The Offshore Wind Farm Round-Up

Number 1 May 9, 2022

The Offshore Wind Farm Round-Up endeavors to periodically provide a review of recent research efforts in which the effects of offshore wind farms have been studied. Like its predecessor — the popular FAQ produced by a coalition of researchers and writers last updated October 2021 — the Round-Up points you in the direction of the science and assumes no point of view one way or the other regarding the presence of offshore wind farms off our shore. Read and draw your own conclusions.

This Round-Up edition includes links related to the

- effect of noise on marine life
- cost of electricity
- impact of turbines on the Cold Pool
- Rutgers study on the visibility of the wind turbines
- lawsuit filed against Bureau of Ocean Energy Management ("BOEM")

The next Round-UP also offers links to a variety of information sources, including studies about right whales and migratory birds, more about visibility and information about the turbines that will be used in the first build-out area of Atlantic Shore's leased area.

NOISE IMPACT: "How loud is the underwater noise from operating offshore wind turbines?" published in *The Journal of the Acoustical Society of America*, November 2020.[1]

Access the full article by clicking on this link:
https://asa.scitation.org/doi/10.1121/10.0002453

HIGHLIGHTS:

- Past research cited in this article found that underwater noise radiating from individual wind turbines is low compared to the noise radiating from cargo ships; this current study concludes that is still the case, despite turbines now being larger and more measurements being available.
- The combined source level of a large wind farm is smaller or comparable to that of a large cargo ship.

[1] **Authors:** Jakob Tougaard, Professor & Senior Researcher, Department of Ecoscience – Marine Mammal Research, Aarhus University; Line Hermannsen Ph.D in Marine Bioacoustics, Aarhus University; Peter T. Madsen, Professor Department of Biology – Zoophysiology, Aarhus University. The university is located in Aarhus, Denmark.

- However, the cumulative contribution to the soundscape from multiple turbines within a wind farm and the fact that wind farms occupy larger and larger fractions of coastal and shelf waters means that their combined contribution of noise cannot be ignored.
- The contribution from wind turbines can, in particular, be expected to be significant in areas with low natural ambient noise and with low levels of ship traffic, possibly large enough to raise concern for negative effects on species of fish and marine mammals.

COST OF ELECTRICITY: "Offshore Wind Procurement Options for Delaware" prepared by the Special Initiative of Offshore Wind ("SIOW") at the University of Delaware for the State of Delaware[2]. Published February 2022 and updated in early April 2022.

The peer-reviewed research compares the cost of electricity from offshore wind to the cost of traditional power sources. The report further assesses the health and carbon costs of offshore wind in comparison to those traditional power sources.

Access the full report by clicking on this link: https://sites.udel.edu/ceoe-siow/files/2022/04/DE-OSWProcurement-SIOW-27Feb2022-3.pdf

HIGHLIGHTS:

- Offshore wind contracts across five US states were analyzed. Lower prices for electric power result from more recent projects, turbines of 10 MW or larger, projects of at least 800 MW in size and from bid evaluations that prioritize least cost.
- The study concluded that today's US offshore wind power prices fall within the range of wholesale power being purchased for the state of Delaware now.
- The Federal government now provides financial cost guidance for health and climate change damage. When added to the market costs of both offshore wind power and today's conventional power, the result shows that offshore wind power is less than 1⁄2 the total social cost of Delaware's electricity today.

COLD POOL IMPACT: "Could federal wind farms influence continental shelf oceanography and alter associated ecological processes? A literature review" -- a report issued by the Science

[2] **Authors** (all at the University of Delaware): Willett Kempton, Professor, School of Marine Science & Policy; Amy Bosteels, Marine Policy; and Kris Ohleth, Director, SIOW, an independent project at the University of Delaware's College of Earth, Ocean and Environment that supports the advancement of offshore wind as part of a comprehensive solution to the most pressing energy problems facing the United States.

Center for Marine Fisheries, Rutgers School of Environmental and Biological Sciences, December 1, 2020[3]

Access the report by clicking this link: https://scemfis.org/wp-content/uploads/2021/01/ColdPoolReview.pdf

HIGHLIGHTS:

- The scale of the impact of current and future wind farms has caused concern about whether these installations have the potential to alter the unique and delicate oceanographic conditions along the expansive Atlantic continental shelf. This region is characterized by a strong seasonal stratification [or layering] that forms on top of cold bottom water, known as the "Cold Pool."
- Strong seasonal stratification [layering] traps very cold water above the ocean bottom, which sustains marine life whose range extends farther south than would be anticipated based on latitude alone. This area includes the most lucrative shellfish fisheries in the U.S.
- Changes in stratification through vertical mixing of water in this seasonally dynamic system could have important consequences in Cold Pool set-up and break-down, a process fundamental to the high fishery productivity of the region.
- While still limited, there is an increasing body of research focused on the several, specific factors that influence ocean mixing and which, in turn, effect the stratification that is a key characteristic of the Cold Pool.
- The majority of research to date on offshore wind turbine effects on ocean mixing, however, was carried out in, or simulated to represent, coastal waters around Northern Europe. It is important to recognize that the oceanographic conditions specific to these European study sites differ in many important ways compared to that of the Mid Atlantic Bight Cold Pool.
- Generally, continental shelf waters in Northern Europe are less layered seasonally and have stronger tidal currents (and higher turbulence) than those of the Mid Atlantic Bight. Thus, results from the European studies characterizing potential impacts of offshore wind facilities on stratification are more representative of what we might expect during the relatively weaker stratified time periods in spring and fall (during Cold Pool set up and breakdown, respectively).
- During the highly stratified summer months, previous results suggest it is less likely that the wind turbines will cause mixing sufficient to overpower the strong stratification that is present during those times.

[3] **Authors** (all from Rutgers University): Travis Miles, Assistant Research Professor in the Rutgers University Ocean For Observing Leadership ("RUCOOL"). From the Department of Marine & Coastal Science: Sarah Murphy, Graduate Student: Josh Kohut, Professor; Sarah Borsetti, Graduate Student; Daphne Munroe, Associate Professor

- The potential for these multiple wind energy locations to alter oceanographic processes and the biological systems that rely on them is possible; however, a great deal of uncertainty remains about the nature and scale of these interactions.

VISIBILITY OF THE TURBINES FROM SHORE: There has been much discussion about how visible the turbines will be from LBI. Links to two studies are included below. In future Round-Up issues, visibility of the wind turbines at night will be addressed.

1) One of the most mentioned studies in these discussions is the Rutgers visibility study, which was produced by the Center of Observing Ocean Leadership at Rutgers School of Environmental & Biological Sciences. Commissioned and paid for by Atlantic Shores Offshore Wind LLC, the study's official title is "Initial Visibility Modeling Study for Offshore Wind for New Jersey's Atlantic Shores Offshore Wind Project."[4]

Access the Rutgers study by clicking on this link:
https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Appendix-II-M1-Visual-Impact-Assessment.pdf

NOTE: It is a pain in the neck to find this study, but here is a way to find it quicker than if you were just flailing around: When you click on the link above, it will bring you to the first page of Appendix II-M1[5] on the website of the Bureau of Ocean Energy Management ("BOEM"). The Rutgers study is Attachment H, the last eleven pages of this very long Appendix.

When you see page one of this Appendix, find the vertical scroll bar on the extreme right of your computer screen. Click on that, hold it down and drag it to the very bottom of your screen and then arrow up (or however you jump up pages) to go back eleven pages to the beginning of the Rutgers report.

2) Next is a more recent study specifically focused for the Atlantic Shores project prepared by Environmental Design & Research, Landscape Architecture, Engineering & Environmental Services, D.P.C. ("EDR")[6] The report was updated March 2022.

Access the EDR report by clicking on this link:

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[4] Authors: Joseph F. Brodie, Ph.D. Marine Studies University of Delaware & Offshore Research Lead Rutgers Center for Ocean Observing Leadership;("RUCOOL"); Brian P. Frei, RUCOOL

[5] The Rutgers study is part of the Construction and Operations Plan ("COP") submitted to the Bureau of Ocean Energy Management ("BOEM") by Atlantic Shores. That is why when you click on the link, you end up on the BOEM website where the COP is available for public scrutiny. The COP has numerous appendices attached to it, including Appendix II – M1 Visual Impact Assessment (VIA) – Wind Turbine Area, where you arrive when you click the link.

[6] "Technical Report: Visual Impact Assessment -- Wind Turbine Area Atlantic Shores Offshore Wind OCS-A 0499" Individual authors are uncredited. EDR's website is https://www.edrdpc.com/

https://www.boem.gov/sites/default/files/documents/renewable-energy/state-activities/Appendix-II-M1-Visual-Impact-Assessment_0.pdf

SECTION 3.2.3 OF THE EDR STUDY DESCRIBES THE CONCLUSIONS FROM THE RUTGERS STUDY, which are summarized below. **Note that the Rutgers report *does not* specifically reference the leased area east of LBI.** In this study, predictive models were used to determine visibility using past meteorological data from the Atlantic City International Airport and the Ocean City Municipal Airport.

HIGHLIGHTS:

- The degree of turbine visibility depends on a number of factors, including humidity and temperature differences between the air and ocean surface, which causes haziness to occur more frequently offshore.
- The percentage of daylight hours with a calculated visibility of 10 or more miles is 41%, based on past meteorological studies. Said another way, during 59% of daylight hours in a given year, it is anticipated that all, or the vast majority, of the wind turbines would not be visible from the shore.
- Based on the results of the Rutgers study, the first row of the wind turbines would be visible approximately 50% of the year, the first two rows, 40% of the year and portions of the nearest four rows could be visible 25% of the year during daylight hours.
- The mitigating effects of atmospheric conditions could serve to reduce the potential visual impacts during significant portions of the year and, during these low visibility periods, would most likely eliminate visibility entirely from most onshore locations.
- The average visibility in April, May and June ranged from 2.5 miles to 10 miles at the Atlantic City Airport.
- The average visibility in July and August ranged from 5 to 12 miles at the same location.
- The yearly, monthly and summer average visibility each share a trend of increasing visibility from the morning to late afternoon. This is consistent with warmer temperatures during the day lowering the relative humidity and causing higher visibility.

LAWSUIT FILED On January 10, 2022, a lawsuit was filed by Save Long Beach Island, known locally as the LBI Coalition of Wind Without Impact https://www.savelbi.org/

A succinct summary of the lawsuit is provided by Gina G. Scala in her February 2022 article in *The Sandpaper*[7]:

> "In its suit, the coalition cited BOEM's [Bureau of Ocean Energy Management] failure to comply with the National Environmental Policy Act and the U.S. Endangered Species Act during its selection process for turbine placement.

[7] "Wind Turbine Lawsuit Gains Ground as Officials Take Stand," *The Sandpaper*, February 16, 2022

> The lawsuit contends the selection of the larger 'wind energy areas' within which turbines are to be placed should have been preceded and supported by a structural regional environmental impact statement (EIS) process with full public input, something the borough has called for in the past," Harvey Cedars Mayor Jonathan Oldham wrote in his Feb. 1 letter to Department of the Interior Secretary Deb Haaland."

Access the full article by clicking on this link:
https://www.thesandpaper.net/articles/atlantic-shores-offshore-wind-scores-new-york-bight-lease-area/

You may need to have a subscription to *The Sandpaper* to access the article. The Long Beach Island Library on Central Avenue in Surf City also has one copy of the February 16th issue that you may borrow to read in the library.

This Round-Up was prepared by a group of writers and researchers from Long Beach Island, New Jersey. Round-Ups are distributed by the Joint Council of Taxpayers Associations of LBI (JCTA) to the voting representatives of its eleven member organizations, who may choose to distribute this information to the members of their individual taxpayers associations via newsletters, websites and social media.

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