pdf> Without such relevant data, BOEM essentially navigates uncharted waters in terms of visibility thresholds for large scale offshore wind proposals like this Project.

Finally, that the photo simulations reflect visibility under clear-day conditions is of no moment, because as BOEM explained in its recently published draft Environmental Impact Statement (Draft EIS), “[m]any viewers, particularly recreational users, are more likely to be present on beaches on clearer days, when viewing conditions are better than on rainy, hazy, or foggy days.” Draft EIS at 3.6.9-28.

Thus, Atlantic Shores’ blanket reliance on variability of atmospheric conditions to cast doubt on the extent of demonstrated adverse visual impacts as a result of the presence of the structures should be viewed with caution. Atlantic Shores’ self-interested assessment still acknowledges that turbines will be visible from 10-mile distances (certain points in LBI are not much further than that, and other shore points closer) during 41% of daylight hours. COP, Volume II at 5-19.

In any event, the federal government’s independent assessment of the Project’s impact on scenic and visual resources, which included its review of Atlantic Shores’ COP and accompanying VIA of the wind turbine area, confirms the degree of impact in the character of the scenic resources along New Jersey’s coast, including the studied observation points in LBI. Importantly, in the Draft EIS, BOEM indicated that the Project provides “no beneficial impacts on scenic and visual resources” and determined there to be only adverse impacts to varying degrees. 3.6.9-28 to -29. This flatly contradicts the VIA’s incorrect conclusion that those reviewing the proposal should “avoid the assumption that project visibility automatically equates to an adverse visual impact.” COP, Appendix II-M1, at 132.

Indeed, BOEM concluded that highly valued open ocean vistas, like those for which LBI has gained statewide recognition,⁷ “would reach the maximum level of change to its features and characters from a formerly undeveloped ocean to **dominant wind farm character** by approximately 2030 and result in **major** impacts.”⁸ Draft EIS, at 3.6.9-49 (emphasis added). BOEM attributes such major impact on otherwise undeveloped ocean views to the distance of the turbines, “[e]xtensive” field of views (FOVs), large scale of change, strong contrasts between the

⁷ <https://www.nj.com/entertainment/2022/06/all-44-nj-beaches-ranked-worst-to-best-for-summer-2022.html>

⁸ BOEM also studied the Project’s cumulative impact on scenic and visual resources, finding it would also be “major” due to “the presence of structures, lighting and vessel traffic.” 3.6.9-50. For example, siting these structures so close to shore will **more than double** the amount of turbines visible from the Beach Haven KOP than just with the recently-approved Ocean Wind 1 project, which is further south. See Draft EIS, at 3.6.9-47 (Table 3.6.9-17).

vertical turbine structures in the horizontal open environment where they are unexpected to the observer, as well as the level of prominence of the facilities in view. *Id.* at 3.6.9-40 and 3.6.9-49.

BOEM rated the prominence of wind turbine facilities located less than 14.4 miles from observation points, which includes Forsythe NWR in Holgate, Beach Haven's Historic District, Centre Street and Holyoke Avenue beaches, as a "5 or 6." *Id.* at 3.6.9-42-43. A "5" in terms of visual prominence means the Project at that distance "[s]trongly attracts viewers' attention to the wind farm"; a rating of "6" means it "[d]ominates" the view, with "strong contrasts in form, line, color, texture, luminance or motion fill[ing] **most** of the horizontal or vertical FOV." *Id.* at 3.6.9-42, n.1 (emphasis added).

The Project, in BOEM's determination, will still have "moderate" visual impact when viewed from other KOPs located up to 32 miles from the turbines, including at mid to northern points on LBI, such as Ship Bottom Beach and the Barnegat Lighthouse. BOEM assigned those views a rating of 3 to 4 in prominence – that is, "visible after brief glance in general direction of the wind farm, unlikely to be missed by casual observer" to "plainly visible, could not be missed by casual observer," even if it does not strongly attract visual attention or dominate view. *Id.* at 3.6.9-42-3.6.9-43, n.1; and see Table 3.6.9-16.

The sole instance in which BOEM classified the Project as having "minor" visual impact with respect to LBI is the view from Beach Haven's Historic District at nighttime and only if Atlantic Shores implements an aircraft detection lighting system (ADLS), which reduces the time that the FAA-required bright red aviation obstruction lighting for structures of this height is activated to when aircrafts are within a certain distance of the area. Atlantic Shores represents that it is "considering" use of this system, but only "if practicable and permitted." COP, Volume II, at 5-21 to 5-22. Without an ADLS system, use of which is not by any means guaranteed at this point, the visual impact from the turbines from certain LBI observation points remains "major" even at night and, in any event, does not ameliorate the significant adverse daytime impact from the presence of the structures.

b. The visibility of the wind turbines will have a negative economic impact on the LBI Municipalities.

The clear visual impacts outlined above will have readily foreseeable negative impact to local economies in the affected areas of coastal New Jersey. As off-shore wind-energy projects around the world have increased, several studies have shown a negative economic impact on these typically seaside, tourist regions. Invariably, these studies show that the closer to shore the turbines are located, the greater tourist reluctance is to visit that shore area. These studies

show that up to 43% of beachgoers would switch beaches to avoid the visual and experiential blight of a close-to-shore turbine array. In seasonal economies, like those of the LBI Municipalities, applying those percentages result in staggering losses when applied against annual LBI tourist revenues of \$1.8 billion, including \$100 million in state tax revenue and \$140 million in local tax revenue.⁹ Other studies looking at the economic impact of these projects show that proximity to wind turbines depresses property values. The studies show plainly that these negative economic impacts decrease markedly as turbines are located further offshore. Indeed, in connection with the DEP's recent response to comments in connection with the issuance of permits and a federal consistency certification for the Ocean Wind 1 offshore wind project, DEP specifically recognized the net negative impact to local tourism for a turbine array that is within 15 miles of the shore.

A recent study undertaken by a team of environmental and natural resource economists at the University of Delaware examined consumer decision-making in relation to wind farm location and concluded that consumers are more likely to switch shore destinations where those destinations are proximate to an offshore windfarm. In other words, beachgoers will avoid a beach if the wind farm is visible from the shore, and choose a different destination, an economic factor denominated by the study team as "trip loss." *George R. Parsons, Jeremy Firestone, Lingxiao Yan and Jenna Toussaint. "The Effect of Offshore Wind Power Projects on Recreational Beach Use: A Contingent-Behavior Study on the East Coast of the United States" Energy Policy Vol. 144 (2020)*¹⁰ (the "Delaware Study") at 4. In the Delaware Study, the wind farms that were 15 miles or closer to shore caused 25-29% of survey respondents to choose a different beach to visit. Delaware Study at 5.

While 25-29% of lost tourism is disturbingly high, those numbers would be presumptively and significantly higher based on the specific scope and turbine dimensions of the Atlantic Shores Project when compared with those presented in the Delaware Study. The methodology of the Delaware Study utilized variables, including those that repelled visitors, that were substantially less than the variables in the Atlantic Shores Project. In the Delaware Study:

respondents were asked to imagine that a wind power project was present offshore and that they were aware of its presence before making the trip. Respondents were then shown the panning photomontages that included

⁹ See <https://nj1015.com/files/2012/10/SOCC-2011-Econ-Impact-Final-10-2012.pdf>; https://visitnj.org/sites/default/files/Economic_Impact_of_Tourism_in_New_Jersey_2021_Final.pdf?tag=itinerary; with data adjusted for inflation.

¹⁰ Available at https://works.bepress.com/george_parsons/60/.

views in clear weather, hazy weather, and at nighttime. A visual with no wind power project was also shown as a point of comparison. The hypothetical project depicted in all photomontages included 100 turbines: each turbine was 6 MW and was 175 m high (blade at apex) with a rotor diameter of 150 m. They were spaced eight rotor diameters from one another, or 1.2 km apart, in a 10 by 10 grid format.

Delaware Study at 2. [Emphasis added]. The variables in the Delaware Study are dwarfed—in every aspect—by the actual variables in the Atlantic Shores array (e.g., 200 turbines, 1064 feet high). Interestingly, in the Delaware Study, the percent of respondents who would choose a different beach for an array that was 2.5 miles offshore was 43%. Delaware Study at 4. But that assumes a far more modest windfarm. The proposed Atlantic Shores Project contains double the number of turbines, and the turbines themselves are nearly twice as tall. Because of its vastly increased visibility, the trip loss from the Atlantic Shores Project at 9 miles may fairly be understood as closer to the 43% trip loss demonstrated by the Delaware Study under its parameters.¹¹

Other studies evaluating lost tourism due to overtly visible offshore wind farms are consistent with the Delaware Study. A 2017 North Carolina study (“NC Study”) based primarily on 144 turbines located at distances 5-18 miles offshore found “a substantial portion of the survey population that would change their vacation destination if wind farms were placed within visual range of the beach.” *Lutzeyer, S., Phaneuf, D. J., and L. O. Taylor (2017). The Amenity Costs of Offshore Windfarms: Evidence from a Choice Experiment. (CEnREP Working Paper No. 17-017). Raleigh, NC: Center for Environmental and Resource Economic Policy at 1.*¹² The NC Study found further that, with respect to the beach vacation rental market, “55 percent of existing customers would not re-rent their most recent vacation property if wind turbines were placed offshore.” *Id.* at 6. The negative economic impacts, what the NC Study refers to as “disutility,” decreases based upon the number of turbines and, markedly, when they are placed at least 12 miles offshore.

The adverse economic consequences of offshore windfarms are not limited to attitudes in the East Coast of the United States. A 2017 European study focusing on Catalan beaches off the

¹¹ Such extrapolation is obvious and appropriate, and as a North Carolina study found, “[v]isualizations used in public engagement forums in NC studies by BOEM used 7 MW turbines placed 10 miles from shore; our 5MW turbines at 5 miles from shore are visually indistinguishable from the larger turbines at greater distance.” *Lutzeyer, S., Phaneuf, D. J., and L. O. Taylor (2017). The Amenity Costs of Offshore Windfarms: Evidence from a Choice Experiment. (CEnREP Working Paper No. 17-017). Raleigh, NC: Center for Environmental and Resource Economic Policy at 9.*

¹² Available at <https://cenrep.ncsu.edu/cenrep/wp-content/uploads/2016/03/WP-2017-017.pdf>.

coast of Spain found what it termed a “welfare loss” of up \$220 million per season. *Voltaire, L., Loreiro, M., Knudsen, C., Nunes, P., 2017. The impact of offshore wind farms on beach recreation demand: policy intake from an economic study on the Catalan coast. Mar. Pol. 81, 116–123.* The study notes that “the installation of a wind farm mainly will cause a shift in trips to Catalan beaches without wind farms, which implies that the estimated negative economic impacts will occur mostly in areas where wind farms are located.” This study cites to other studies in Europe and the United States that reached similar conclusions. In all instances, the negative economic impacts are diminished by distance, density, and height of the turbines.¹³

Indeed, BOEM itself has acknowledged that an offshore wind project will have a negative impact on tourism. *See Parsons, G. Firestone, J. “Atlantic Offshore Wind Energy Development: Values and Implications for Recreation and Tourism.” Sterling (VA): U.S. Department of the Interior, Bureau of Ocean Energy Management. OCS Study BOEM (2018).*¹⁴ This study discussed survey data, including data specific to New Jersey, which found there would be a 9-12% trip loss of an offshore wind project at the distance from shore of the Atlantic Shores Project. *Id.* at 17, Table 5. This study used a theoretical project of 100 turbines, each 574 feet high, and thus the much larger Atlantic Shores Project would likely have an even larger negative impact on trips. *Id.* at 1.

Significantly, in connection with the separately-pending Ocean Winds project a few miles to the south, in pushing back against public concerns over the impact to local tourism, DEP embraced earlier iterations of the Delaware Study and the NC Study to conclude that the types of concerns being raised could be ameliorated by placing the turbines at least 15 miles off shore. *New Jersey Department of Environmental Protection, Division of Land Resource Protection, Ocean Wind 1 State Permit Applications & Federal Consistency Certification, dated April 27, 2023 at 12.* Specifically, DEP, citing the Draft Environmental Impact Statement prepared in connection with the Ocean Winds project, stated:

¹³ Some studies have noted the theoretical potential of wind farm tourism, an activity where customers are ferried by boat to view the turbines in action. The LBI Municipalities submit that any honest and long-term assessment of wind farm tourism will recognize the implausibility of such a theory. Whatever *de minimus* consumer demand might be created for such an undertaking, no data or commonsense support exists to indicate that any single consumer would visit a wind farm more than once—at best, it is a one-time, novelty trip. In the wake of this ephemeral demand is the perpetual blight of these turbines on the horizon for the millions of repeat visitors who come to enjoy the beauty of Long Beach Island.

¹⁴ Available at <https://espis.boem.gov/final%20reports/5662.pdf>.

a University of Delaware study evaluating the impacts of visible offshore WTGs on beach use found that WTGs visible more than 15 miles from the viewer would have negligible impacts on businesses dependent on recreation and tourism activity (Parsons and Firestone 2018).

And again, the Delaware study analyzed the impact of turbines half the size; the impact here would in all likelihood be significantly greater.

With regard to nighttime views of lighted turbines, DEP stated:

The study found that nighttime views of aviation hazard lighting (without ADLS) for WTGs close to shore (5 to 8 miles [8 to 13 kilometers]) would adversely affect the rental price of properties with ocean views (Lutzeyer et al. 2017). It did not specifically address the relationship between lighting, nighttime views, and tourism for WTGs 15 or more miles (24.1 or more kilometers) from shore. More than 95 percent of the WTG positions likely to be present based on anticipated offshore wind lease area build-out in the geographic analysis area would be more than 15 miles (24.1 kilometers) from coastal locations with views of the WTGs.

Id.

Thus, DEP must conclude, based on studies it has already acknowledged as legitimate, that the Atlantic Shores Project will be visible and will have negative economic impacts on the businesses in the LBI municipalities that rely upon recreation and tourism.

c. The visual impact of the Atlantic Shores Project is inconsistent with DEP's coastal zone management rules.

These impacts of the Atlantic Shores Project discussed above violate several of DEP's coastal zone management rules designed to preserve scenic resources and related recreational uses along New Jersey's coast, and thus these visual and resulting economic impacts are within the scope of DEP's review of the project, and mandate that DEP cannot find it consistent with its enforceable coastal policies.

i. N.J.A.C. 7:7-16.10 (Scenic resources and design)

N.J.A.C. 7:7-16.10(c) limits “[n]ew coastal development that is not visually compatible with existing scenic resource in terms of large-scale elements of building and site design.”¹⁵ According to the expressed regulatory rationale, “[a] project which is of a scale and location that has significant effect on the scenic resources of a region is considered to have a regional impact and to be of State concern.” N.J.A.C. 7:7-16.10(g).

Such development is “discouraged” – meaning it is “likely to be rejected or denied” by DEP. N.J.A.C. 7:7-1.5. As cannot be disputed in this instance, the rule is especially applicable with respect to “developments which by their singular or collective size, location and design could have a significant adverse effect on the scenic resources of the coastal zone.” N.J.A.C. 7:7-16.10(g). The DEP needs to look no further than the applicant’s own submissions for substantially credible evidence of the significant adverse visual effects of the project, which are detailed at length above and have been confirmed by BOEM in its Draft EIS. The turbines are comparably sized to skyscrapers and in that regard, similarly urbanize/industrialize an otherwise serene, natural undeveloped view of the ocean environment. See COP, Attachment G to Attachment A (Visual Impact Assessment Study Plan – Offshore) to Appendix II-M1 (reflecting comments from panel members on visual impact rating forms). They are extremely close in proximity to LBI’s shoreline and the observation points on the island received some of the most negative visibility scores of those studied. The visual impact – in Atlantic Shore’s own words – will be **significant**. Hence, as provided by regulation, this discouraged development should be rejected in its proposed form.

DEP’s sole exception for permitting a discouraged development is not satisfied here, when “the proposed use to be in the public interest despite its discouraged status . . . provided that mitigating or compensating measures can be taken so that there is a net gain in quality and quantity of the coastal resource of concern.” N.J.A.C. 7:7-1.5. BOEM considered an alternative that proposed to adjust the layout and maximum number of turbines to reduce visual impacts, but ultimately rejected that alternative as insufficient “to change the level of impacts as compared with the Proposed Action.” Given that the significant adverse visual impact is mainly “associated with the presence of offshore structures in previously undeveloped ocean and substantially increased vessel traffic,” Draft EIS, at 3.6.9-52, there is simply no meaningful mitigation, absent moving to another lease areas, that can be implemented to ameliorate the significant adverse visual impacts necessary to find the Project consistent with DEP requirements for approving discouraged developments.

¹⁵ This regulation provides several technical setback requirements for coastal development “adjacent to a bay or ocean or bayfront or oceanfront, beach, dune or boardwalk,” which are inapplicable given that the proposed development is not “adjacent to” but *on* the ocean. N.J.A.C. 7:7-16.10(d)-(f).

ii. **N.J.A.C. 7:7-15.3 (Resort/recreational).**

Development pertaining to resort and recreational uses in New Jersey's coastal zone are also among uses regulated by DEP. N.J.A.C. 7:7-15.3(a) ("Resort/recreation uses include the wide range of small and large developments attracted to and often dependent upon locations along the coast."). Indeed, the visual impacts set forth above are not affecting remote locations; they are pervasive in prime oceanfront destinations where recreation is paramount among residents and tourists alike. See VIA, at 13 (recognizing that recreational users in or around the ocean shoreline "will often have continuous views of landscape features over relatively long periods of time, and scenic quality generally enhances the quality of any outdoor recreational activity even though these individuals may not be specifically involved in sight-seeing"). LBI is certainly no exception.

DEP has set standards relevant to recreation priority, pursuant to which "[r]esort/recreation uses and commercial fisheries uses shall have priority over all other uses in Monmouth, Ocean, Atlantic, and Cape May counties with highest priority reserved for those uses that serve a greater rather than a lesser number of people, and those uses that provide facilities for people of all ages and for people with physical handicaps." N.J.A.C. 7:7-15.3(b)(2). According to the rule, deeming areas of recreation a priority setting reflects its station as an integral part of the coastal environment and economy, and as "essential for the quality of life." N.J.A.C. 7:7-15.3(f). The rule notes the "the importance of maintaining the visual quality of the oceanfront."

Recreational uses typical along LBI's oceanfront such as sunbathing, swimming, boating, fishing, walking, and running (to name a few), thus take highest priority under this regulation. LBI's ocean-centric recreation serves a greater number of people on the island as its beaches are largely undeveloped or residential, lacking for example a boardwalk. Enjoyment of the beaches and oceanfront is available to people of all ages and physical abilities.

The Project's dominating visual impact on the ocean landscape along LBI detracts from full enjoyment of, and engagement in recreational activities along the beach. BOEM specifically states in its Draft EIS that:

WTGs visible from some shoreline locations in the geographic analysis area would have adverse impacts on visual resources when discernable due to the introduction of industrial elements in previously undeveloped views. **Based on the relationship between visual impacts and impacts on recreational experience, the impact**

of visible WTGs on recreation would be long term, continuous, and adverse.

Draft EIS, at 3.6.8-18.

As discussed above, the LBI Municipalities are likely to see a reduction in recreational and tourism activities at their beaches, which is inconsistent with highly prioritized recreational uses along the coast.

iii. N.J.A.C. 7:7-16.9 (Public access) and N.J.A.C. 7:7-9.22 (Beaches)

DEP's preservation of the scenic quality of tidal waterways, shores and related recreational uses coincides with the Agency's charge under the Public Trust Doctrine to ensure the public has meaningful access to and full utilization of natural resources such as tidal waterways and their shores. N.J.A.C. 7:7-16.9(f); *see also* N.J.A.C. 7:7-9.22 (c) and (d) (subjecting beaches to the public access and trust rules based on the rationale that "[u]restricted access for recreational purposes is desirable so that the beaches can be enjoyed by all residents and visitors of the State"). New Jersey jurisprudence has expanded the doctrine to assure access to "public recreational uses such as swimming, sunbathing, fishing, surfing, sport diving, bird watching, walking and boating along the various tidal shores." N.J.A.C. 7:7-16.9(f). As noted throughout this submission, visual disruption of the ocean landscape to the degree proposed by Atlantic Shores interferes directly with public recreational uses guaranteed by the public trust and access rules.

II. The Atlantic Shores Project will negatively impact commercial fishing and fisheries in violation of DEP Regulations.

DEP's regulations recognize the importance of commercial fishing and protecting shellfish (N.J.A.C. 7:7-9.2), surf clam (N.J.A.C. 7:7-9.3), prime fishing areas (N.J.A.C. 7:7-9:4), finfish migratory pathways (N.J.A.C. 7:7-9.5), and marine fish and fisheries (N.J.A.C. 7:7-15.4). As DEP's rule rationale recognizes:

Finfish (freshwater, estuarine, and marine) and shellfish resources, and the habitats that support these resources provide significant recreation experiences for residents of New Jersey and interstate visitors. These resources also help the State's economy, by leading to expenditures of approximately \$ 1.4 billion per year (U.S. Department of Commerce, National Marine Fisheries Service, 2008). The Department also estimates that 1.2 million people participated in marine/estuarine recreational fishing in 2010 in New Jersey. (U.S. Department of Commerce, National Marine Fisheries Service, 2011) The

value of and participation in recreational saltwater fishing is underestimated here as these figures only include finfish data and do not include recreational crabbing and clamming, which are important activities in New Jersey. Commercial landings for all finfish and shellfish in New Jersey during 2010 were 161,831,909 pounds, valued at \$ 177 million dockside, according to U.S. Department of Commerce statistics (2011). The total ripple effect on the State economy is estimated at \$ 2.6 billion, with recreational fishing yielding \$ 1.6 billion and commercial fishing yielding \$ 1.06 billion. (U.S. Department of Commerce, National Marine Fisheries Service, 2008 and 2011).

N.J.A.C. 7:7-15.4(d). Any proposed development that would adversely impact marine fish or fisheries (or access thereto) is discouraged. N.J.A.C. 7:7-15.2(d).

The BOEM's Draft EIS leaves no question that the Atlantic Shores project would adversely impact marine fish and fisheries, and thus must be found inconsistent with New Jersey's coastal policies. Draft EIS, 3.6.1 et seq. The Draft EIS acknowledges that the turbines "could have several impacts on commercial and for-hire recreational fisheries, including through gear loss or damage, navigational hazards, habitat conversion and fish aggregation, migration disturbances, and space-use conflicts." Draft EIS 3.6.1-64. Despite BOEM's vague impact classifications of minor, moderate, and major (Draft EIS Table 3.6.1-33), the bottom line is, and the Draft EIS recognizes that

[f]ishing vessel operators who are displaced from fishing grounds within offshore wind areas and are unable to find alternative fishing locations would experience long-term revenue losses.

Draft EIS 3.6.1-55.

The amount of revenue at risk increases as proposed offshore wind energy projects are constructed and come online and would continue beyond 2030 during the continued O&M phases of the offshore wind energy projects. The most revenue at risk is during the construction of these projects, which is the focal period of this table, but revenue exposure would occur during the O&M phase as well, which will extend well beyond 2030.

Id.

Moreover, and of particular relevance to LBI and its famed Barnegat Light scallops, the Draft EIS acknowledges, as it must, that

[t]he presence of the WTG foundations and associated scour protection, as well as cable protection, would convert existing sand or sand with mobile gravel habitat to hard-bottom, which, in turn, would reduce the habitat for target species that prefer soft-bottom habitat (e.g., surfclams, sea scallops, squid, summer flounder).

Draft EIS 3.6.1-58. To illustrate, projected 2030 revenue from the species whose patterns and habitats are directly affected by the proposed project zone is \$33,597,000, with scallops, alone, comprising \$22,251,000 of that revenue. Table 3.6.1-34. Naturally, it follows that the local communities that support commercial fishing will suffer:

Fishing communities that derive a high percentage of revenue from the Lease Area and have a high reliance on the commercial fishing industry are expected to experience the greatest impacts from reduced demand for shoreside support services.

Draft EIS 3.6.1-67.

The Draft EIS attempts to minimize these impacts by terming them not irreversible because the turbines will be decommissioned in 35 years and might not be replaced. *See* Draft EIS 4.2.3. But the speculative future removal of turbines does not diminish the real and substantial harm over the next several decades, and even BOEM must acknowledge that “[i]rretrievable impacts (lost revenue) could occur due to the loss of use of fishing areas at an individual level.” *Id.*

Drive up and down Long Beach Boulevard or tour Viking Village in Barnegat Light if you wish to put a name and face to these businesses—they are everywhere! It is not surprising that the Draft EIS acknowledges that alternatives to the Proposed Action that include fewer turbines of more modest scale with lower noise emissions reduces the negative economic consequences to Long Beach Island’s fishing industry. It notes:

Relative to the Proposed Action, Alternatives C, D, and E would result in the removal of WTGs from the Lease Area and are expected to provide a reduction in potential adverse impacts on commercial fisheries compared to other alternatives, including the Proposed Action.

Draft EIS 3.6.1-79.

The clear weight of credible authority as discussed above, including DEP's and BOEM's own analyses, militate against the Atlantic Shores Project as currently conceived. DEP should deny Atlantic Shores' request for a consistency certification for the project as proposed, and explore whether alternatives exist, such as the Hudson South lease area, that would have lesser impacts on protected fisheries.

III. The Atlantic Shores Project will have an adverse impact on the North American Right Whale in violation of DEP's threatened and endangered species rule.

As Atlantic Shores recognizes in its COP, marine mammals are important species to any marine ecosystem; specifically, whales enhance primary productivity in their feeding areas by concentrating nitrogen at the surface and have even been identified as important for both the storage and transfer of carbon. COP, § 4.7, at p.4-153. Atlantic Shores has identified 37 species of marine mammals present in the Outer Continental Shelf (OCS) where the Project is located. In addition to protection under federal statutes, several of these marine mammals are listed by New Jersey as endangered and threatened wildlife species.

Of those species, five whale species are listed as endangered under the federal ESA and New Jersey's ENSP: North Atlantic Right Whale (NARW), Fin Whale, Sei Whale, Blue Whale, Sperm Whale. COP, Table 4.7-1. Two of those species of endangered whales have been found to be present in the Atlantic Shores project area: the Fin Whale (listed as common) and the NARW (listed as regular), with the NARW on the brink of extinction. The project will have an impact on the entire whale population but given the presence of the NARW on site and its critically endangered status, we focus our commentary specifically on the NARW.

The NARW is considered one of the world's most endangered large whale species. Labeled "critically endangered" by BOEM¹⁶ there are estimated fewer than 350 NARW remaining, of which less than 70 are breeding females.¹⁷ Since 2017, there has been a multi-year decline in the NARW population such that BOEM declared an "Unusual Mortality Event" for the NARW.¹⁸

¹⁶ BOEM's Atlantic Shores Offshore Wind: Atlantic Shores South Project Biological Assessment for National Marine Fisheries Service, dated May 2023, available at <https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Atlantic%20Shores%20South%20NMFS%20BA.pdf>, at 3.2.2.2, p. 84

¹⁷ NOAA, North Atlantic Right Whale, <https://www.fisheries.noaa.gov/species/north-atlantic-right-whale>

¹⁸ 2017-2023 North Atlantic Right Whale Unusual Mortality Event, <https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2023-north-atlantic-right-whale-unusual-mortality-event>

The documented deaths, injuries and illnesses is nearing 100¹⁹ as compared to only [57 calves born since 2017](#).²⁰ Studies also indicate that [females are dying at faster rates](#) than males and that their average lifespan is shrinking from around 70 years to around 45 years.²¹ With NARW numbers that low and an increased mortality rate, every death brings the species closer to extinction.

The NARW typically occupy coastal and shelf waters within 56 mi of the shoreline and is a migratory species that travels from high-latitude feeding waters to low-latitude calving and breeding ground.²² As the COP and Draft EIS recognize, the New Jersey coastal waters are important migratory routes for NARW and the Project area overlaps a biologically important area for NARW migration. COP, at 4-172; Draft EIS 3.5.6-2 To ensure the continued survival of the NARW, females must be able to give birth off the warmer waters of South Carolina and Georgia, and then return North to feed. So, anything that imperils the NARWs' migration must be avoided to ensure the continued survival of the species. Nothing must imperil that migration. The whale 12-mile-wide migration corridor off New Jersey intersects with and is adjacent to the proposed project area.²³

The Atlantic Shores Project will cause a number of negative impacts on the NARW. One significant such impact is noise exposure from the project. Marine mammals rely heavily on sound for essential biological functions, including communication, mating, foraging, predator avoidance, and navigation. Draft EIS, p. 3.5.6-23 Underwater anthropogenic noise is far from innocuous and can have deleterious effects on marine mammals. It could block migration, bringing marine mammals to shore; bring about whale surfacing to avoid noise levels and pose a higher risk for vessel strikes; separate mothers from calves by masking communications; impede navigational capabilities, feeding, or mating, and impede the ability to detect predators or vessels.

There is compelling evidence that baleen whales (like the NARW) have acute very-low-frequency and infrasonic hearing. COP, 4-171. NARW are specifically well-adapted to and

¹⁹ Research suggests that only about one-third of NARW whale deaths are documented, so the number can actually be much higher. *See Id.*

²⁰ *Id.*

²¹ NOAA Fisheries, North Atlantic Right Whale, <https://www.fisheries.noaa.gov/species/north-atlantic-right-whale#overview>

²² https://media.fisheries.noaa.gov/2022-01/AtlanticShoresHRG_2022_App_OPR1.pdf

²³ NJ Offshore Wind Strategic Plan, Natural Resource Technical Appendix, Figure 21. Section 2.6. Indeed, it was noted that the annual abundance of the NARW is highest at depth contours between 30 and 40 meters, whereas that are shallower and much deeper than this range show less relative density.

dependent upon listening to sounds in the low-frequency register for critical life functions such as communicating, navigating, mating, and maintaining social bonds between mothers and calves.²⁴ Based on extensive research and a number of studies, the National Marine Fisheries Service (NMFS) established a 120 dB noise level at which 50 percent of the marine mammal population would be disturbed,²⁵ (with the NARW disturbance levels being lower).

There would be unavoidable underwater anthropogenic noise involved in the construction, installation, operation, and decommissioning of the Atlantic Shores Project. Draft EIS 3.5.6-56; Appendix B, § B5. Pile driving and vessel noise are an especially serious concern for the NARW. Pile driving can result in physiological and behavioral effects on marine mammals and the NARWs are expected to have the largest exposure ranges for injury from pile driving. Draft EIS 3.5.6-66. Moreover, the low frequencies produced by vessel noise and the relatively large transmission distances associated with sound at those frequencies put NARW at the greatest risk of impact compared to other marine mammals. Draft EIS, 3.5.6-32.

The noise poses a problem for NARWs because it can increase stress hormone levels and contribute to suppressed immunity, reduced reproductive rates, and fecundity, and, most significantly, cause acoustic masking that interferes with their detection of prey, predators, and communication signals, all of which is critical for the NARW's survival. *Id.* Atlantic Shores plans to use up to 51 vessels during the construction and installation of the project, with as many as 16 vessels expected to operate at one time, causing a significant increase in vessel activity compared to normal condition. Draft EIS, 3.5.6-64. Over the past several decades, there have been an increasing number of whales washing up on shore each year, and the only change from prior years is the large number of wind energy vessel surveys being conducted off the coast. Those vessels use high intensity noise devices to characterize the seabed for future wind turbine

²⁴ Written Testimony of Dr. Christopher W. Clark Before the House Natural Resource Committee, Subcommittee on Water, Oceans, and Wildlife Hearing on "Examining the Threats to the North Atlantic Right Whale", March 7, 2019 (internal reference citations omitted). Dr. Clark, a PhD researcher conducted an experiment by listening to the whales every day for eighteen months. He and his team observed that the whales produced "contact calls" - a distinctive class of calls as a means of maintaining contact and coming together into social groups. The research team validated the biological importance of contact calls by conducting experiments in which they used an underwater loudspeaker to play back different types of sounds and in response, distant whales called back, and many swam to the location of our underwater loudspeaker.

²⁵ "NOAA Fisheries has defined the threshold level for Level B harassment at 120 dBRMS re 1 micro Pascal (μ Pa) for continuous noise and 160 BRMS re 1 μ Pa for impulsive and intermittent noise."

https://media.fisheries.noaa.gov/2022-01/AtlanticShoresHRG_2022_App_OPR1.pdf, at p. 3.

placement. Indeed, recent whale deaths off Martha's Vineyard – with two dead humpback whales washing ashore just days after piledriving for the Vineyard Wind project commenced, underscore the serious harms that wind projects can cause for whales.²⁶

Once operational, the impact of turbine operation on noise levels in the NARW's migration corridor remains a substantial concern. Dr. Robert Stern, the former director of the Office of Environmental Compliance in the U.S. Department of Energy, a recognized expert in environmental impact studies, submitted a letter, on behalf of his organization, Save LBI, to President Joseph Biden, that the LBI Municipalities have reviewed, endorse, and submit herewith for DEP's convenience.²⁷ That letter is replete with scientific data on the potential deleterious effects of wind turbines on marine life in various phases from installation to operation. Regarding turbine operation, Save LBI commissioned an acoustic company to calculate the operational turbine noise levels at various distances from the full wind complex proposed off LBI and the study confirmed an estimated conservative noise source level of 181 dB for a single turbine, resulting in the 12-mile-wide right whale migration corridor permeated with continuous noise levels from 140 to 145 dB, at least 20 dB above the 120 dB criteria set forth by NMFS at which the whale's behavior will be disturbed. Dr. Stern's analysis shows noise to 140 dB out to 13-34 miles and noise to 160 dB out to 16 miles from sound source.

The increase in vessel activity also poses a threat of vessel strikes to all mysticetes, including the NARW. Animal size and diving depth are the two most important parameters for predicting this risk.²⁸ The Draft EIS readily admits that NARW are particularly vulnerable to vessel strikes, and vessel strikes are a primary cause of death for this species. Draft EIS, 3.5.6-66. Based on NMFS data, the NARW has been experiencing unusual mortality events since 2017,²⁹ with the main cause attributed to vessel strikes and entanglement in fisheries gear. Draft EIS, 3.5.6-7. From 2017 to 2022, a total of 34 whales died, and with only a small number of deaths actually detected, the actual number of deaths is likely much higher. Draft EIS, 3.5.6-30. Even excluding

²⁶ See <https://www.wbur.org/news/2023/06/08/offshore-wind-farm-marthas-vineyard-turbines> (foundation installation began on June 8, 2023) and <https://www.mvtimes.com/2023/06/13/dead-humpback-found-edgartown/> (dead humpback whales washed ashore mere days later).

²⁷ See Letter from R. Stern on behalf of Save LBI to President Biden, with numerous internal citations to studies therein. For ease of reference, we include a copy of that letter with this submission.

²⁸ NJ Offshore Wind Strategic Plan, Natural Resource Technical Appendix, at p. 66, https://www.nj.gov/bpu/pdf/Draft_NJ_OWSP_Appendix_7-10-20.pdf.

²⁹ <https://www.fisheries.noaa.gov/national/marine-life-distress/2017-2023-north-atlantic-right-whale-unusual-mortality-event>

vessel traffic from the project, the impact of vessel traffic on NARW is major and long term and vessel strikes have had and continue to have population-level effects that compromise the viability of the species. Draft EIS, 3.5.6-32.

A number of additional potential risks are associated with the project. As the Draft EIS acknowledges, the installation of turbines “could result in hydrodynamic changes, entanglement or ingestion of lost fishing gear, habitat conversion and prey aggregation, avoidance or displacement, and behavioral disruption.” Draft EIS, 3.5.6-64. Changing in types of fishing gear that result in an increased number of vertical lines in the water would increase the risk of marine mammal interactions with fishing gear, which poses a specific threat to the NARW, as entanglement in fishing gear is a leading cause of death for this species. Draft EIS, p. 3.5.6-66.

Atlantic Shores has proposed a number of mitigation measures to try to combat the ill effects of the installation and operation of the turbines. Those measures are insufficient. For example, Atlantic Shores proposed to limit the Project to seasonal pile-driving restrictions with no pile driving occurring between January and April (the typical timing of migration) to minimize risks to NARWs. However, the NARW uses the Project area as a migratory corridor and can be present year-round. Ocean Wind Farm Biological Assessment, at p.102. Aerial surveys have documented NARW offshore of New Jersey in all seasons except summer, see Biological assessment, p.85, and NARW has been acoustically detected in waters off New Jersey and New York during all months of the year. *Id.* The BOEM’s biological assessment of the project concludes that “the effects of exposure to noise above behavioral thresholds resulting from impact pile driving for foundation installation **may affect, likely to adversely affect** fin whales and NARWs,” noting that “this migratory corridor “is considered a Biologically Important Area; as such, behavioral disturbance in this area for a critically endangered species may result in affecting critical functions. Therefore, the behavioral disturbance resulting from impact pile driving cannot be discounted.” Biological Assessment, p. 102.

Atlantic Shores has also proposed to follow multi-step vessel strike avoidance procedures to mitigate the potential impacts on the NARW. COP, 4-218 – 4-220. But again, the measures may not be sufficient as any collision risk posed to the NARW could have severe population level effects. A study using a database of 10,000 photo-documented right whale observations and a population matrix model demonstrate that the prevention of even two female mortalities per year would increase the population growth rate to replacement level.³⁰

³⁰ NJ Offshore Wind Strategic Plan, Natural Resource Technical Appendix, at p.68, https://www.nj.gov/bpu/pdf/Draft_NJ_OWSP_Appendix_7-10-20.pdf (citing studies).

Significantly, the “cumulative impact” of the proposed action in the Draft EIS states that the “BOEM anticipates that the cumulative impacts would result in ... **moderate** to **major** impacts on NARW.” It further explains that

the BOEM made this determination because the anticipated impact would be notable and measurable, but most marine mammals are expected to recover completely when IPF stressors are removed and remedial or mitigating actions are taken. However, impacts on individual NARWs could have severe population-level effects (e.g., vessel strikes if they were to occur). The main drivers for these impact ratings are gear utilization, impact pile-driving noise, vessel noise, the presence of structures, and vessel traffic (i.e., vessel strike). The Proposed Action would contribute to the cumulative impact rating primarily through impact pile-driving noise, vessel noise, and the presence of structures.

The DEP’s Coastal Zone Management Rules set forth protections for endangered or threatened wildlife and require an applicant of a proposed project sought to be developed on a site with documented endangered or threatened wildlife to demonstrate that the endangered or threatened wildlife would not be adversely affected. See N.J.A.C. § 7:7-9.36(b) and (c); N.J.A.C. 7:7-11.2(b) and (c); 7:7-11.4(c). Given the potential negative impacts of the Project and the BOEM’s concession that the project poses moderate to major impacts on NARW, the Project does not comply with the CZM’s requirement of showing no adverse effect. DEP should deny Atlantic Shores’ request for a consistency certification for the project as proposed, and explore whether alternatives exist, such as the Hudson South lease area, that would have lesser impacts on protected marine mammals.

IV. The Atlantic Shores Project will negatively impact critical wildlife habitat for birds.

Finally, the Atlantic Shores Project as proposed is inconsistent with DEP rules protecting avian species, including N.J.A.C. 7:7-9.36 (Endangered or threatened wildlife or plant species habitats) and N.J.A.C. 7:7-9.37 (Critical wildlife habitats).

As BOEM acknowledges in its Draft EIS, “[m]any species and higher taxonomic groups of birds may occur within the project area because of its position along the Atlantic Flyway and the region in which the geographic range of many northern and southern species overlap.” Draft EIS at 3.5.3-1. The project area is known to be used by at least three species of shorebirds listed by New Jersey as endangered, the red knot, piping plover, and roseate tern. Draft EIS at 3.5.3-6.³¹

³¹ BOEM is preparing a biological assessment in connection with endangered bird species. Any DEP determination should await that biological assessment.

BOEM preliminarily found that the Atlantic Shores Project may adversely affect the red knot, and may affect the piping plover and roseate tern, among other species. The LBI Municipalities believe BOEM's preliminary assessment greatly understates the impact on these species, especially given that this project is one of many proposed in a close geographic area.

Specific to the piping plover, the Draft EIS claimed that Atlantic Shores had not detected them during digital aerial surveys. However, other studies have found that migratory routes of piping plovers indeed cross through the project area, among other lease areas designated by BOEM. See Pamela H. Loring, James D. McLaren, Holly F. Goyert and Peter W.C. Paton. "Supportive wind conditions influence offshore movements of Atlantic Coast Piping Plovers during fall migration," *The Condor* 122 (2020).³² This study tagged 150 adult piping plovers in southern New England, tracked them via radio telemetry, and modeled their migratory flight paths based on this data. *Id.* The study, the first to describe the piping plover's flight altitude during migration, found "that the mean offshore migratory flight altitudes of Piping Plovers crossing the mid-Atlantic Bight were mostly within or above the [Rotor Swept Zone] off offshore wind turbines." *Id.* at 10. The flight paths of several birds crossed the Atlantic Shores lease area. *Id.* at 11, Figure 6.

Additionally, a study on offshore wind projects in the North Sea reflects that offshore wind farms can cause significant mortality for migrating bird species. See Robin Brabant, Nicolas Vanermen, Eric W.M. Stienen and Steven Degraer. "Towards a Cumulative Collision Risk Assessment of Local and Migrating Birds in North Sea Offshore Wind Farms" *Hydrobiologia* (2015). This study found that, when considering a realistic scenario of 10,000 total turbines in the North Sea rather than analyzing on an individual project basis as regulators typically do, there could be thousands of song bird deaths in a single night resulting in significant, population level impacts. *Id.*

In New Jersey alone, Governor Murphy has set a goal of 11,000 MW of offshore wind energy generation by 2040. DEP has already approved the Ocean Wind 1 project directly adjacent to the proposed Atlantic Shores Project area. Other states on the Eastern seaboard plan to develop wind projects as well. Thus, the impact of the Atlantic Shores project must be considered in conjunction with these other proposed projects. Indeed, even with its inadequate analysis, the Draft EIS predicted the Atlantic Shores Project, if constructed, would have a moderate cumulative impact on birds "primarily through the permanent impacts from the presences of the structures."

³² Available at <https://academic.oup.com/condor/article/122/3/duaa028/5860737>.

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DEP's rules discourage development "that would directly or through secondary impacts on the relevant site or in the surrounding region adversely affect critical wildlife habitat." N.J.A.C. 7:7-9.37(b). Critical wildlife habitat includes "specific areas known to serve an essential role in maintaining wildlife, particularly in wintering, breeding, and migrating." N.J.A.C. 7:7-9.37(a)(1). The Atlantic Shores proposal would adversely affect migratory routes for the endangered piping plover, and BOEM has recognized that it may adversely impact the endangered red knot as well. The proposal is thus not consistent with DEP's coastal zone management rules. DEP should deny Atlantic Shores' request for a consistency certification for the project as proposed, and explore whether alternatives exist, such as the Hudson South lease area, that would have lesser impacts on critical habitat for birds.

V. Conclusion

Because the project fails to strike an appropriate balance between achieving alternative energy goals in a manner consistent with DEP's coastal zone management rules, DEP should deny Atlantic Shores' request for a federal consistency certification. As proposed, the Project would be the closest offshore wind project of its scale and size in the United States, would be sited just offshore a premier beach location that relies heavily on tourism and fishing to support its economy, and would have negative impacts on both marine mammals and birds.

Again, the LBI Municipalities support developing of clean energy. But they cannot support this project because of these negative impacts, and DEP should likewise decline to support it as it violates DEP's enforceable coastal policies. The LBI Municipalities urge Atlantic Shores to instead pursue development within the Hudson South lease area, which would greatly reduce the visual and other impacts to LBI and other shore locations, and we believe cause fewer impacts to whales and birds as well given its location further offshore. Atlantic Shores' request for a consistency certification in connection with its current proposal should be denied.

Very truly yours,

/s/ Frank Huttle III

Frank Huttle III

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Ship Bottom, Kristy DeBoer, Municipal Clerk, kdeboer@shipbottom.org
Barnegat Light, Brenda Kuhn, Municipal Clerk, Brenda.Kuhn@BarnegatLight.org

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Surf City, Christine Hannemann, Borough Clerk, frontdesk@surfcitynj.org

Harvey Cedars, Anna Grimste, Municipal Clerk, agrmiste@harveycedars.org

EXHIBIT C

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October 19, 2023

Janet Stewart, Manager
Bureau of Coastal Permitting
P.O. Box 420, Code 501-02A
Trenton, New Jersey 08625

**Re: *Atlantic Shores Offshore Wind, LLC
Supplemental Public Comments on Request for Federal Consistency Certification***

Dear Ms. Stewart:

On behalf of Long Beach Township, Beach Haven, Ship Bottom, Barnegat Light, Surf City, and Harvey Cedars (the LBI Municipalities) as well as Brigantine,¹ we submit this supplemental comment letter on the pending request by Atlantic Shores Offshore Wind, LLC (Atlantic Shores) for a Federal Consistency Certification.

Since submitting our June 29, 2023 comment letter, the LBI Municipalities retained Interface Multi-Media to produce expert visual renderings of the impact the turbines Atlantic Shores will have on the view from the beach in Holgate and Long Beach Township:



¹ Brigantine joins in full in the LBI Municipalities' June 29, 2023 public comment letter.

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Larger copies of these renderings are attached to this letter, and an animation of the view from Holgate is available at <https://vimeo.com/865989588/ed41118942>.²

These renderings were created using the most accurate geolocation data of the wind turbines available, as provided by the Bureau of Ocean Energy Management (BOEM). This data was incorporated into a 3D computer model and overlaid over photographs taken in Long Beach Township with a 50mm camera lens, and accurately represent what the human eye will see. Everything from the colors of the paint on the blades and foundations to the shadows from the sun were accurately modeled to the time and day the photographs were taken.

These renderings reflect that Atlantic Shores' visual impact study – as damning as it is in showing that the turbines will have a significant visual impact from the shore, as Atlantic Shores must concede – understate the impact. The turbines will dominate the view on peak beach days. Plethora of evidence included in the LBI Municipalities' initial submission demonstrates that turbines of this scale, this close to shore, will have severe impacts on tourists' willingness to continue to visit these beach communities, and have a resulting drastic negative economic impact on the LBI Municipalities. These impacts are inconsistent with DEP's Coastal Zone Management rules for the reasons detailed in the LBI Municipalities' initial submission, and DEP should decline to issue the consistency certification as a result.

² This rendering reflects the view from the beach between W McKinley Avenue and W Cleveland Avenue in Holgate.

The LBI Municipalities also wish to express their continuing substantial concerns with the other impacts of the proposed turbines identified in their initial comment letter, including the impacts on the fishing industry, in particular in Barnegat Light. DEP itself appears to have conceded there will be adverse impacts, and these impacts mean the Atlantic Shores' project cannot be found consistent with DEP's coastal zone management regulations.

Specifically, the LBI Municipalities have reviewed DEP's consistency certification issued in connection with the Empire Wind project, which is proposed to be constructed to the northeast of the Atlantic Shores project. In DEP's analysis accompanying that certification, it addressed and acknowledged that project's potential impacts to shellfish habitat, surf clam areas, and prime fishing areas. DEP also acknowledged the resulting negative impact the project would have on commercial and recreational fishing and ports along the New Jersey coast, including Barnegat Light, finding "[s]horeside impacts are certain if landings are impacted." Those impacts will be the same or greater for the Atlantic Shores project.

Moreover, DEP's own comments on the Draft Environmental Impact Statement ("DEIS") for the Atlantic Shores project acknowledged that this project as proposed will negatively impact benthic habitat, included the slough and sand ridge complex which "provide habitat for a variety of fish species and benthic infauna." Comment Ltr at 2. DEP's letter acknowledged that the impacts of the turbines on this habitat "would not be temporary," would alter sand waves that "may be many thousands of years old," that there is not yet scientific literature evaluating the impact of removing this habitat, and "[t]here is no clear evidence that the habitat created by turbine foundations provides similar ecosystem services." *Id.* A precautionary approach should be utilized in the absence of definitive science and, at a minimum, that DEP *should not* find the project consistent with its coastal policies until such studies have been performed to evaluate the impact of alteration of these habitats.³

DEP also acknowledged in its comments that it is not just the turbines, but also submarine cables that will cause adverse impacts to commercial fisheries. If the cables are not buried – or even if they are, as they will likely become exposed over time – fishing would be inhibited as commercial fishers would be unable to trawl in these areas without risking damage to the cables.

LBI's commercial fisheries rely upon these offshore habitats for fishing, trawling for flounder and other aquatic species, and for passing through to areas further offshore. Any disturbance – to the extent fishing boats are even able to access the areas at all – will cause likely negative impacts

³ The same is true for the impact of electromagnetic forces from cables on ocean species, as very few species have been evaluated for impacts, as well as the impact of turbines and noise from construction and operation on marine mammals including the North American Right Whale.

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on commercial fishers who rely on the area. Landings will thus indeed be impacted by the Atlantic Shores project, and the impact is too severe to be considered consistent with CAFRA and New Jersey's Coastal Zone Management regulations. As DEP acknowledges, New Jersey's fishing industry operates on "a very small profit margin." The experience of LBI's commercial fisheries has been that a fishing market takes decades to establish; if purchasers can no longer buy sufficient quantities of seafood from Barnegat Light and other New Jersey commercial fishing ports, they will go elsewhere and those business relationships will be lost, possibly forever. It is thus not enough to say that the impact will be temporary because the turbines will eventually be decommissioned – it will take decades beyond the decommissioning to attempt to rebuild those business relationships and to sell fishing catches so the industry can attempt to recover.⁴ In the meantime, the industry on LBI will be devastated, with connected negative impacts on the community and heritage dependent on this industry.

For these reasons, and for all of those expressed in the LBI Municipalities' initial public comment letter, we submit that the proposed Atlantic Shores project is inconsistent with DEP's coastal zone management regulations. DEP thus must decline to issue the consistency certification requested by Atlantic Shores.

Very truly yours,

/s/ Frank Huttle III

Frank Huttle III

cc: Michael S. Stein, Esq., mstein@pashmanstein.com
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Long Beach Township, Danielle La Valle, Municipal Clerk, dlavalle@longbeachtownship.com
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Harvey Cedars, Anna Grimste, Municipal Clerk, agrimste@harveycedars.org
Brigantine, Lynn Sweeney, City Clerk, lsweeney@brigantinebeachnj.com

⁴ Thus, to the extent Atlantic Shores were to propose a compensation program for impacted commercial fisheries, payment through decommissioning would be inadequate to fully compensate the losses that would be incurred if the turbines are constructed.

EXHIBIT D

Potential Economic Losses of Reduced Tourism Attributable to Proposed Wind Turbines in Long Beach Island, NJ

Prepared by:



Prepared for:



on behalf of Long Beach Township, N.J



Published March 2024



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Introduction Project Background

Atlantic Shores Offshore Wind, LLC (“Atlantic Shores”) is proposing two wind turbine projects spanning more than 100,000 acres of undeveloped ocean off the shores of Long Beach Island, NJ and would represent a visual disamenity that would generate negative impacts within the economies of the affected areas of coastal New Jersey. Existing research shows that these negative impacts include reduced tourism as a result of wind turbines being visible from beaches and shores.

Tourism Economics, an Oxford Economics Company, analyzed the potential reductions in tourism (and resulting reductions in tourism spending by visitors) in Long Beach Township, Beach Haven, Ship Bottom, Barnegat Light, Surf City, and Harvey Cedars, (“the LBI Municipalities”) in Ocean County. Although not included in the negative economic impacts included in this study, Tourism Economics anticipates that there would also be reductions in tourism and resulting negative economic impacts felt in Atlantic County, including in Brigantine and Ventnor City.

As part of the analysis, Tourism Economics took the following steps:

- Analyzed existing studies on visitor spending and tourism impacts in New Jersey, Ocean County, and the LBI Municipalities;
- Compiled existing research and studies on the effect of offshore wind power projects on recreational beach use in the United States and other destinations worldwide;
- Developed an economic impact model using IMPLAN data.

This document presents key elements of the research and findings. It is organized in the following sections:

1. Introduction
2. Executive summary
3. Direct impacts – Reduced visitation & visitor spending
4. Economic impact analysis
5. Methods and data sources

Tourism Economics reserves its right to supplement or amend this report based on any additional information that may come to its attention.

Executive Summary

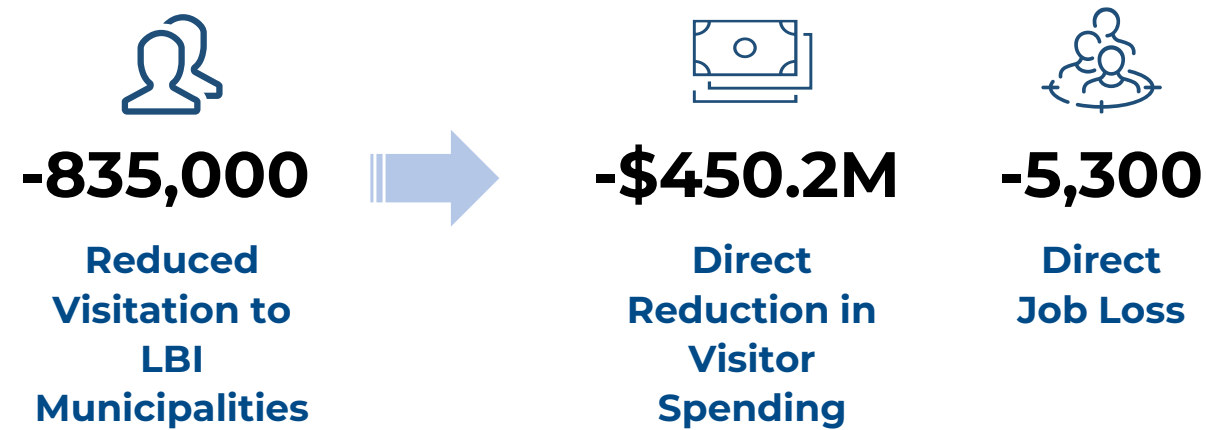
Negative Impacts of Proposed Wind Turbines

Reductions in Visitation and Visitor Spending

The proposed wind turbines would represent visual disamenities that would generate negative impacts within the economies of the affected areas of coastal New Jersey. Existing research shows that these negative impacts include reduced tourism as a result of wind turbines being visible from beaches and shores.

Tourism Economics estimates that the wind turbines will lead to a loss of 835,000 visitors to the LBI municipalities. The reduced visitation will generate a loss of \$450.2 million in reduced visitor spending with approximately 5,300 in lost jobs.

Summary Direct Economic Tourism Losses in LBI Municipalities



Tourism Economics reserves its right to supplement or amend this report based on any additional information that may come to its attention.

Total Economic Losses Attributable to Proposed Wind Turbines

The \$450.2 million in reduced visitor spending will generate \$668.2 million in total economic losses throughout Ocean County. The \$668.2 million in total economic losses will include approximately 6,700 total lost jobs and \$47.6 million in reduced state and local tax revenues.



Summary Economic Impacts of Reduced Tourism in LBI Municipalities



Direct Impacts

Literature Review

The proposed wind turbines would represent visual disamenities that would generate negative impacts within the economies of the affected areas of coastal New Jersey. Existing research shows that these negative impacts include reduced tourism as a result of wind turbines being visible from beaches and shores.

The various studies examined the effect of wind turbines (either proposed, hypothetical, or existing turbines) on tourism in locations throughout the U.S. and worldwide. As shown below, the estimated effects of wind turbines on existing visitation vary across the existing research. Landry et al. (2012) find relatively low visitation losses for turbine projects (11%), while other studies like Voltaire et al. (2017) and Lutzeyer et al. (2018) find visitation losses exceeding 50%.

Based on the range of estimated visitation losses in existing literature, Tourism Economics estimates that the potential negative effect of the proposed wind turbines will be a 25% loss of visitation to the LBI Municipalities, or a loss of 835,000 visitors.

Summary Literature Review Findings

Title	Authors	Year	Finding
The Effect of Offshore Wind Power Projects on Recreational Beach Use on the East Coast of the United States: Evidence from Contingent-Behavior Data	Parsons, P., Firestone, J., Yan, L., Toussaint, J.	2020	"29% report that they would seek out another beach or do something else (most seeking out another ocean beach). At 20-miles offshore only 10% of the respondents report that their experience would be made somewhat worse or worse and only 5% report changing trip plans."
The Impact Of Offshore Wind Farms On Beach Recreation Demand	Voltaire, L., Loureiro, M. L., Knudsen, C., & Nunes, P. A. L. D.	2017	"All scenarios combined, 51% of respondents state that they would not change their trip behaviour if an offshore wind farm was built at the beach where they were surveyed, 12.4% say they would visit the beach less, and 36.6% say they would take no trips at all."
The Effect of Wind Power Installations on Coastal Tourism	Lilley, J. Firestone & Kempton, W.	2010	"25% of the tourists would choose another beach if an offshore wind farm was installed 10km from the coast."
Wind Turbines and Coastal Recreation Demand	Landry, C., Allen, T., Cherry, T. & Whitehead, J.	2012	"Very low trip loss for wind power projects even as close at one-mile offshore (11%)"
The Amenity Costs Of Offshore Wind Farms: Evidence From a Choice Experiment	Sanja Lutzeyer, Daniel J. Phaneuf and Laura O. Taylor	2018	"Over 50 percent of those surveyed indicated they would not return to the same property for their next rental should a utility-scale wind farm be placed offshore"

Sources: as cited above

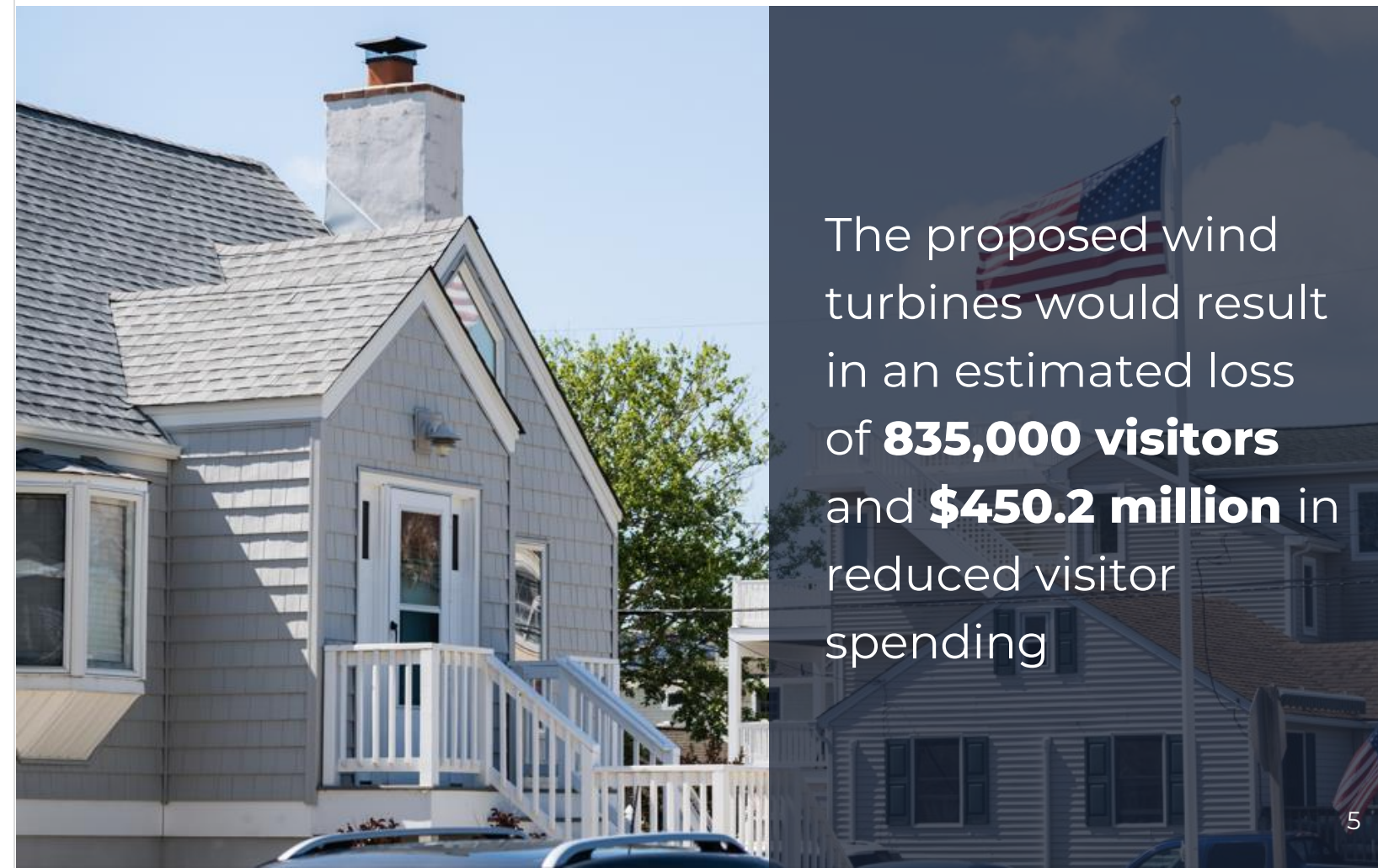
Reduced Visitation in the LBI Municipalities

Each year, Tourism Economics analyzes the impacts of the New Jersey visitor economy on behalf of VisitNJ. Based on Tourism Economics' latest report, "The New Jersey Visitor Economy 2022", Ocean County welcomed 10.3 million visitors and \$5.4 billion in total visitor spending in 2022. Tourism Economics estimates that the LBI Municipalities welcomed 3.3 million visitors and \$1.8 billion in visitor spending in 2022.

As previously stated, Tourism Economics estimates the proposed wind turbines will lead to a 25% loss in visitation to the LBI Municipalities. Based on Tourism Economics' estimates of visitation to the LBI municipalities in 2022, the 25% loss in visitation will translate to 835,000 visits.

 **-835,000 VISITS**

Estimated Visitation Losses Attributable to Proposed Wind Turbines in Long Beach Island, NJ



The proposed wind turbines would result in an estimated loss of **835,000 visitors** and **\$450.2 million** in reduced visitor spending

Reduced Visitor Spending in the LBI Municipalities

The loss of 835,000 visitors to the LBI municipalities attributable to the proposed wind turbines would result in \$450.2 million in reduced visitor spending. As shown below, the \$450.2 million in lost visitor spending would include \$162.4 million on lodging (including hotels, motels, and short-term rentals), \$131.2 million in food and drink purchases, \$95.2 million in retail purchases, \$38.3 million in entertainment and recreation purchases, and \$23.1 million on transportation (including ride shares, taxis, parking, gasoline, and ground transportation).

-\$450.2 MILLION

Reduced Visitor Spending Attributable to Proposed Wind Turbines

Hotels, motels, short-term rentals, other lodging -\$162.4M	Full-service restaurants, fast food, convenience stores -\$131.2M	Souvenirs, general merchandise, malls, and local retailers -\$95.2M	
Lodging	Food and beverage	Retail	
		Amusements, theaters, entertainment, other rec. -\$38.3M	Transportation -\$23.1M
		Recreation	Transport

Source: Tourism Economics



Economic Impacts Methodology

Tourism Economics estimated the economic impacts of reduced visitor spending (attributable to the proposed wind turbines) using regional Input-Output (I-O) model based on a customized IMPLAN (www.implan.com) models for the economy of Ocean County. IMPLAN is recognized as an industry standard in local-level I-O models.

An I-O model represents a profile of an economy by measuring the relationships among industries and consumers to track the flow of industry revenue to wages, profits, capital, taxes and suppliers. The supply chain is traced as dollars flow through the economy, representing indirect impacts. The model also calculates the induced impacts of spending. Induced impacts represent benefits to the economy as incomes earned as a result of direct spending are spent in the local economy, generating additional sales, jobs, taxes, and income.

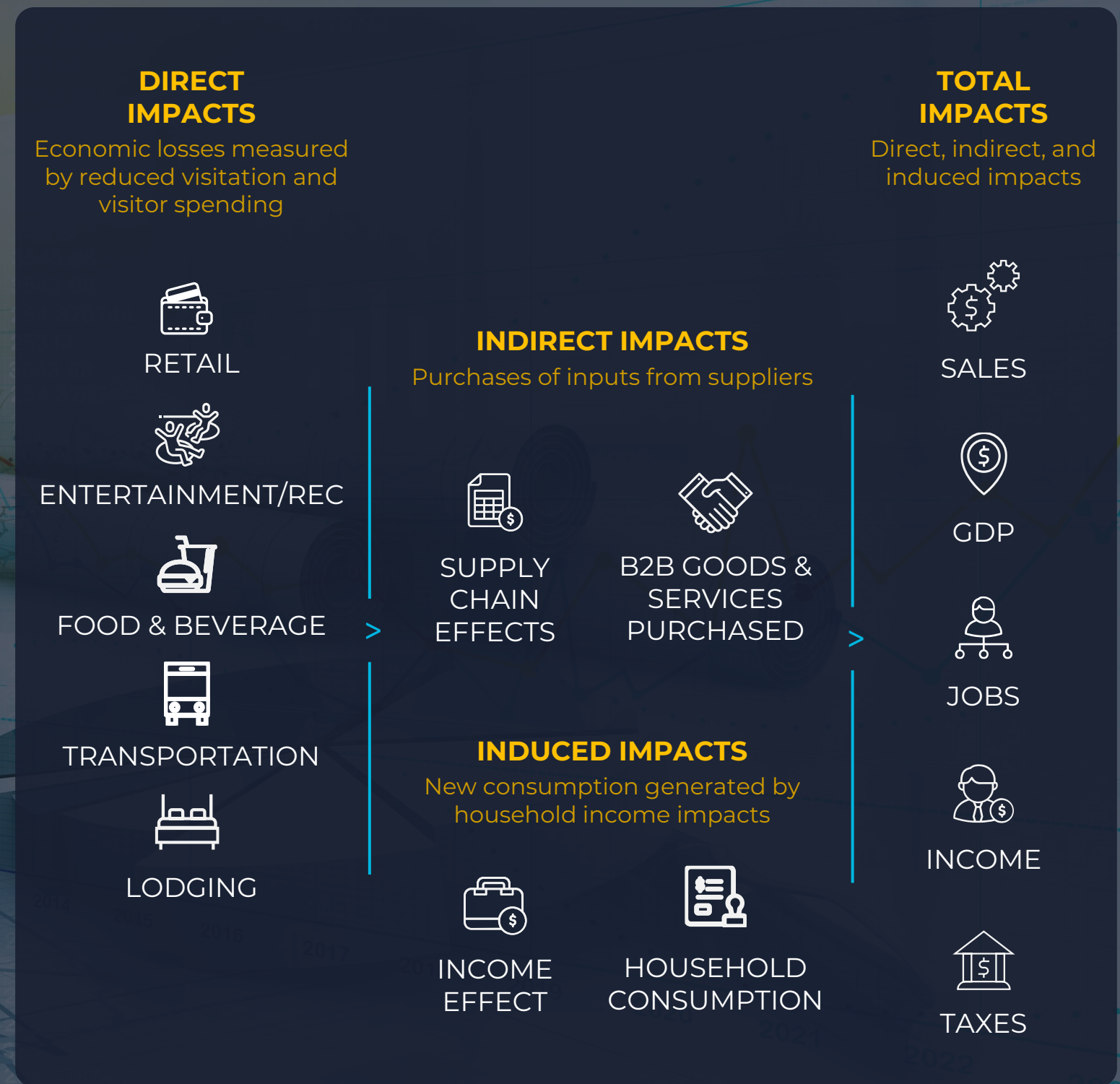
The modeling process begins with aligning the direct expenditure measurements with the related sectors in the model (e.g. hotels, restaurants, retail, and recreation). The model is then run to trace the flow of these expenditures through the economy. In this process, the inter-relationships between consumers and industries generate each level of impact.

IMPLAN calculates three levels of impact – direct, indirect, and induced – for a broad set of indicators.

These include the following:

- Business sales (also called gross output)
- Household income (including wages and benefits)
- Employment
- Federal taxes
- State and local taxes

ECONOMIC IMPACTS FRAMEWORK



Economic Impacts

Reduced Business Sales by Industry

The proposed wind turbines will generate an estimated \$668.2 million in reduced economic activity.

The \$450.2 million in reduced visitor spending will generate \$119.7 million in reduced indirect expenditures (purchases of inputs from suppliers) and \$98.3 million in reduced induced expenditures (consumption generated by household income impacts), resulting in a total economic loss of \$668.2 million in Ocean County.

The total economic impact (losses) of \$668.2 million in Ocean County will include \$169.5 million in total lost labor income and an associated job loss of 6,729 total full-time and part-time jobs.

Summary Economic Losses

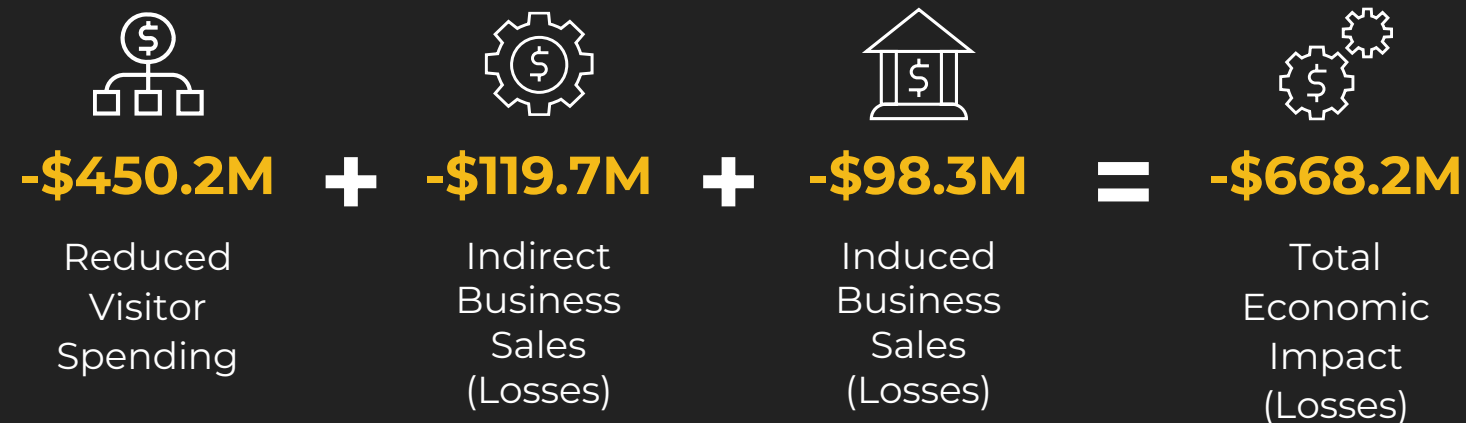
(\$ millions and number of full-time and part-time jobs)

	Direct Impacts	Indirect Impacts	Induced Impacts	Total Impacts
Reduced economic output (business sales)	\$450.2	\$119.7	\$98.3	\$668.2
Labor income losses	\$119.1	\$25.9	\$24.4	\$169.5
Job losses	5,339	749	642	6,729

Source: Tourism Economics

Note: totals may not sum due to rounding.

Summary Economic Impacts (Losses)



ECONOMIC IMPACTS (LOSSES)

REUCED BUSINESS SALES BY INDUSTRY (\$ MILLIONS)

	Direct Business Sales	Indirect Business Sales	Induced Business Sales	Total Business Sales
Total, all industries	\$450.2	\$119.7	\$98.3	\$668.2
By industry				
Lodging	\$162.4	\$0.0	\$0.0	\$162.4
Food & Beverage	\$131.2	\$10.2	\$7.3	\$148.7
Retail Trade	\$95.2	\$2.4	\$8.4	\$106.0
Finance, Insurance and Real Estate	\$0.0	\$33.1	\$33.7	\$66.9
Business Services	\$0.0	\$32.4	\$7.7	\$40.1
Recreation and Entertainment	\$38.3	\$0.7	\$1.1	\$40.1
Construction and Utilities	\$0.0	\$17.6	\$4.3	\$21.9
Education and Health Care	\$0.0	\$0.2	\$19.6	\$19.7
Gasoline Stations	\$17.3	\$0.1	\$0.6	\$18.0
Other Transport	\$5.8	\$3.0	\$1.7	\$10.5
Personal Services	\$0.0	\$2.9	\$6.2	\$9.1
Wholesale Trade	\$0.0	\$4.6	\$3.1	\$7.7
Communications	\$0.0	\$5.5	\$1.9	\$7.5
Government	\$0.0	\$3.8	\$1.4	\$5.2
Manufacturing	\$0.0	\$2.6	\$1.1	\$3.7
Agriculture, Fishing, Mining	\$0.0	\$0.4	\$0.1	\$0.5
Air Transport	\$0.0	\$0.0	\$0.1	\$0.1

Source: Tourism Economics

Note: totals may not sum due to rounding.

Economic Impacts Employment Losses by Industry

The proposed wind turbines will generate an estimated job loss of 6,729 part-time and full-time jobs.

Economic Impacts of Proposed Wind Turbines

Employment Losses by Industry (number of full-time and part-time jobs)

	Direct Employment	Indirect Employment	Induced Employment	Total Employment
Total, all industries	5,339	749	642	6,729
By industry				
Food & Beverage	2,036	147	94	2,277
Lodging	1,975	0	0	1,975
Retail Trade	715	21	79	815
Recreation and Entertainment	537	11	18	566
Business Services	0	232	57	289
Finance, Insurance and Real Estate	0	192	83	275
Education and Health Care	0	2	185	187
Other Transport	41	31	20	92
Personal Services	0	22	67	88
Gasoline Stations	35	1	5	41
Government	0	27	7	34
Construction and Utilities	0	24	8	31
Wholesale Trade	0	18	11	30
Communications	0	13	5	17
Manufacturing	0	6	1	8
Agriculture, Fishing, Mining	0	3	1	3
Air Transport	0	0	0	0

Source: Tourism Economics

Note: totals may not sum due to rounding.

Economic Impacts Labor Income Losses by Industry

The proposed wind turbines will generate an estimated \$169.5 million in reduced labor income.

Economic Impacts of Proposed Wind Turbines

Labor Income Losses by Industry (\$ millions)

	Direct Labor Income	Indirect Labor Income	Induced Labor Income	Total Labor Income
Total, all industries	\$119.1	\$25.9	\$24.4	\$169.5
By industry				
Food & Beverage	\$41.4	\$4.2	\$2.6	\$48.1
Lodging	\$47.5	\$0.0	\$0.0	\$47.5
Retail Trade	\$13.0	\$0.7	\$2.5	\$16.1
Recreation and Entertainment	\$14.5	\$0.2	\$0.3	\$15.0
Business Services	\$0.0	\$9.7	\$2.4	\$12.1
Education and Health Care	\$0.0	\$0.1	\$9.6	\$9.7
Finance, Insurance and Real Estate	\$0.0	\$2.2	\$1.7	\$3.9
Personal Services	\$0.0	\$1.0	\$2.4	\$3.4
Government	\$0.0	\$2.6	\$0.6	\$3.3
Other Transport	\$1.8	\$0.9	\$0.5	\$3.1
Construction and Utilities	\$0.0	\$2.4	\$0.6	\$3.0
Wholesale Trade	\$0.0	\$1.1	\$0.7	\$1.7
Gasoline Stations	\$1.0	\$0.0	\$0.1	\$1.1
Communications	\$0.0	\$0.5	\$0.2	\$0.8
Manufacturing	\$0.0	\$0.4	\$0.1	\$0.4
Agriculture, Fishing, Mining	\$0.0	\$0.0	\$0.0	\$0.0
Air Transport	\$0.0	\$0.0	\$0.0	\$0.0

Source: Tourism Economics

Note: totals may not sum due to rounding.

Fiscal Impacts

Tax Generation

The proposed wind turbines will generate an estimated \$80.3 million in reduced state and local tax revenues.

The reduced economic activity attributable to visitation losses to the LBI Municipalities will generate \$145.3 million in reduced federal and state and local tax revenues.

Total reduced federal tax revenues will amount to \$65.0 million, while total reduced state and local taxes will amount to \$80.3 million. Reduced state and local tax revenues will include \$22.5 million in reduced sales tax revenue, \$7.1 million in reduced personal income tax revenue, \$2.5 million in reduced corporate taxes, \$2.8 million in reduced excise and fees, and \$44.8 million in reduced property tax revenues.

FISCAL IMPACTS

LOST TAX REVENUES (\$ MILLIONS)

	Direct Taxes	Indirect & Induced Taxes	Total Taxes
Total Taxes	\$57.7	\$87.6	\$145.3
Federal	\$24.9	\$40.0	\$65.0
Personal income	\$12.4	\$18.2	\$30.6
Corporate	\$1.2	\$2.1	\$3.3
Social insurance	\$9.9	\$17.7	\$27.6
State and Local	\$32.7	\$47.6	\$80.3
Sales	\$9.2	\$13.3	\$22.5
Personal income	\$2.9	\$4.2	\$7.1
Corporate	\$0.9	\$1.6	\$2.5
Excise and fees	\$1.2	\$1.7	\$2.8
Property	\$18.3	\$26.4	\$44.8

Source: Tourism Economics

Note: totals may not sum due to rounding.

Methods and Data Sources

Glossary – Economic Impact Definitions

Term	Description
Direct Impact	Impacts (business sales, jobs, income, and taxes) created directly from spending by visitors to a destination within a discreet group of tourism-related sectors (e.g. recreation, transportation, lodging).
Indirect Impact	Impacts created from purchase of goods and services used as inputs (e.g. food wholesalers, utilities, business services) into production by the directly affected tourism-related sectors (i.e. economic effects stemming from business-to-business purchases in the supply chain).
Induced Impact	Impacts created from spending in the local economy by employees whose wages are generated either directly or indirectly by visitor spending.
Employment	Jobs directly and indirectly supported by visitor activity (includes part-time and seasonal work). One job is defined as one person working at least one hour per week for fifty weeks during the calendar year.
Labor income	Income (wages, salaries, proprietor income and benefits) supported by visitor spending.
Local Taxes	City and County taxes generated by visitor spending. This includes any local sales, income, bed, usage fees, licenses and other revenues streams of local governmental authorities – from transportation to sanitation to general government.
State Taxes	State tax revenues generated by visitor spending. This will include sales, income, corporate, usage fees and other assessments of state governments.

IMPLAN Economic Impact Model

An IMPLAN model was compiled for Ocean County, NJ. This traces the flow of visitor-related expenditures through the local economy and their effects on employment, wages, and taxes. IMPLAN also quantifies the indirect (supplier) and induced (income) impacts of tourism. Tourism Economics then cross-checks these findings with employment and wage data for each sector to ensure the findings are within reasonable ranges.

About the Research Team



Oxford Economics was founded in 1981 as a commercial venture with Oxford University's business college to provide economic forecasting and modelling to UK companies and financial institutions expanding abroad. Since then, we have become one of the world's foremost independent global advisory firms, providing reports, forecasts and analytical tools on 200 countries, 100 industrial sectors and over 3,000 cities. Our best-of-class global economic and industry models and analytical tools give us an unparalleled ability to forecast external market trends and assess their economic, social and business impact.

Oxford Economics is an adviser to corporate, financial and government decision-makers and thought leaders. Our worldwide client base comprises over 2,000 international organizations, including leading multinational companies and financial institutions; key government bodies and trade associations; and top universities, consultancies, and think tanks.

This study was conducted by the Tourism Economics group within Oxford Economics. Tourism Economics combines an understanding of traveler dynamics with rigorous economics in order to answer the most important questions facing destinations, investors, and strategic planners. By combining quantitative methods with industry knowledge, Tourism Economics designs custom market strategies, destination recovery plans, forecasting models, policy analysis, and economic impact studies.

Oxford Economics employs 400 full-time staff, including 250 professional economists and analysts. Headquartered in Oxford, England, with regional centers in London, New York, and Singapore, Oxford Economics has offices across the globe in Belfast, Chicago, Dubai, Miami, Milan, Paris, Philadelphia, San Francisco, and Washington DC.

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